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Editorial

Greetings and a warm welcome to our very first issue of Farmers Review Africa! We couldn't be more excited to have made it to this point.

FARMERS REVIEW AFRICA published by Mailing Times media, is Africa’s premier farming magazine, which provides updates of news and analysis on topical issues of national and international importance in agriculture. It is a publication which links the technology applied in the Agricultural sector to the field experience of professionals in this area. The magazine is committed to advancing the interests of the region’s farmers and its agricultural industry by serving as a mouthpiece for the industry and by keeping its readers informed of the latest developments in the agricultural sector.

Besides being a source of valuable industry information, Farmers Review Africa has provided networking and learning opportunities through prime conferences and business meet-ups. For instance the recent, Agricultural Investment Funds Conference.

Nutrition has become one of the buzz words of the year, like resilience, and landscapes. What they have in common is that they refer to complex situations with political forces competing over the backs of rural and urban communities. The nutrition challenge is clear – with a billion hungry people on this planet and another two billion overweight – it is time to act. Persistent hunger and malnutrition are inexcusable in a world of plenty. But the crucial question is: who should act and how?

In this issue we explore the global and local context of today’s efforts to address hunger and malnutrition. And we take a fresh look at how family farmers and consumers take the initiative in their hands, regenerating food cultures, revitalising and rejuvenating mixed farming systems, and using political spaces to call for a different, rights-based approach to food and nutrition.

It cannot be emphasised enough: women are the strongest drivers of better nutrition. It is they who most directly link production to consumption. They take most of the key decisions on what to grow or raise and how. They are responsible for cooking and processing food, for sharing it in the family, and especially for feeding the children whose adequate nutrition is crucial for their future.

Several articles in this issue show the different innovations in the agricultural sector, which have the potential to expand yields, increase efficiencies, reduce waste and address concerns about toxicity, safety and the environment.

The FARMERS REVIEW MAGAZINE is a worthy read, a great meet-up in print and a proven investment window.
The winner of the 5th annual Social Innovation Awards is a Low-cost insect production unit for animal feed by Khepri Biosciences.

Owner of Khepri Biosciences, Bandile Dlabantu from the Eastern Cape, was last week awarded a prize of R1.2-million for the commercialisation of the invention, a cost-effective waste management method for food producers and abattoirs. The container unit is able to process organic waste onsite using fly larvae, with a 40% reduction of the waste products. The larvae are converted into low cost animal feed protein.

Judges said the insect production unit would assist local emerging farmers, particularly chicken farmers, reduce their feed bills. “It offers a replacement which is equally as nutritious as fish meal and is more sustainable,” says Bridgit Evans, SAB Foundation Manager.

The winning innovation was cost effective, sustainable and replicable, and would have a significant impact on social problems, particularly for people in rural areas, the judging panel said.

“While all of this year’s entrants were of such an extremely high standard that for the first time ever, all 14 finalists were given some kind of seed funding, what made Bandile’s project stand out was his out-grower scheme which allows for increased job opportunities through partnerships with rural communities in running small scale fly farms,” says Evans.

“The prize from the SAB Foundation allows us to commission the first six mobile fly farms for our pilot facility a Chamdor abattoir that will process 100% of the waste produced by the abattoir daily,” said Dlabantu. “This site would employ 10 people permanently and three part-time allowing us the opportunity to raise the funding that will build a plant with a capacity to take 60% of the organic waste in Gauteng and produce 100 000 tons of animal feed protein in five years’ time.”

Gradesmatch, an innovative system designed to enhance the way in which high school learners interact with higher learning institution and bursars in South Africa, was awarded the second place grant of R600 000. The innovation matches learners’ high school marks with the institution entrance requirements. Gradesmatch breaks down the student’s results by subject, showing them how to improve or alternative paths to follow best suited to their strengths, whilst also providing career information.

Third place winner Lakheni, which gives low income families access to discounted food items, won a R400 000 grant. Lakheni provides poorly resourced crèches with a stable income stream that will enable them to deliver better services and be better equipped to nourish young children.

Developmental grants of R250 000 each were awarded to:

Subz Washable Sanitary Pads – A sustainable, washable, eco-friendly, reusable sanitary pad and panty that is easy to use and wash that allows girls freedom to go to school with dignity to get the education they deserve.

Manufacturing of external maxillofacial prostheses – A new way to make external maxillofacial prosthesis using Additive Manufacturing technology to benefit people suffering from facial deformities caused by accidents or cancer. There is a backlog of patients requiring prosthesis and very few skilled technologists using traditional methods of prosthesis fabrication.

Mobile career planning platform - The TshedzaApp uses technology to positively impact on education in South Africa. It mimics the conversation that young people have with a career counsellor, from finding careers that are suitable for them to knowing which subjects to select in high school, courses to study and which universities, and cuts out the classical expensive and time consuming face to face and brick and mortar counsellor-led career planning.

Seed grants of R100 000 were awarded to eight more projects, namely: SnappBox, Genie Lamp, The Lumkani early warning fire detection system, briGado. Abomakgereza (Recycling Hustlers), Specialised Deliveries, Lady Liberty and Eggmobile Social Project.

All winners receive their grant funding in tranches determined by their growth plan to commercialise and upscale the service and product.

“The prize money for all categories was increased this year because we want the award to have an impact and inflation has taken its toll over the years. SAB believes that investing in the country’s entrepreneurs will help to grow SA’s economy. Each year we look for innovations which address social challenges and assist our intended beneficiaries – women, youth, people with disabilities and people living in rural areas,” said Evans.

The SAB Social Innovation Awards has to date invested R20 million in 63 innovations which are geared at benefiting the SAB Foundation’s core beneficiaries.
Packaging solutions for agricultural produce

The largest losses from farm to plate are attributed to poor handling, distribution, storage, and purchase/consumption behavior. Huge resources that could otherwise be spent on more productive activities go into producing and transporting goods that only go to waste. Losses at almost every stage of the food chain may be reduced by using appropriate packaging.

The food packaging industry sector of developing countries derives its strength from the large volume of agricultural production, the steady growth in food commodities and the continually increasing food demand fuelled by rising incomes. Packaging is an essential part of a long-term incremental development process to reduce losses, that will have to employ a blend of technologies and processes. The global food packaging industry has a lot to contribute not only in addressing food losses but also in ensuring food safety as well as enhancing global food trade, which is a key to economic development of varying economies.

As for the type of end product, packaging manufacturing has globally the greatest share of the total industry (81%), followed by the packaging service (14%) then by packaging machinery (5%). Packaging machinery is equipment for uses such as canning; container cleaning, filling, and forming; bagging, packing, unpacking, bottling, sealing and placing of lid; inspection and check weighing; wrapping, shrink film and heat sealing; case forming, labelling and encoding; palletizing and depalletizing, and related uses. The trend to consume more creates a demand that drives producers to offer products in ready-to-go and prolonged shelf-life packages to induce volume purchase. Meal preparation takes time and with the advent of double income households, where women are also preoccupied with activities outside of the home or men are expected to share in food preparation chores, food that comes in easy-to-open and resealable packages is extremely popular.

If there is an industry sector that is equally, if not more dynamic than the food sector, it is none other than the packaging industry. It is undergoing transformation almost every day with new technologies, better than before, taking the place of old ones (Packaging Trend-The Future Outlook, 2010). In today’s high-tech world, an increasing number of companies are seeking to upgrade their products and systems using smart solutions.

M pact: Packaging for profit

Returnable Transit Packaging revolutionizes the supply chain.

One of the biggest packaging influences over the last decade has been the impact of Returnable Transit Packaging (RTP) within the fresh produce industry. Led by Atlantis-based M pact Plastic Containers, with a sister plant in Brits, these polypropylene bins, crates and boxes can offer greater durability, better hygiene, less maintenance, improved product protection, optimal cooling conditions and better long-term logistical performance than their wooden or carton cousins.

These long lasting and environmentally friendly crates stack efficiently to maximize outward load capacity and then nest for the return journey to minimize space. But RTP also brings another element to the retail stable, appearance! These sturdy, bright, attractive products operate from farm to shop floor, eliminating the need for repacking in the retail space. This reduces product damage and time spent. When empty, they can simply be shipped back to their point of origin for cleaning and the entire cycle starts again!

Jumbo Bins

One of M pact Plastic Containers most successful products has been the Jumbo

Innovative packaging

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Bin, which has made steady inroads into the South African agricultural market over the past 10 years and is considered by many to be the world's best quality bulk bin. This economical, high quality product offers the following advantages: Smooth interior surfaces reduce waste and downgrades; Superior inbuilt ventilation reduces cooling time and saves energy; Clean, non-porous surfaces; Eliminates HACCP problems associated with wood; Weighs 45% less than wooden bins for quicker, safer handling and stacking; Positive interlocking foot design for quicker, safer handling and stacking; Can be stacked up to eight units high; Compatible with most bin handling equipment; One-piece moulding eliminates maintenance and there are Various sizes in offer.

Mpact Plastic Containers also offers a range of other products including drying racks, Agrilug, stack crates, chicken coops, Supanest, Stack/Nest and prop trays. These are available throughout South Africa and are manufactured with local conditions in mind. The company has a passion by innovation and has an established track record in the development of game-changing products that are seen as benchmarks in the industry.

In line with Mpact Plastic Containers commitment to environmental responsibility, both production facilities are ISO14001 and ISO 9001 accredited and there is a close liaison with the Mpact Recycling Division, which recycles bulk paper and plastics.

**Acorn Paper**

**Sustainable and Eco Friendly Packaging: Our Green Commitment**

Acorn Paper is an industry leader in the Green movement, based on their strong commitment to initiatives related to environmental issues, and is actively engaged in the process of expanding our already extensive and diverse product lines with the latest biodegradable and eco friendly packaging products.

Acorn’s corrugated box production and design have evolved as the movement to produce products that are more environmentally friendly has occurred. The company sought to reduce the amount of materials used in the production of corrugated boxes. Using high performance liner board is now possible, with a corresponding significant overall reduction in paper basis weight, which results in a significant source reduction of raw materials.

**H.B. Fuller**

**Agricultural Packaging Solutions Help Bring Fresh Produce from Farm to Store Shelf**

It's a long and complicated journey from farm to store shelf. The right packaging helps to reduce waste, minimize returned goods claims and deliver fresh foods to consumers, who often choose stores based on the quality of their produce.

H.B. Fuller is committed to providing innovative answers to the challenges our customers face.

Vegetable packaging. Corrugated fiberboard is one of the most common types of vegetable packaging because it’s versatile, cost-effective and recyclable, and it lends itself to retail-ready designs. Flexible packaging is another format that continues to grow in popularity thanks to convenience for consumers as well as reduced material costs and increased shelf life for brand owners.

Fruit packaging. Fruit is especially delicate because it tends to age and spoil quickly. However the aging of fruit can be slowed by as much as 800 percent when packaging and temperatures are optimal. Clamshell and flexible packaging are two of the most popular varieties of fruit packaging, each providing plenty of perforations for ventilation.

Dairy packaging. Dairy packaging must meet specific standards to ensure its contents remain safe during transport and while on shelves. It also must be able to withstand cold temperatures and moisture, block out visible and UV rays and maintain a clean well-branded look. Consumers expect BPA-free and sustainable materials in their dairy packaging.

Past innovations have led to positive changes not only in the packaging materials and technology, but also in culture. Today’s manufacturers seek packaging options that not only offer the necessary protection to ensure that the product arrives at its final destination intact, but that also provides a cost-effective solution that has minimal impact on the environment.

**Contributors**

1. Mpact

**November - December 2015**

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Returnable Transit Packaging
The modern way to move agricultural produce

Mpact Plastic Containers
Smarter, sustainable solutions

Chicken Coop
Three part design - easily assembled.
Fits 12 live birds. All parts replaceable.
Reduces bird mortality when in transit.

Mpact Plastic Containers have adopted a modern and sustainable approach to fresh produce packaging. We offer a huge range of multi-trip, reusable containers that are durable, hygienic and logistically efficient while offering unmatched product protection.

Stacking Crate
Durable, multi-purpose stacking crate.
Four hand grip system.
Compatible with European pallet sizes.
Solid or vented sides with solid base.

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**Stack and Nest Containers**
Meet the requirements of multiple industries. Available in various sizes with multiple stacking and nesting configurations.

- **95mm stacking**
- **115mm nesting**
- **38.8 L capacity**
- **1.76 kg weight**

**Agricultural Lug**
Specifically designed for the food industry. Stable stacking up to 6 units high. Hygienic, manufactured from food grade material.

- **45mm stacking**
- **43 L capacity**
- **1.62 kg weight**

**Supanest Containers**
Swivel bars facilitate stacking and nesting. Smooth interior protects produce. Compatible with dolly system and pallets.

- **45mm stacking**
- **187mm nesting**
- **28 L capacity**
- **1.6 kg weight**

**R.T.P.**
A cost effective alternative that's friendly to the environment.

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Hygienic and easy to clean, suitable for drying fruit and confectionery.

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+27 21 573 9400
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Chemicals that make plants defend themselves could replace pesticides

Pesticides are used around the world to control insects that destroy crops. However, in recent years their use has been criticized, because of the detrimental effect they can have on ecosystems, ravaging food chains and damaging the environment. One of the problems with many pesticides is that they kill indiscriminately.

The extensive application of chemical insecticides not only causes severe environmental and farm produce pollution but also damages the ecosystem. Chemical triggers that make plants defend themselves against insects could replace pesticides, causing less damage to the environment.

For rice plants, this means pesticides kill the natural enemies of one of their biggest pests, the white-backed planthopper Sogatella furcifera. This pest attacks rice, leading to yellowing or “hopper burn,” which causes the plants to wilt and can damage the grains. It also transmits a virus disease called, southern rice black-streaked dwarf virus, which stunts the plants’ growth and stops them from “heading,” which is when pollination occurs.

Left untreated, many of the insects’ eggs would be eaten, but when pesticides are used these hatch, leading to even more insects on the plants. What’s more, in some areas as many as a third of the planthoppers are resistant to pesticides.

Biology has long promised to usher in new solutions to help protect rice plants from infestation, though activist groups are as opposed to biology as they are chemistry. Regardless, progress continues and since plants have natural self-defense mechanisms that kick in when they are infested with pests like the planthopper, switching on that defense mechanism using chemicals that are not toxic to the insects or their natural enemies is a key topic. Plants have natural self-defense mechanisms that kick in when they are infested with pests like the planthopper. This defense mechanism can be switched on using chemicals that do not harm the environment and are not toxic to the insects or their natural enemies.
Agricultural health and safety

With high numbers and rates of fatal injury, agriculture, forestry and fishing is the riskiest industry sector. In the last ten years, almost one person a week has been killed as a direct result of agricultural work. Many more have been seriously injured or made ill by their work.

Farming is a hazardous industry. Farmers and farm workers work with potentially dangerous machinery, vehicles, chemicals, livestock, at height or near pits and silos. They are exposed to the effects of bad weather, noise and dust. The risks also include family members working at the farm and children living at the farm.

Agricultural work can also be physically demanding and the repetitive nature of the work causes a range of health problems, including severe back pain.

People have a right to return home from work safe and sound. Good farmers and employers recognise the benefits of reducing incidents and ill health among their workers, and are aware of the financial and other reasons to aim for and maintain good standards of health and safety.

Health and safety is a fundamental requirement of a sustainable farming business and should be regarded as an essential part of farm business management. Unwise risk-taking is an underlying problem in the industry and those working on their own are especially vulnerable.

The personal costs of injury and ill health can be devastating. Life is never the same again for family members left behind after a work-related death, or for those looking after someone with a long-term illness or serious injury caused by their work.

Managing risks in a sensible way protects you, your family, your workers and your business and can bring the following benefits:

- a reduction in injuries and ill health and the resulting financial and personal costs;
- improved productivity, good morale and a happier, healthier workforce;
- better farming practice to help develop a sustainable farming business;
- the ability to carry out weather-critical operations at the right time;
- reduced sickness payments and recruitment/training costs for replacement workers;
- reduced loss of output resulting from experienced and competent workers being off work;
- longer life for equipment and machinery;
- less chance of damage to machinery, buildings and product;
- lower insurance premiums and legal costs;
- less chance of enforcement action and its costs, eg the cost of dealing with an incident and/or fines;
- reduced risk of damage to the reputation of the business.
The key ingredient for healthy soils and healthy crops is soil organic matter. But it has been neglected in recent decades. How could we have forgotten about it? And what is needed to bring it back in the fields and on political agendas?

Before the 1940s, organic matter was a key theme at international soil conferences. There exists a decade –old wealth of knowledge about organic matter. But things changed after the Second World War. Organic matter became neglected, and not by accident. The process of artificially producing nitrogen was originally developed for the explosives industry, but then the resulting chemical was also used for fertilizer. The impact on maize yields was so dramatic that researchers and policy makers became convinced that chemical fertilizer could solve global hunger.

With this new emphasis on chemical fertilizers, world renowned researchers working on soil organic matter were systematically neglected. Scientific journals were no longer interested in publishing their research, and they were no longer invited to international conferences. Subsequently, the importance of soil organic matter also dropped off agricultural curricula and from policy, extension and investment agendas.

Under the influence of the economic and political power of the chemical industry new crop varieties and production methods that required large quantities of fertilizer were promoted. Slowly then, this belief, pushed by industry, narrowed the view of researchers, education, policy makers and extension staff and became the norm. Chemical fertilizers were so much easier to apply a few bags of fertilizers than the bulky organic matter that also demanded mixed farming.

With the use of chemical fertilizers and new varieties, crop yields first increased in some parts of the world. But now, many farmers are experiencing diminishing returns. They need to apply more and more (expensive) fertilizer each season. This is largely due to the loss of soil organic matter and loss of its capacity to retain water and nutrients. Pollution from excess nutrients and eroded soil particles entering waterways are additional long-term consequences of this historical mismanagement.

And, was hunger eliminated, or even reduced, in the process? The total food production per capita increased, but there are more hungry and malnourished people today than ever in the history of humanity.

With the globalisation of our food systems, we are also confronting a growing global imbalance. Nutrients are mined from the soil in one part of the world, and exported in the form of crops to other parts, leading to problems on both sides.

It is high time that we revive soils with practices that increase organic matter and do not demand ever increasing amounts of non-renewable resources. Farmers have worked with others to develop successful agroecological strategies using fallows, cover crops, green manures, mulch, and the incorporation of crop residues and compost into their living soils.

To restore our soils, we must overcome a range of obstacles, from local shortages of biomass to lost knowledge and oversimplified systems. We must build on and learn from farmers and their existing agroecological practices.

Soil organic matter is made up of a wide variety of living and dead plant and animal material. In agriculture, this can range from leaf mulch to manure and compost. Often called ‘black gold’, it is a basic building block of soil life that supports plants to grow and thrive. It is important in several ways, mainly by enhancing soil life and increasing the water and nutrient holding capacity.
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ARC National Beef Cattle Improvement Herd Of The Year 2015

BreedPlan’s S.A Stud Breeder Of The Year
Improving pasture productivity & quality

Do your pastures “run out” in July or August so you have to start feeding more in the barn? Is your pastures weedy, short or full of plants, the animals won’t eat? Many of these problems are caused by over-grazing damage.

Pastures, just like hay fields, need to have time to regrow after each time they are grazed (or mowed). Pasture plants need time to rest and re-grow leaves and roots. This gives them time to replenish energy stored in roots (by photosynthesis). Leaving the animals in the same pasture or returning them to a pasture before it is fully re-grown does not give the plants time to recover.

Repeated grazing, without adequate time for plants to re-grow, results in plants that weaken, may stop growing and die. These weakened plants will not be able to compete with weed species, and won’t be able to hold the soil as well, resulting in bare soil and erosion. Some grasses and clovers will survive by staying very short, never growing tall enough for livestock to easily graze, while other areas in the pasture will be rejected by livestock, soon growing up into weeds, brush or small trees.

Many producers are looking for ways to improve their pasture yields. The good news is that there are several things that can be done.

You can improve pasture fertility. You could plant improved forage varieties. You can manage the grazing of a pasture by removing the livestock before the grazed plants regrow.

Beef producers: Follow these steps to improve pasture productivity

For a long time, many cattle ranchers considered beef production and they are busy focusing on their cows, and the grass supporting those cattle is often overlooked. But over the last couple of years, that thinking has begun to change.

Due to research and greater industry awareness, more cattle owners and managers are realizing the value of producing abundant grass and using their cattle to harvest this important crop.

Making your pastures work harder takes a systems approach that includes grazing management, balanced fertility levels, adequate weed control and control of other pests that can hurt grass production. Manage all those things well and you’ll achieve the result you’re looking for: increased grass production.

How you maintain good grazing condition in your pasture
has a lot to do with your grazing management plan and stocking rate. For example, when pasture is in excellent grazing condition, it may only take three acres to feed one cow per month. However, when the same pasture condition is poor, every cow will need 15 acres.

To avoid poor conditions, you'll want to initiate a grazing management plan that includes several key steps:

1. Maintain the appropriate stocking rate. Determine the right number of cattle to keep your pasture in good to excellent condition.
2. Monitor grazing. Depending on the size of the pasture, erect a few 10- by 10-foot enclosures that protect grass from cows in various areas. Monitor the grazing around these areas at regular intervals, daily to weekly, depending on the size of the pasture and the number of cattle. When the grass outside an enclosure has been grazed down 50 percent, it’s time to move the cattle to another pasture and let that pasture recover.
3. Record pasture condition over time. One way to do this is to drive a steel post into the ground, then take photos in all four directions away from the post. Each year go back to the post and take a set of pictures. Then, as the years progress, compare the photos to see if you’re maintaining the grass system or starting to see encroachment or establishment of increaser plants or other undesirable plants.
4. Modify grazing patterns. If there are areas where cows aren’t grazing, encourage them to use those spots with mineral blocks or water tanks.
5. Adjust the stocking rate as needed. If your pasture needs recovery time, you may need to lease additional pasture land or reduce cattle numbers for the long-term good of your operation. While these are not easy decisions to make, they are sometimes necessary.

The condition of your pasture depends on the care you provide. By taking the time to manage your acres properly from the beginning, you’ll reap long-term benefits for years to come.
Boom times - sprayers that cover more ground

The "explosive" development in sprayer technology will continue to accelerate over the next few years. Spraying is big business, so getting it right from the get-go is a crucial part in any cropping management program. Demand is up for high-capacity, self-propelled sprayers. All of the major sprayer manufacturers report a sharp rise in sales, with growers accounting for the bulk of the growth.

There are many factors that drive the trend, for instance, larger farm sizes are prominent nowadays. Growers today must cover more ground in the same amount of time due to rapid farm consolidation. Stopping to refill on chemicals takes time, so farmers are upgrading to bigger tanks to lengthen fill intervals.

Secondly factor is the timeliness of application. The list of products, farmers needs to apply has gotten long in recent years, and each product has its own application window. Farmers today have to control for bugs, worms, weeds and diseases, so there are just so many trips to make.

Cutting-edge features
Growers who upgrade to these big rigs benefit not only from larger tanks, but also the premium high-tech features and comforts that come along with them. Here are just a few of the technologies being offered:

- Five-way nozzle bodies (vs. single-nozzle bodies)
- Factory-installed autosteer
- RTK correction for sub-inch positioning accuracy
- Automatic boom section shutoff to save on inputs
- Automatic boom height control
- Camera systems to monitor activity
- Variable-rate technology (VRT) with individual nozzle control for prescription applications
- Continuously variable transmission (CVT), featured for the first time by AGCO
- Telemetry systems that allow for fleet management, vehicle diagnostics, and wireless data transfer between field and office

Boom sprays reliability
As farmers strive to increase the efficiency of their operations, every gain in time, improvement in spray efficacy or saving in reduced wastage makes an impact on the bottom line. The vertical stability of a boom directly influences spraying accuracy. An unstable boom which dips too close to the ground will leave unsprayed strips as the nozzles get too close to the ground, losing their overlap.

A boom which vibrates up and down will lead to over and under-application of product. In addition, the boom and nozzles may be damaged through the repeated ground strike. The damage can run into tens of thousands of dollars if targeted spraying modules such as Weedseekers or Weedits are fitted to the boom.
Running a boom high in the air to avoid damage from ground-strike is no solution either, as this can lead to excessive spray drift and wasted chemical. Nozzle choice and spray pressure also affect drift, but a boom which can be run safely at half a metre above the ground, is an excellent starting point. Vertical stability is influenced by the sprayer’s wheel suspension, boom construction and mast suspension (where the boom is attached to the sprayer). Dampening systems such as shock absorbers or hydraulic accumulators are used to bring boom vibrations under control, and are particular to the design.

Roll stability, where the boom rotates vertically around its centre, is just as important as the ability to control vibration. A boom which has poor roll stability will pitch one boom tip into the ground while the other tip rises high into the air. This often occurs when turning or making steering corrections, and is worse at higher speeds. The implications for a boom with poor roll stability are the same as for poor vertical stability, with poor spray accuracy and boom damage the likely result. For a controlled traffic farmer, roll stability is less important than vertical stability, as the machine operates in straight lines and is rarely turned at spraying speed.

New sprayers are up to the task with features that can fit any size operation and help make spraying more efficient.

These sprayers offer an array of features that should make it easy for farmers to find a model that best fits their needs. Although pull-type sprayers still tend to be more economical, self-propelled sprayers are growing in popularity. If farmers continue to increase their number of corn acres, they may rethink their sprayer choices.

Smart boom

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Water drainage - manage your water table

Drainage boosts yield and impacts field operations, soil characteristics and soil health. Especially in a wet year, or in an average year with a month of wet weather, we can see the detrimental effects of excess water on yield maps, whether the crop is wheat, soybeans or corn.

Think of drainage as controlling seasonal high water tables, Ferrie says. When soil gets saturated during the growing season, it is very hard on a crop. The roots need oxygen to drive cell respiration. In saturated soils, without oxygen, plant growth ceases.

If the soil stays saturated long enough, plants die. If saturation occurs intermittently, perhaps two days at a time, throughout the growing season, it lowers the crop’s yield potential, and there’s no way to recover it. If soil is only saturated for even one week, at the wrong time, it triggers many problems.

Besides root growth, oxygen is important for soil health (and healthy soil produces higher yielding crops). Most of the soil microbes that play a big role in soil health are aerobic, or oxygen-breathing.

In summary, when you lower seasonally high water tables, oxygen enters the soil, roots are able to flourish and soil is healthier. Beneficial microbes thrive, mineralizing nutrients locked up in the soil and making them available to plants and you produce more yield.

Moreso consider the impact of wet soil not just on planting efficiency, but also on crop growth through the entire season. When a field is too wet to plant and you have to pull out and move to another area, efficiency suffers, you have to choose between planting late or working wet fields to dry them out.

Installing drainage also pays off in more efficient fertilizer use, because the drained soil is better aerated, micro-organisms release more nutrients and less nitrogen is lost through denitrification.

Drainage can be such so that water and soil sediments are channeled and collected in sediment ponds/basins/ditches, where collected water can be saved for future use during periods of dry weather or the collected soil sediments returned back to the farm.

Agricultural drainage improvements can be made on either the soil surface, the subsurface, or a combination of both. Surface drainage is designed to remove standing water from the soil surface. It affects the water table by reducing the volume of water entering the soil profile.
This type of drainage includes land leveling and smoothing; the construction of surface water inlets to subsurface drains; and the construction of shallow ditches and grass waterways, which empty into open ditches and streams. Subsurface drainage is designed to remove excess water from the soil profile. The water table level is controlled through a series of drainage pipes (tile or tubing) that are installed below the soil surface, usually just below the root zone. Subsurface drainage pipes are typically installed at a depth of 30 to 40 inches, and at a spacing of 20 to 80 feet. The subsurface drainage network generally outlets to an open ditch or stream. For the same amount of treated acreage, subsurface drainage improvements are generally more expensive than surface drainage improvements.

An important distinction must be made between improving drainage of land presently in agricultural production and converting additional wetlands. Present agricultural trends are toward intensive use of existing cropland, with much of the emphasis on new management technologies. Maintaining and improving existing drainage and associated yields on wet agricultural soils presently in production minimizes the economic need for landowners to convert wetlands. This encourages a new emphasis on protecting existing wetlands and establishing new wetland areas, while maintaining our highly productive agricultural lands. Factors determining the most efficient drainage system design for a particular property include soil type, land configuration, amount and pattern of rainfall, and types of crops to be grown. Soils of high sand or silt content are generally suited to subsurface drainage, while soils of high clay content generally require surface systems.
For most of history, people were experts on food preservation because their lives depended on it. Around the turn of the twentieth century, electric refrigeration enabled people to transport food longer distances, sell it in modern supermarkets, and keep it cool at home. As a result, most of us never learned the low-tech food preservation skills once passed down in every culture.

For gardeners or those looking to eat more local foods, it is worth relearning some of those skills – especially winter food storage, the oldest and easiest method. Many fall crops can be safely stored and eaten over the winter months without the use of fancy canning equipment.

Our ancestors built root cellars, underground structures that kept food at a consistently cold temperature year round. Depending on individual needs, it may be worth building a root cellar or another type of food storage system if you don’t have ideal conditions to store winter crops. But before you start digging or building, it’s important to assess whether the chosen dwelling – probably a garage, shed, basement, cellar, or unheated room – already provides the ideal conditions for storing some food.

Pumpkins and Winter Squash
Choose squash varieties that store well, such as buttercup or blue hubbard, and retain a three-inch stem. Cure homegrown varieties in a warm, sunny, ventilated place for one week. Then store the squash in ventilated boxes at 50 to 55 degrees and around 75 percent humidity. Garages and basements are often suitable. It’s better to store squash on a shelf rather than on a cold concrete floor. Depending on the variety, winter squash can keep for two to six months. Store them away from apples.

Onions, Garlic, and Shallots
Choose good keeper varieties, such as Copra onions and Purple Stripe or Ajo Rojo garlic. First cure homegrown varieties by spreading them on newspaper in a sunny, well-ventilated spot for one to three weeks until they’re dried out. Then store them in baskets, mesh bags, or paper bags punched with holes, in a cool, dry, well-ventilated place such as an attic, basement, or unheated room. They can keep for six to ten months. Store them away from potatoes, and never store in a refrigerator or in plastic.

Potatoes
Use late-variety crops, such as russet or Kennebec, for storage. Cure homegrown varieties by spreading them on newspaper and placing them in a dark place at 45 to 60 degrees for 10 to 14 days. The skins will thicken and toughen up. For storage, place them in cloth-covered baskets or ventilated boxes with a sheet of newspaper between each layer and on top. Keep them in a dark place.
Many fall crops can be safely stored and eaten over the winter months without the use of fancy canning equipment.

that stays around 40 degrees with moderate humidity, such as the top shelf in a cellar or basement room. They can keep for five to eight months. Store away from onions and apples.

**Dried Shell Beans**
Harvest the pods when they’re dry on the vines and the beans rattle in the shell. Shell, sort, and store in dry, airtight containers in a cool, dry place (Mason jars work well). They can keep for one year or longer.

**Apples**
Choose late-season apples, such as Fuji, Winesap, or Granny Smith, for storage. Individually wrap each apple in paper and store in boxes or baskets lined with plastic with ventilation holes or foil to help retain moisture. Ideally, apples should be kept at 32 degrees; some varieties will keep for up to six months at that temperature. If storing apples in a refrigerator, create moisture by storing them in damp bags with ventilation holes. Apples should be stored away from many crops because they produce an ethylene gas that can harm other vegetables.

**Pears**
Choose winter pears, like D’Anjou or Winter Nellis. Pick the fruit when it’s still slightly immature, and cure at 40 to 50 degrees for a week. Then store in ventilated cardboard boxes in a place that will remain around 30 to 32 degrees. This could be an unheated shed, garage, or basement as long as the temperature never goes below 30 or above 45. If using a refrigerator, store in damp plastic bags with ventilation holes. Before eating, ripen pears by leaving them at room temperature for one week.

**Root Vegetables**
Root vegetables are either easy or tricky to store, depending on the climate. They need near-freezing conditions and high humidity. Where I live in western Oregon, the winters rarely go below freezing and the ground stays moist (to say the least), so I leave my carrots in the ground and harvest them all winter. I could do the same with parsnips, beets, turnips, rutabaga, storage radishes, and celeriac. If the temperature goes below freezing but stays above 10 degrees, mulch root vegetables with 6 to 18 inches of straw and leave them in the ground. Beware of rodents, though, who may be attracted to the straw and will happily munch on the produce.

**Celery and Cabbage**
Like root vegetables, celery and cabbage can be left in the ground and harvested through the winter in mild climates. In colder climates, harvest cabbage before the first hard freeze when it is still slightly immature, and remove the outer leaves. Store in ventilated plastic bags in a refrigerator or packed in damp sand, sawdust, or sphagnum moss. Celery should be lifted out of the garden with its roots intact before the first hard freeze and transplanted into containers of damp sand. Keep both crops as close to 32 degrees as possible. They can keep up to four months and may be better stored away from other crops.
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Women are the backbone of the development of rural and national economies. They comprise 43% of the world’s agricultural labor force, which rises to 70% in some countries. In Africa, 80% of the agricultural production comes from small farmers, who are mostly rural women. Women comprise the largest percentage of the workforce in the agricultural sector, but do not have access and control over all land and productive resources. During the last ten years, many African countries have adopted new land laws in order to strengthen women’s land ownership rights. This has helped improve the situation of rural women.

Women guarantee livelihoods, especially in rural areas. As a result of their great efforts in agricultural production, women’s production helps to guarantee their self-sustenance.

Agriculture is the main alternative for Rural Women, and it should come with better access to land and resources for the prevention, adaptation and mitigation of climate change, combined with rural women learning how to deal with cultural resistance and adapting to various manifestations of this phenomenon. Realizing the importance of rural women in agriculture is an important aspect of gender relations. In many countries, the role of women in agriculture is considered just to be a "help" and not an important economic contribution to agricultural production. It is a fact that rural women guarantee increases in food production. This is not, however, sufficient to meet future needs.

It is true that agricultural activities should lead to rural women increasing their income. Mere financial support is, however, not sufficient.

The adoption of measures that facilitate the transition to a type of agriculture that respects the environment and contributes to the conservation of natural resources that benefit women is, in particular, necessary. The training of rural women is very important, especially with the adoption of modern agricultural techniques that are tailored to local conditions and that use natural resources in a sustainable manner, with a view to achieving economic development without degrading the environment.

Giving support to rural women is a way of breaking the vicious cycle that leads to rural poverty and to the expansion of slums in the cities, where the poor get poorer. Development strategies should consider rural women as the epicenter, paying special attention to their social skills both within and without agriculture sector. Rural women - instead of being treated as mere beneficiaries - should, in other words, be viewed as experts who possess knowledge which complement experts’ formal knowledge. In order to contribute to an increase in the levels of production and productivity, it is necessary to provide support to those women’s organizations and farmers who promote new conceptual and development programs and who contribute to the implementation of new ideas by women with a view to diversifying income-generating activities and the provision of other services in rural areas.

It is extremely important to recognize the role that rural women play and the contribution that they make in networks and cooperatives, giving them greater political and financial support and involving them in the training and conducting of development programs that enhance women’s role in agricultural production.

It is a fact that rural women guarantee increases in food production.
Women forging change

Women showing the way with agroecology

Around the world, women forge change in their communities using agroecological approaches. Yet, surprisingly little has been written about this subject. This issue of Farming Matters shows how women can transform a situation of exclusion, crisis and social vulnerability, into a positive spiral of innovation, solidarity, and personal growth.

Edith van Walsum

Many innovations led by women are based on agroecological principles such as increasing diversity, using fewer pesticides, or building new relationships with consumers. Through small experiments women learn, get organised and strengthen their autonomy. They gain increasing recognition and visibility in their communities and increase their self-esteem. This positive spiral can culminate into much larger processes of emancipation at the regional, national or even international level. This issue of Farming Matters, dedicated to women farmers and agricultural workers, shows a variety of experiences, each of them inspiring in their own way. Women's struggles are about much more than maximising the yield of rice, maize or beans- they are about creativity, dignity and autonomy, and the well-being of their communities.

A brief historical perspective

Long before the term 'agroecology' became popular, and much longer before the term 'climate smart agriculture' was coined, women and men farmers around the world were practicing agroecological principles. Women were not only doing most of the work in family farming, they were also highly knowledgeable and skilful in their work. Whereas men tended to have the broad overview of their farm, women kept expert knowledge about the selection and storage of seeds; multi-cropping systems of grains, tubers, beans and vegetables; the food and medicinal value of wild plants; and the raising of small animals. Since the 1970s, scientists, development agencies, NGOs and policymakers have been paying increasing attention to the roles of women in agriculture. But globally, female farmers still receive only 5% of all extension services while they do 75% of the work in agriculture and produce 75% of the world’s food. Rural women's major stumbling block continues to be their lack of access to and control over land as we learn from an interview with four powerful women's rights activists from Asia and Africa. According to IFAD, women only own around 2% of all titled land worldwide. Increasingly, farmer access to seeds is also endangered, which is especially problematic for women. If the world is serious about addressing gender inequality, it is important that we continue to address such deeper political and cultural issues.

One family different path

A general assumption is that if only women knew more about new crops and technologies their productivity would increase up to 20–30 percent (FAO). The risk of this thinking is that it suggests that women only have to catch up with men to produce more. Several authors in this issue of Farming Matters present a different, more complex picture where women do not automatically strive to follow men's strategies, but choose their own pathway in agriculture and in life. While men tend to invest most of their time and energy in crops for sale, women differentiate risk by mixing food crops that have different growth periods and purposes. The case of women farmers in Kenya (see box) illustrates this well. There are a continuous choices made in each farm family. We often see men strive for higher yields, more income and integration into regional or global markets, promoted by agricultural policies and regulations, education and extension. At the same time, women work towards maintaining a buffer against all sorts of risk, providing nutritious food, securing a home base for the family, a healthy family labour force and maintaining biodiversity. Many families strive to reconcile these different needs, but this does not always happen without tension and conflict. So, rather than asking ourselves how can women be integrated into industrial agriculture...
and global value chains, we should ask women farmers what type of agriculture they want, and why.

Why women choose an agroecological path
From the articles in this issue, various reasons emerge that explain why women choose agroecology and become drivers of change.

1. Women's agro-eco-logic: Agroecological practices are normally inexpensive, simple and effective; there is a minimal dependence on external inputs. The yields may be higher but can also be lower than those in conventional agriculture. What counts more for women is the total benefit they derive: enough diverse and healthy food to feed the family, a decent net income, fodder to feed the animals, and improved soil health. This becomes clear from the work of peasant women in Mozambique.

2. Creativity and innovation: Beyond just being a common sense approach to agriculture, agroecology is a more rewarding way of farming. Women emphasise that agroecological practices open space for creative change in the production system, while fostering solidarity and increasing productivity. This can be seen in the story from Malaysia. Similarly, experiences in the Himalayas (page 38) show that in harsh circumstances of climate stress and male outmigration, women use their creative skills to drive positive change through agroecological innovation.

3. Gender logic and a body logic: The System of Rice Intensification, a set of practices rooted in agroecological principles, benefits women. It has led to a significant reduction in drudgery and improvement in the wellbeing of women rice farmers who earlier used to stand for long hours in dirty muddy water to transplant the rice. Such benefits are rarely reported; yet, they are likely to be crucial factors explaining the spreading of SRI so far and for further spread in future. This challenges the assumption that agroecology generally increases women's workload, and that women are not interested in agroecology as a result.

4. Living in harmony with nature: For women, choosing the agroecological path is ultimately a choice for autonomy. Women explicitly choose to follow a pathway with nature, not against it. In Spain, women farmers point at 'life' as the central aspect of their feminist approaches to agroecology that have transformed the food system of the city. Women’s proximity to nature is neither romantic nor ideological, it just is.

5. From communities to movements: Women fight for their autonomy, yet, at the same time they are committed to living and working in harmony with their family and the community. Agroecology brings these worlds together. Experiences in Brazil and Colombia show how women become drivers of peaceful agroecological change in situations of conflict.

New opportunities
Policies at all levels can support women in reinforcing their agroecological strategies. Sabrina Naisa Masinjila identifies three key areas which we wholeheartedly support: Ensuring that women farmers remain at the centre of localised seed production systems; supporting farmer-led extensions networks; and ensuring access to land.

At the global level there are various opportunities to ensure the adoption of such policies. To name a few: the 2014 International Year of Family Farming has put the role of women in family farming firmly on the political agenda and an IYFF+10 process must ensure this translates into concrete commitments to support rural women. The International Declaration on Agroecology drafted by global social movements recognized that women provide a principal social base of agro-ecology. This was presented at three regional seminars on agroecology organised by FAO in 2015 and needs to be followed up by governments in 2016. Finally, the Sustainable Development Goals, recently launched by the United Nations, explicitly state the need to transform our food systems and to invest in critical agents of change, including rural women. Now is the time to utilise these and other policy arenas to implement grassroots policy proposals based on a wealth of practical experiences with women-led agro-ecology.

Women keep the farm and family going in times or crisis. Women hold the future and agroecology can help them get there.
few pieces of machinery are more important to a grain grower than a seeding bar and cart, or air seeder. Depth of seeding, row width, seeding and fertiliser rates all play a key role in the successful germination of a crop and the air seeder is a vital part of the equation when it comes to getting your crop off to a good start.

Air seeders are used primarily for seeding small grains and soybeans, but have the potential to plant corn as well. Air seeders can handle bulk quantities of seed and fertilizer and are well adapted to planting large acreages very efficiently. Seed distribution in the row is generally less uniform for air seeders than with corn planters with finger pickup or vacuum seed distribution systems.

While the air seeder is without doubt one of the workhorses of modern grain farming, subject to thousands of hectares of till, the modern versions are not only robust, but highly accurate and intricate bits of gear. On the surface, it’s a large bin, or several bins, with a bunch of hoses, a few fans, some metering gear and wheels. But there’s a whole lot of technology and engineering which goes into an air seeder to make sure it can cope with everything from canola and lupins to mono ammonium phosphate. Its job is to accurately measure and deliver a particular amount of product from the cart to the seeding bar and be able to continue to do that.

Some of the air seeder technology is tried and tested and has not changed much over the years, for example, the metering systems. But some aspects of the air seeder are all about change - and progress. Control panels and screens are now far more common on air seeders in a similar trend to tractors with guidance and telemetry equipment. And safety is also much higher up the priority list.

Air seeder carts are a significant investment for any cropping enterprise, so making the right decision for your business is crucial, and that’s a decision which can only be made by understanding everything involved. Buying an air seeder is a major purchase, especially if it involves the air cart and seeding bar. Grain growers and primary producers can expect to part with the big bucks. Which means making sure you have the right cart for the job is paramount.

Some of the things you need to consider when purchasing an air seeder.

**Calibration**

Calibrating the seeder is critical to ensure the right rate of seed and fertiliser is applied and it’s a job which simply cannot be overlooked if you are serious about getting a good application. Whatever the calibration method, make sure you have a thorough understanding of the process before purchase.
Monitoring
Hand-in-hand with calibration is the monitor or control panel. If the air seeder comes standard with a display monitor, which many do now, have a play and make sure it’s easy to use. Navigate the various functions and pay close attention to menu structures, the way information is displayed, how robust the monitor is and how easily it can be seen (which includes adjustment for brightness and contrast). Just because a machine comes with a monitor does not necessarily mean it is automatically much easier to use. Having said that, modern monitors have come along in leaps and bounds compared with even five or so years ago and they are generally easy to navigate and install in a tractor cabin.

Wheels and Tyres
With the increase in size of many of the modern air carts (upwards of 17,000L capacity), attention should be paid to the tyres, in particular the load rating. Also pay close attention to the bracketing and mounting of wheels, including caster wheels as they can be a weak point in the design.

Safety
Close attention needs to be paid to rails, walkways and ladders. Getting to the top of bins can be quite a trek in some cases and being up 2–3m means sure footing and plenty to grab on to is a must. Also make sure it’s easy and safe to open and close bin lids and to operate the auger if there is one present. Again, ask to have these aspects of the air cart demonstrated.

Another safety aspect is hitching, which can be an issue depending on whether it’s a tow-behind or tow-between design. Hitching needs to be safe and simple, no matter what the set up. Build quality Finally, take particular note of the finish and potential for rust and wear points to deteriorate over time. Poor quality finishing, even in the paint work, can lead to premature rusting and wear. Other key areas to note are drive shafts and sprockets.
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Finding a way out of the maize

Recurring drought and crop failure in many parts of the world have led to food and nutrition insecurity, and a dependence on food aid. But recently, some farmers in Kenya have been developing their own sustainable way to secure enough nutritious food along with extra income so that they can send their children to school. Traditional drought tolerant, nutritious crops such as cassava, sorghum and millet that were losing popularity due to a surge in maize production are again becoming commonplace, with reliable harvests improving diets and income.

Mary Mwendwa

The dryness of the soil in Mutunga's farm shows that it has not rained for a long time in Mutomo district in eastern Kenya. "The last time I had a good maize harvest was in 2003," says Mutunga. He is amongst a growing group of farmers in the area who are diversifying their crops as a way of dealing with the changing climate that is putting their lives at risk. But this has also had other benefits, including a greater nutritional diversity.

The coming of maize
Following colonialism, maize gradually became a staple in the Kenyan diet, replacing traditional crops such as sorghum and millet. Nutritional repercussions from this dietary shift were significant, as maize alone does not provide a balanced diet in terms of proteins, vitamins and minerals. Sorghums and millet are rich sources of B-complex vitamins, and cassava is a source of calcium and vitamin C, as well as a major provider of calories. "People here were used to planting maize, but harvests have failed more and more, and so they have turned to drought tolerant crops such as sorghum, millet, cowpeas and cassava," says Benedict Mathitu, an extensionist. These crops are not new. In fact, they used to be highly valued but we have forgotten about them. Neglected by people and science, they are also sometimes called 'orphan crops'. Musenya Joseph, one of Mutunga's neighbours' explains, "These crops were planted by our ancestors a long time ago, but we abandoned them. Now that things have turned bad on us in terms of the harsh climate, we are going back to these crops as they can withstand drought. We have seen the benefits and no doubt this is our best option for now."
Spreading risk
The average annual rainfall in Mutomo district is 300-600 mm and it is one of the poorest parts of Kenya. Farmers find it difficult to invest in planting anything that is not drought tolerant, and they need to spread their risk and also plant as many different crops as possible. Intercropping sorghum, millet and cowpea with cassava and maize is one way of doing this. Cassava is suited to areas where rainfall is uncertain. A well-established cassava plant can resist drought by shedding its leaves, and resuming growth only when the rain starts. Similarly, sorghum and millet are relatively easy to maintain. They are less susceptible to pests and diseases, and when harvested and stored in a dry place, they can be kept for long periods.

The benefits of returning to orphan crops are foremost felt in farmers’ bellies. Even though the main motivations for returning to these traditional or neglected species was to guarantee a harvest even in drought years, moving from maize to cassava, sorghum and millet has had profound implications in terms of nutrition. Anastancia Musenya, whose farm is dotted with cassava plants says, “Cassava is our saviour in this hunger-stricken region where we get regular droughts and famines. Cassava can withstand harsh weather and its nutrition is really good.” Cassava is a good source of carbohydrate, though there are inconsiderable differences between varieties in their nutritional content, with some containing cyanide that requires a lot of cooking to break down. But where Anastancia lives, cassava has become the new staple crop replacing maize. But farmers in Mutomo also know that a diverse diet is more than just the sum of its parts, and is more than just calories. “We don’t grow cassava alone, we have cowpeas, millet and sorghum too,” says Musenya. “Sorghum and millet are some of our traditional crops which we grind to make highly nutritious porridge lour” adds Mutunga. “Lactating mothers and babies feed on it and even during drought everybody is saved by the porridge.”

Orphan crops are regaining popularity as farmers realize the nutritional wealth that was left behind by their forefathers, and intercropping is becoming common as farmers strive to cultivate diversity. Tamarind trees, pigeon pea and green gram are just some of the traditional legumes that had been forgotten but are now being grown again. Anastancia says, “Tamarind and pigeon peas were a part of our forefathers’ diet. Tamarind is very good for adding to the porridge which we cook here, for flavour and more protein.” Other complementary crops being more widely grown in recent years include mangoes, bananas and other fruits.

Diversifying crops and diets
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Support and self-help
Although recurrent drought forced many farmers to start diversifying their crops, the transition needed community level support to address remaining challenges. Cultural barriers such as associating cassava with a ‘poor man’s diet’, and practical barriers such as pests and diseases, needed to be overcome. But a large number of self-help groups became established to discuss and tackle these challenges, and this enabled many more farmers to make the change. Mutunga is a leader of several self-help groups. One of the groups is wikwatyo wa Kandae, meaning ‘the hope of Kandae’, and organises training on cassava farming for its members. The group receives a lot of support from the Ministry of Agriculture and from community based organizations.

The diversity brings nutritional value into the home, onto the market and at the same time builds resilience.

Musenya, also a member of the group, says that the biggest challenge they faced when starting to grow cassava was getting hold of quality seeds. Two problems were that the cassava mosaic virus and cassava brown streak virus are common, and that cassava takes longer to mature meaning that more planning is needed. Thankfully, Dr. Cyrus Githunguri, a government agronomist and crop physiologist, helped to develop a disease resistant and quick-maturing variety, and he calls upon farmers to use such new varieties of old crops to help fight poverty and poor nutrition in their homesteads.

Martha Mwangi works with more than 40 farmer groups in the region. Her role is to assist them with training on farming methods that are more suitable for the current climate. She works closely with KARI and the Ministry of Agriculture, and facilitates a lot of the communication between them and the farmers in Mutomo. She believes that cassava farming has greatly improved the livelihoods of many farming families in the area. Extensionists confirm that farmers have really welcomed the shift to drought tolerant crops after participating in training through their self-help groups.

New crops, new opportunities
The self-help groups do more than just facilitate training on growing crops, however, explains Mutunga. “We also have a savings scheme where members contribute money, which is used in times of emergencies like drought, and for providing school fees for our children.” They motivate each other to learn more about making nutritious and tasty food and support farmers to sell the surplus from the crops they now grow, such as millet, sorghum and pigeon pea. The groups that Martha Mwangi works with own a bakery which makes bread from a mix of wheat and cassava lour. Cassava chips, crisps cakes and chapattis are also made and sold in local markets, with sales estimated to contribute 300-500 Kenya Shillings (about US$3-5) a day to each household. This is an important addition to farm income, and it provides more nutritious foods for others to consume.

This renewed diversity means that more food is available from the harvest. The diversity brings nutritional value into the home, onto the market and, at the same time builds resilience. This is a real boost to farmers who have up until recently, been suffering from recurrent drought and relying on food aid. Now they have rediscovered traditional crops, they spread their risk, learn together, and pass on the nutritional benefits to their families and others who buy new processed products from them.

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The feed premix market is projected to reach $9,939.49 million by 2019, at a CAGR of 3.0%, as studied from 2014.

The market for feed premix has a significant impact on animal health and processed meat market. Feed premix is broadly categorized in vitamins, minerals, amino acids, and antibiotics on the basis of ingredient types. Feed premixes are mixed with additives and various ingredients of grains, which include corn, soybeans, sorghum, oats, and barley.

Mineral/Vitamin and Amino Acid deficiencies in all types of animal can and will result in severe nutritional disorders such as retarded growth rates, anaemia, poor fertility, dermatitis, diarrhoea, rickets, weakness, loss of appetite and in severe cases mortality. It is imperative livestock receive a balanced diet of minerals, vitamins and amino acids which come from a quality source and that have not deteriorated either in transport, storage or have been effected by temperature. This blend of grains, additives, and other raw materials is known as compound feed' for animals.

Compound feeds are formulated according to the specific requirements of the target animal. There has been a tremendous increase in the demand for feed premix for the greater health of animals.

The premix industry is charged with the responsibility of manufacturing a high quality premix consistently, efficiently and economically. Its main objective is to deliver the micro ingredients in a manner desired by the consumer. Premix is a critical input in feeds. The use of a quality premix is an important feature in any livestock operation leading to improved safety, reliability and performance.

Premixing has progressed from the simple hand mixing of several ingredients to mechanical mixing, to continuous mixing, and now to computer controlled mixing. However, the basic concept of mixing ingredients together to result in a homogeneous blend has remained unchanged.

The new approach to develop feed mixes and analogues has brought in revolutionary changes in feed industry. Since the quality check is exercised at two points the feed quality is better. The acceptance of analogues in the feed market nullifies the monopoly of preferred ingredients in the international market, which is stamped mostly as a corn soya feed market. The availability of good quality analogues brings down the animal feed price and increases the animal production.

Leading companies in the feed premixes market are continuously seeking new products, technologies and methods for manufacturing feed premixes with high proficiency. Thus, the feed premix market is gaining more global presence and acceptance among customers.
Evonik Africa (Pty) Ltd
Optimising protein quality and feed costs by reducing the dietary protein content
The reduction of crude protein in broiler diets in favour of balancing the ration to meet the exact amino acid requirements of the bird has caused many debates over the last few years. However, as time moves on and scientific knowledge becomes more widespread, it becomes evident that in order to be competitive in the poultry industry and maintain high performance in the birds, balancing the rations for amino acids is the way forward.
The genetic potential of the modern broiler is continuously improving, which means that the nutrition of these birds needs to follow suit in the cheapest, most efficient and environmentally way possible. Broilers do not have a requirement for crude protein, but rather for individual amino acids and its balance. If diets are deficient in just one amino acid, the production will be less than optimal. The balance in which these amino acids are supplied in protein is also an expensive part of the diet cost, therefore lowering the dietary protein levels will decrease feed costs.
New tech sheds light on the future of food

The challenges of growing enough food to feed the world have grown more severe in the 21st century. The challenge of growing enough healthy food for Africa’s burgeoning cities is huge. At the same time, the stresses of climate change, and the declining availability of arable land and fresh water are challenging conventional agriculture as never before.

Africa needs to move farming closer to urban population hubs, grow more with less, and develop farming technologies and practices that ensure food safety. Doing so will take innovation, investment and collaboration.

There is an urgent need to develop new methods for sustainable food production. This includes a greater emphasis on urban agriculture such as vertical farming which, properly designed and planned, could provide the sustainable means to improve food supply we need. Ideally, urban agriculture fits neatly alongside or within existing buildings in a self-contained and sustainable manner without competing for resources. Such urban plots can be at ground level or on rooftops. They can use greenhouses in order to take advantage of the sun’s energy, or grow indoors with the help of artificial lights.

Vertical Farming is promising because it requires no soil, and can save space and energy – and improve crop yield. It takes advantage of the vertical space of city buildings rather than turning over wide expanses of land to agriculture and uses advanced greenhouse technology: hydroponics and aeroponics, and environmental controls that regulate temperature, humidity and light to produce vegetables, fruits and other crops year-round.

The approach works best for salad greens and herbs, which have higher margins than other produce and can be grown in larger quantities than other vegetables that require more space and longer grow cycles. Seasonality isn’t a factor for the business, and there’s no risk of poor weather conditions or seed contamination—a worry that comes up when growing non-GMO seeds in an open field. Another benefit: lower transportation costs and less spoilage, since many of these farms supply local restaurants and supermarkets.
It also offers lots of other advantages, freeing producers from concerns such as pests and diseases, weather and planting times and allowing consumers to access fresh locally grown food all year round. They offer closed loop systems that process plant waste and filter dirty water. Some vertical farming projects are using aquaponics whereby waste from farmed fish is used as fertilizer for crops, thus recycling almost all of the water and reducing the need for synthetic inputs.

The big advantage of indoor vertical farming is that there is a less impact on the environment. It conserve the water, the nutrients, we don’t pollute or generate emissions.

If successfully implemented, they offer the promise of urban renewal, sustainable production of a safe and varied food supply, year-round crop production of fruit, vegetables, edible mushrooms and algae year-round. By allowing traditional outdoor farms to revert to a natural state and reducing the energy costs needed to transport foods to consumers, vertical farms could also significantly alleviate climate change, and help restore ecosystems that have been sacrificed for horizontal farming.

Growing enough healthy food to supply Africa’s exploding urban populations is a grand challenge, akin to others previously posed by philanthropists and governments. Now is the time to forge the creative partnerships between African entrepreneurs, Western vertical farming pioneers, social impact funders, and corporations to develop economically rewarding but also safe food solutions for Africa’s cities.
Farming goes high tech

Agriculture is a global business, and no sector is excluded from the rush of new technologies, techniques and supplies. As competitors on the global stage, South African farmers need to make sure they are at the forefront of the latest advancements.

Whether you are a small certified organic grower or a large operation growing conventional product, you can no longer avoid the global scrutiny of your practices. There are companies with thousands of acres of organic food that can sustainably and reliably supply the local supermarkets—so yes, you need to care!

Each and every area of industry is being improved upon and developed at a dizzying pace: irrigation, machinery, agro-chemicals of all sorts, seed sources, greenhouse coverings, renewable energy solutions, solar panels, composters, software, apps, aquaponics, multi-cropping systems, medicinal-quality crop production, water harvesting systems, local farm weather networks, new crops and animals, green fertilizers, reusable and recyclable plastics, multi-layered growing, soil-less growing, algae culture and green walls—to name just a few. How does anyone keep up with all the new-fangled technologies? All you need to do is attend a trade show or receive visitors to the farm who are selling these novelties to see the vast possibilities. But are they all as marvelous as they are claimed to be?

In the tech industry, we tend to talk about the exploding Maker Movement as if tinkering is something new. In fact, it’s as old as dirt: farmers have been making, building, rebuilding, hacking, and tinkering with their equipment since chickens were feral. I’ve seen farmers do with rusty harvesters and old welders what modern Makers do with Raspberry Pis and breadboards.

Using science and technology as a basis, farmers are engaging in the methods of precision agriculture that includes soil maps, GPS guidance and even drones to help increase crop yields and efficiency—and save farmers a surprising sum along the way.

Of course, the world is changing, and that’s especially true in the world of agriculture. Most problems can’t be solved with duct tape and baling wire anymore. Regulations are stricter, agribusiness is more consolidated, resources are more scarce, and equipment is infinitely more complicated and proprietary.

What used to be done by hand is now managed at scale by giant machine. And that equipment is expensive—equivalent to the price of a small house. New, elaborate computer systems afford the kind of precision and predictability that farmers 20 years ago couldn’t have even imagined. But they’ve also introduced new problems. Aside from using it, there’s not much you can do with modern ag equipment. When it breaks or needs maintenance, farmers are dependent on dealers and manufacturer technicians—a hard pill to swallow for farmers, who have been maintaining their own equipment since the plow.

High-Tech Tractors Are Increasingly a Liability

The cost and hassle of repairing modern tractors has soured a lot of farmers on computerized systems altogether.

The problem is that farmers are essentially driving around a giant black box outfitted with harvesting blades. Only manufacturers have the keys to those boxes. Different connectors are needed from brand to brand, sometimes even from model to model.

Modifications and troubleshooting require diagnostic software that farmers can’t have. Even if a farmer managed to get the right software, calibrations to the tECU sometimes require a factory password. No password, no changes—not without the permission of the manufacturer.

In the tech industry, we tend to talk about the exploding Maker Movement as if tinkering is something new.
In order to effectively manage and control fly pests, it is important to understand the breeding habits and life cycles of the key fly pest species. With this knowledge, you can create a specific "pest fly management" strategy. Adults are attracted to practically all types of organic matter, especially animal feed and manure, broken eggs, dead animals, etc.

An adult fly may live 30 days and a female can lay up to 900 eggs, usually laid in clusters. The larvae (maggots) use the moist, organic matter as food. After completing their development, they crawl to a drier area to pupate. The pupal stage is a resting and development stage in which each larva develops into an adult fly. The entire life cycle—from adult fly, to eggs, to larvae, to adult flies, to more eggs—takes only 7-10 days in hot weather.

Know their enemies!
Anywhere manure accumulates and stays reasonably dry, there will be an abundance of mites and beetles that prey on all fly stages and use them for their own reproduction. Dry manure means a more active and effective population of natural predators and parasites. Any cultural method undertaken to manage manure and biological methods implemented to kill flies are therefore complementary. Cultural controls used to reduce their ability to breed can include:

- Stopping water leaks promptly: check the water supply daily for leaks, cracks, clogged lines, etc.
- Managing feed storage areas: keep feed cleaned up around silos and feed bins
- Maintaining adequate ventilation: air flow through areas where manure collects is critical to maintaining dry manure. Flies don’t like dry manure, therefore dry manure means less fly breeding.

Letting nature take its course would be acceptable under most natural conditions. However, high animal density in poultry, dairy, feedlot and farming operations produce large amounts of animal waste in short periods on relatively small areas. Fly populations can be correspondingly great. Therefore, it is necessary to supplement natural populations of predators and parasites with commercially produced fly parasites to increase the number of flies that are killed.

Enter—Fly Parasites
The most important natural enemy of flies are fly parasites called parasitic wasps. These tiny insects are completely safe to humans and animals. Frequent releases of fly parasites will reduce (and sometimes almost eliminate) fly populations. The adult fly parasite searches fly breeding areas for fly pupae. Once found, the fly parasite drills a hole through the armoured puparia and lays an egg on the protected fly pupa. The parasite egg hatches and the immature wasp eats and kills the developing pupa. After feeding on the dead fly, a new adult fly parasite emerges from the fly puparia in about 2-3 weeks. The new parasites then search out and kill more fly pupae. Each female fly parasite will kill about 100 fly pupae in its lifetime.

In summary, an adult female fly can lay up to 900 eggs within a week; an adult female fly parasite can lay up to 100 eggs in 2-3 weeks. This is why it is important to start your fly control program early, before the fly population explodes, otherwise you’re continually behind the eight ball and playing catch-up, which rarely works.
Recent innovations in technology now enable plant operators to calculate the optimal mix of water, chemicals, temperature and flow required to achieve safety standards while saving at least 20% in energy cost and by reducing the downtime for cleaning by at least 20%.

A typical clean-in-place (CIP) process requires large amounts of water, chemicals and energy. It is estimated that, on average, a food and beverage plant will spend 20% of each day on cleaning equipment, which represents significant downtime for a plant. Energy usage varies depending on the process. For example, a milk plant is likely to use 13% of its energy on CIP, whereas a powdered milk, cheese and whey process is likely to use 9% of its energy on CIP. In a fruit jam manufacturing facility in England, cleaning hoses in the fruit room were identified as one of the highest end users of water in the facility (17% of total site water consumption).

Many manufacturers are unsure of how their CIP systems are performing. Therefore additional steps are often introduced as a safeguard to ensure adherence to sanitation standards. This practice results in higher consumption of water, chemicals, and energy than is necessary in order to avoid the contamination issues. A number of companies have addressed CIP improvements with small modifications such as altering the chemical concentration, or by adjusting the time taken for each stage of the CIP process. However, very few food and beverage manufacturers have put tools in place that render the CIP process efficient.

The result of improper cleaning is costly to a plant in violation of food and beverage industry safety regulations. The all-too-frequent incidences of food safety disasters around the globe are often caused by simple mistakes or faulty processes in a food or beverage factory which lead to sickness, injury, and even death for those who consume contaminated products. In addition to the human tragedy, these contamination incidents lead to the expense of product recalls, loss of confidence in a company’s brand, and ultimately loss of revenue. Food safety authorities conduct plant audits to ensure that the critical control points identified as HACCP (hazard analysis and critical control points) are monitored and reviewed for regulatory compliance and continuous improvement. In the event of a contamination incident, full traceability (enabled by software) and ‘proof of clean’ will reduce the legislative and legal impact.

Production downtime
Lowering operational expenditure and reducing waste to lower the cost of production without impacting product quality are universal goals of food and beverage enterprises. However, when a CIP process is in operation, production is stopped. This impacts profitability. As a result, two tendencies manifest themselves which are both negative to the business:

1. When a problem occurs, there is a natural reaction to avoid seeking the root cause of the problem. Such an intervention could involve even more time-consuming maintenance work.
2. With the risk of contamination at the forefront of most operators’ minds, the tendency of the CIP operator is to overcompensate with increased cleaning time.

Fortunately, new Endress+Hauser CIP technologies alleviate the above problems because of significant improvements in efficiency:

i) More advanced CIP automation enables dramatic reductions
in troubleshooting time in the event of a problem, cutting what once took hours to perform into minutes of diagnostics.

ii) An optimised CIP process can reduce cleaning times by up to 20%. If CIP currently takes around five hours of each day, a 20% reduction in cleaning time will deliver approximately an extra hour of production time.

High consumption of energy and water

Efficiency improvement does not only focus on reducing cycle time, as well as energy, water, and chemical consumption. The primary purpose of the CIP system is to remove fouling from the equipment. When production equipment is not completely clean, expensive raw materials have to be thrown out. Effective cleaning results in fewer instances of contamination and therefore improved production efficiency.

The cleaning function, however, is energy intensive. Almost half of a milk-processing facility's energy is used to clean the processing lines and equipment. Calculating the precise temperature needed to clean equipment is critical to reducing the energy consumption. For every 1°C reduction in CIP temperature there will be a 1/60th reduction in the energy needed to heat the fluid.

The amount of water or chemicals used can also be reduced by introducing recovery tanks so that the liquid can be re-used instead of sent down the drain.

Loss of innovation and flexibility

Food and beverage manufacturers must innovate in order to remain competitive. Recipes need to be improved and new product lines developed. Therefore, CIP systems need to be flexible in order to adapt to different types of fouling on the equipment as product lines evolve.

Operators need to be able to alter cleaning recipes to suit particular types of fouling, whether product (sugar, fat, protein, or minerals) or microbial (vegetative microorganisms, or spore forming microorganisms) and ensure that the CIP system is operating in an efficient manner. Chocolate, for example, will require a different cleaning recipe for butter than it will for flour.

Modern CIP systems, equipped with automation software enable a simple drill down into any aspect of the process. This traceability of the system offers a number of benefits:

1. Operators can check each CIP operation to verify whether it has worked correctly
2. Diagnostics are simple to perform and deliver detailed information on each element of the cleaning cycle
3. Faults and issues can quickly be highlighted and rectified
4. Plant managers can generate detailed operational reports
5. Food security reporting to regulators is easy to assemble and more comprehensive

Recent innovations in technology now enable plant operators to calculate the optimal mix of water, chemicals, temperature and flow required to achieve safety standards while saving at least 20% in energy cost and by reducing the downtime for cleaning by at least 20%.

Installing instrumentation in the process lines provides real-time control and follow-up, as well as making the process completely traceable, and this allows fast access to the process data, such as concentration, temperature, speed and phase shift. This way it achieves the maximum washing effect, measures the phase separation, determines when a cycle starts or finishes, and also quantifies water and chemical consumption, which are increasingly more common challenges.

In addition, all the steps in the process can be easily traced and automatically documented, which simplifies any auditing requirements that need to be performed by regulatory inspectors. With Endress+Hauser's detailed portfolio, which has instrumentation designed for the food and beverage industry – any manufacturing plant will be able to automate and overcome the challenges facing this process.

For further information, please visit http://bit.ly/23n8F08

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Farmers produce close to a million metric tons of tomatoes in Canada every year. Scientists find better ways to grow them in the field or greenhouse and explore whether tomatoes could have applications in the prevention of cancer and other diseases.

Tomatoes are one of the most popular of the vegetables (but its actually considered to be a fruit - a berry, to be exact) grown today. It’s just about everyone who has at least one tomato plant, even if its in a clay pot on their back deck or high-rise patio. Some people grow them upside down in a bag and some people grow them right side up. Everyone will agree, though, that there’s nothing quite like a home-grown, vine-ripened tomato.

This is because home-grown tomatoes taste better. And this is because they probably haven't been sprayed with fungicides or insecticides and the plants are probably the healthiest with the least stress because they get regular lots of attention, plenty of water and sunlight and maybe even an occasional dose of fertilizer.

But the same isn't true of commercially grown tomatoes that suffer from stress and nutrient deficiency that causes other issues and symptoms to appear such as fungal growth and insect infestation. Although tomatoes have an incredible potential for quality and yield, those produced under conventional farming conditions fall far short of their potential for taste, texture, storability, nutrient content and weight (moisture content).

Tomatoes are warm-season crops and are sensitive to frost at any growth stage, so field planting in temperate climates occurs after the threat of frost is past in the spring or transplants are planted and grown under row covers in late spring. Tomatoes produced in temperate climates are also grown in greenhouses and under plastic covered high tunnels to extend the production season. The emergence of greenhouse tomato production has begun to change the shape of the U.S. fresh-market tomato industry. Greenhouse tomato production allows producers to grow fresh tomatoes in structures, sometimes using methods of climate control and alternative soils. Advantages of greenhouse production include uniform appearance and quality, consistency in production, increased yields per acre and enhanced grower capability to sustain year-round production.

**Balance is Key**

A tomato plant goes through distinct stages of its life as the season progresses. During each of these stages, it will have distinct environmental and nutrient requirements that, if met, will eliminate or minimize the opportunity for quality and yield loss due to stress. Each time that an environmental or nutritional need is not met, the plant will experience yield loss. It is the additive affect of many small stresses that cause significant losses in quality and yield. The key to proper nutrition is more about the balance of
Interconnection of Major Nutrients

The four major elements which are particularly critical in the production of tomatoes are nitrogen, calcium, potassium and phosphorus.

Nitrogen (N)
When NH₄ is the major nitrogen source, toxicity can occur resulting in a significant reduction in fruit yield. However, in initial plant development, NH₄ is readily utilized and benefits early plant growth and development. However, when the tomato plant enters its reproduction stage, NH₄ can adversely affect both plant growth and fruit yield and increase the incidence of blossom-end rot (BER) in fruit, a phenomenon that has been frequently observed and reported. Too much NH₄ (greater than 25% of total nitrogen) can cause a decrease in the number and fresh weight of fruit and an increase in the number of fruit with blossom end rot (BER).

Calcium (Ca)
The lack of calcium is intimately tied to the occurrence of BER in fruit. However, the occurrence of this fruit disorder is not necessarily a calcium deficiency, but is more likely due to a combination of factors that restrict the movement of calcium into the plant and fruit. The most common inducing factor is moisture stress, due to either an excess or deficiency of water. High humidity and/or excess water conditions slow the transpiration rate of the plant. Since calcium moves in the plant in the transpiration stream, a reduction in water movement within the plant reduces the amount of calcium-carrying water reaching the developing fruit. Under water stress, the same phenomenon occurs and BER occurs in developing fruit. Any factor that would restrict the uptake of calcium through the roots, such as low soil pH and imbalance among the major cations, potassium and magnesium plus NH₄, can interfere with Ca uptake. Having a sufficient concentration of calcium but it isn’t the answer. Frequently, it is the balance among the major cations that interferes with calcium uptake.

Potassium (K)
An inadequate supply of potassium to the tomato plant will result in uneven fruit ripening, thereby reducing fruit quality. However, excessive levels of potassium can significantly interfere with the availability of magnesium and calcium. Potassium uptake by plant roots is significantly affected by soil aeration and temperature. If soil is too wet, potassium uptake will be reduced. It is wise to increase the potassium content in the nutrient solution when the tomato plant begins to fruit, but not so much that it interferes with uptake of calcium and magnesium.

Magnesium (Mg)
Magnesium deficiency primarily occurs when there is an imbalance among the other major elements. Magnesium deficiency symptoms (interveinal chlorosis on the older leaves) can be an indication of some type of plant stress due either to low or high moisture or temperature conditions. A severe magnesium deficiency can result in BER in the fruit.
When chemicals were first introduced in farming, everyone marveled at what they could do. Yields were dramatically increased. In the beginning, the soil was so healthy, any damage done by chemical fertilizers was imperceptible, and pests had yet to evolve resistance to the insecticides. Our technologies were exported around the world as a revolution in agriculture - the green revolution.

Chemical fertilizers, insecticides, herbicides, antibiotics, hormones, factory farms, and genetically modified organisms, or GMOs. It just keeps coming. Almost no one calls it the green revolution anymore because there is nothing green about it, at least not in the modern ecologically friendly meaning of the word green.

**Downsides to the Green Revolution**

There are a number of problems brought on by conventional agriculture's techniques. Conventional methods are inhumane to animals; they spread disease and pollution and degrade our nation's soil and water.

A return to organic agriculture, which prohibits the use of chemicals and encourages crop rotation, will protect the arable land, increase the nutritional value of our food, and dramatically reduce our food's toxicity.

**Toxic Food**

Yes, our food is toxic when grown by conventional means. Studies have repeatedly shown that the nutritional content of organic food is dramatically superior to the nutritional content of conventionally grown food. Before the advent of today's conventional agriculture, our food contained more nutrients.

The organic agriculture's predominant strategy is to cultivate nutrient rich soil. In order to add nutrients back into the soil, organic agriculture uses crop rotation and natural fertilizers. This produces healthy plants, which makes for healthy food.

Organic farmers do use pesticides; however, organic farmers use pesticides that are plant based. These bio-chemicals naturally, quickly decompose. In contrast, conventional agriculture uses a vast array of chemicals, most of them synthetic.

**What About the Soil**

We must protect our nation's arable land in order to protect our food supply for future generations. Even though agriculturally viable resources are obviously of great economic value to the entire nation, our nation's soil is treated as though it were disposable.

Pesticides, herbicides, fungicides, and petroleum-based fertilizers strip the soil of nutrients and kill beneficial organisms such as earthworms, predatory insects, and microorganisms. In order to grow anything in such chemical laden soil, more chemicals are added. This process degrades the topsoil and causes salts to build up in the land, leaving barren dirt. After this process strips the land of its agricultural viability, conventional agribusiness moves on, acquiring more farmland. Then the process is repeated, rendering more land barren. By comparison, organic farming replenishes the soil through crop rotation, natural fertilizers, and the use of time-honored, natural techniques.

**Dead Zones**

Conventional farming utilizes phosphorous and nitrogen chemical fertilizers. When rain and runoff carry these fertilizers into the ocean, marine life is suffocated. The fertilizers triggers an overgrowth of marine plankton. Once the masses of plankton die, their death feeds ocean bacteria. The bacteria consume oxygen, and with an unnatural overabundance of plankton, the bacteria consume just about all of the oxygen left in the ocean. Shrimp, fish, and all other forms of marine life either leave the area or die from lack of oxygen. The end result is hypoxia, oceanic dead zones. These areas are devoid of nearly all life other than plankton and bacteria.

**Conclusion**

Pesticide residue, antibiotics, preservatives, and genetic modification directly affect the long-term sustainability of farming, fishing, the consumer's health, and the health of those who grow and produce the food. We do not exist separately from the environment in which we live. If what we consume is polluted, our bodies become polluted. Beyond choosing what we buy in the store, we as a nation must choose, for the long term or short term, organic or conventional. This choice affects us all, even those not yet born.
New Holland T7.315 Tractor wins Machine of the Year 2016 Title in the L category at Agritechnica

New Holland reaps a prestigious award at Agritechnica 2015: the brand new T7.315 tractor was crowned with the coveted "Machine of the Year" 2016 in the L category, title bestowed by a jury of 19 journalists representing leading European agricultural publications. The machine was rewarded for its technical innovation and the benefits it brings to customers, with selection criteria focusing on innovative features, performance, productivity, cost of operation, ease of use and operator comfort.

Carlo Lambro, New Holland Agriculture Brand President, stated: “This award represents an important recognition from the industry of New Holland's approach to product development that focuses innovation on meeting our customers' needs with technologies that enable them to run their farming businesses efficiently, profitably and sustainably. The T7.315 rewarded is testament to our development teams' capacity to understand our customers' demands and provide effective solutions. We are particularly proud of receiving this award this year, when we are celebrating New Holland's 120 years of innovation in agriculture.”

"We are very proud of this recognition," commented Sean Lennon, Head of Tractor and Telehandler Product Management. "We devoted a lot of effort to developing this product: a tractor meeting the specific requests made by our customers. We asked them what they wanted from their 'ideal tractor'. They told us they would like a top-of-the-range T7 with more power that would also be capable of high load jobs usually done by heavier tractors and of taking multi-tasking to a new level. The T7.315 delivers on every point. This award is a well deserved recognition of the hard work and dedication of all those involved in the development of the T7.315, from our engineering teams to the whole Basildon plant team, who set up a brand new dedicated assembly line and new processes to ensure consistently high quality on every unit leaving the line.”

The T7.315 is one of two new heavy-duty models that extend the T7 Series to meet the needs of farming operations requiring the power of a large-frame tractor with the versatility and agility of a small frame machine. The T7.315 delivers versatility without equal for performing a wide range of field and haulage jobs, from row crop work, baling hay or mowing to hauling manure and other big chores. It also features the revolutionary IntelliCruise™ tractor-baler automation that enables New Holland's BigBaler to control the tractor's speed to maximize productivity and bale consistency, making it the ultimate baling tractor.

New Holland Agriculture's reputation is built on the success of our customers, cash crop producers, livestock farmers, contractors, vineyards, or groundscape professionals. They can count on the widest offering of innovative products and services: a full line of equipment, from tractors to harvesting, material handling equipment, complemented by tailored financial services from a specialist in agriculture. A highly professional global dealer network and New Holland's commitment to excellence guarantees the ultimate customer experience for every customer.

Barclays Africa
Agriculture contributes over to 30% of our continent’s economy. It’s little wonder then, that preserving produce is vital.

But, without proper cold storage, fruit and vegetables start spoiling soon after they’ve been harvested.

One Nigerian farmer has solved this problem. Alongside his team, he created walk-in, solar-powered cold stations that can extend the shelf life of fresh food for up to 21 days. These solar-powered cold storage facilities are installed at markets as well as farms and farmers can sign up with a pay-as-you-store subscription model.

This innovation has attracted the attention of the United Nations and is being rolled out in South America and Southeast Asia. #GetStarted on solving logistical problems to help Africa’s economy grow.
You don't need to be a farmer, a soil scientist or a policy expert to know that agriculture is key to Africa's future. How, after all, could this not be the case? Agriculture remains, by far, our continent's biggest industry and biggest employer. Although there has been a remarkable success in many other sectors, agriculture still accounts for nearly 40% of the gross domestic product (GDP) of African countries and the livelihoods of seven out of 10 people.

About four out of five Africans rely on agriculture for their livelihoods. Most poor people not only depend on agriculture, they also live in rural areas. To realize the potential of the sector, researchers advocate for a sustained transformation based on consistent policies and effective implementation strategies.

Agriculture in Africa remains where the greatest potential for increasing broad-based growth and sustainable wealth creation currently lies, and it can offer the greatest potential for the reduction of poverty and inequality said Mr. Ehiraiika explaining the role agriculture can play in manufacturing, service and value-chain sectors. He stated that agriculture has the attribute of being the primary source of the income that goes into the pockets of the bulk of consumers.

Increased agricultural productivity, combined with viable agribusiness that adds value to farmers' production and improved access to markets, can drive broader economic growth and make a tremendous contribution to the attainment of food security.

Agriculture can be expected to be one of Africa's key drivers for sustainable growth if funding for research and technology development is provided. There is also a need to develop targeted financing strategies and financial products suited to the agriculture sector and smallholder farmers.

Agriculture in Africa remains where the greatest potential for increasing broad-based growth and sustainable wealth creation currently lies, and it can offer the greatest potential for the reduction of poverty and inequality. Just as African countries have leapfrogged fixed telephone lines and gone straight to mobile phones and tablets, so too can the continent make huge strides by taking advantage of recent advances in science, technology and innovations to dramatically improve agricultural productivity, raise incomes and create new markets for produce.

Hon VV Windvoel is one of the long serving members in the Legislative sector. He joined the Mpumalanga Provincial Legislature in 1994. He chaired the Portfolio Committee on Agriculture from 1999 -2001. He became an NCOP member in Parliament during the period 2001 – 2004, where he continued to serve as a Chief Whip from 2004 to 2009. In 2009-2014 he served as the Chairperson of the Portfolio Committee on Legislation Oversight Premier’s Office and Finance. Currently is the Chairperson of the Portfolio committee on Agriculture, Rural Development, Land and Environmental Affairs. His busy schedules in the Legislative and Political environment could not stop him from acquiring educational qualifications. He holds a Diploma in teaching, which he obtained in 1989. He further studied and obtained a Post-graduate Diploma in Management. Currently he is doing his Masters in Governance and Leadership.
The Agriculture Investment & Funds Africa Conference (AIFA 2015)

Agriculture Investment & Funds Africa Conference (AIFA) took off on the 30th November to 1st December 2015, at Emperors Palace in Johannesburg South Africa.

The conference, organized by the FARMERS REVIEW AFRICA, a growing agriculture intelligence hub in consultation with the Department of Agriculture, Forestry and Fisheries (DAFF), North West University, Women in Agriculture Sub Saharan Africa (WASSA) and MN Capital was developed to be the first investment-funds focused Agriculture Conference in Africa.

The keynote address was done by Minister Senzeni Zokwana of the Department of Agriculture, Forestry and Fisheries (DAFF), entitled, A call to invest in African Agriculture: Why now is the right time to allocate assets to African agriculture.

Agriculture persists as an important sector of the African economy. However, its significance in the economy varies widely across African countries, agriculture remains a vital sector for most countries. Despite its importance, agricultural productivity remains dismal, undermining Africa’s overall productivity and food security. Investing in agriculture is one of the most effective ways to reduce hunger and poverty, particularly in rural areas. Many countries that have consistently invested in agriculture are on track to achieve the first Millennium Development Goal of reducing by half the proportion of hungry people.

Gross domestic product (GDP) growth in agriculture has been shown to be at least twice as effective in reducing poverty as growth originating in other sectors (World Bank, World Development Report 2008, Agriculture for development.) Billions more investment is needed in agriculture and food distribution systems around the world in the next few years, if widespread hunger is to be avoided.

If that investment is directed towards sustainable forms of agriculture, then farming can also be made into a weapon in the fight against dangerous global warming, as more environmentally friendly farming methods can result in soils absorbing carbon dioxide rather than releasing it.

The Agriculture Investment & Funds Africa Conference arose out of a need to bring together the agendas of investment funds, agriculture, food security and climate management and to promote constructive deal flow between African Agri-entrepreneurs and investors from across the Continent and beyond.

The aim of the Conference was to help solidify and grow the community of thought leaders, Agri-entrepreneurs, investors and policy makers who believe in the strong role of agriculture in economic development and poverty alleviation and are committed to putting real money to work in the space.

The Conference served as a prime gathering of leading investors, fund managers, agricultural practitioners and key stakeholders who are committed to promoting sustainable and responsible investing in agriculture as well as agriculture-driven development.

During this two day agriculture investment and funds conference, several presentations and discussions were done around the need for investment in agriculture.

Some of the presentation and discussion topics, evolved around:

- Why now is the right time to allocate assets to African Agriculture.
- Analysis of diverse agri-based investments, business models, investment partnerships available to investors.
- Discovering what key investment groups considers to be an ideal and attractive agricultural investment opportunity for solid portfolios.
- Making the most of agricultural investment: The human face of agriculture funding.

**Purposes of the Conference**

- To promote an Investment-Smart Agriculture Alliance;
- To share knowledge,
information and good practices among public, private and civil society stakeholders;

- To promote planned agriculture investment within the broader development goals;

- To facilitate the implementation of concrete actions linking agriculture-related investments, policies, and measures with the major transformation concerns, including gender equity advancement, black economic empowerment and climate.

- To build regional partnerships for the resilience of agriculture, forestry and fisheries to harsh economic and policy implications;

- To Promote the application of research investment solutions, information and policies conducive to increased and sustainable agricultural production yields, productivity and sustainable development;

- Explore and share knowledge and responses on new technological approaches conducive to productivity, adaptation and mitigation.

The AIFA program offered an excellent opportunity for interaction with investors, fund managers, regional leaders, practitioners, farmers, organized agriculture, civil society, the private sector and NGOs to discuss and share experiences of successes.

The conference concluded on a high note with a Gala dinner and the launch of the FARMERS REVIEW AFRICA Magazine, the Africa’s premier farming magazine, which provides the updates of news and analysis on topical issues of national and international importance in agriculture.

The Gala dinner was hosted by Mailing Times Media with their sponsors the MTN Foundation.

As a cut above, all investment and development conferences, AIFA 2015 further assessed community impacts and community responses to current and envisaged investment practices.

A World Bank report entitled “Growing Africa: Unlocking the Potential of Agribusiness,” says that Africa’s farmers and agribusinesses could create a trillion-dollar food market by 2030 if they can expand their access to more capital, electricity, better technology and irrigated land to grow high-value nutritious foods.

Therefore, the time has come to make African agriculture and agribusiness a catalyst for ending poverty, as we cannot overstate the importance of agriculture to Africa’s determination to maintain and boost its high growth rates, create more jobs, and grow enough cheap, nutritious food to feed its families, export its surplus crops, while safeguarding the continent’s environment.

African farmers and businesses must be empowered through good policies, increased public and private investments and strong public-private partnerships. A strong agribusiness sector is vital for Africa’s economic future.
Agriculture Investment and Funds Conference Africa 2015

AIFA
Why is now the right time to invest in Mpumalanga Province – Agricultural Sector?

The Mpumalanga Provincial Legislature as it is the case with all Legislatures is Constitutional mandated to conduct oversight over the Executive (government). In doing this oversight, the Legislature works through committees that are linked to Government departments. Currently the Portfolio Committee on Agriculture, Rural Development; Land and Environmental Affairs has steadily continued to monitor and oversight the activities of the department. This monitoring and oversight takes place with the context that Mpumalanga Province is predominantly rural and subsistence farming plays a crucial role in the livelihood of many rural community members and also in improving the Gross Domestic Product of the province. It has a high economic spin-off that may contribute in sustaining the lives especially at the time the country is facing high unemployment rate.

The Committee has continued to play an oversight and the advisory role to the department of Agriculture, Rural Development, Land and Environmental Affairs. Whilst the province has a potential to do more, with correct and relevant investment, the committee as chaired by the Hon VV Windvoël, believes that projects that have been kick-started like the Fortune – 40 Young Farmers Incubator Project have a potential to elevate economic activities in the province. The project intends to attract youth into the farming sector and to create economic opportunities for young unemployed people who are currently economically inactive.

The major project that has so far excited the portfolio committee on agriculture is the Mpumalanga International Fresh Produce Market which seeks to create opportunities for small scale farmers to graduate to commercial farming through partnership with established local farmers and farmers from abroad.

Based on the economic opportunities in the province it can only be said that, it is now the right time to invest in Mpumalanga Province’s Agricultural Sector.
If the rains do not come soon, South Africa and its consumers will face serious difficulties

South Africa has to protect its food security capacity. If in the years ahead the country has to continue coping with climate change, it will be in trouble. Then the country will move from food prices based on export parity to import-parity based prices, which will bring about a difference of 75 percent. As a country South Africa will not be able to afford it.

On a special Nation in Conversation programme dedicated to the current drought and its impact on farming and society, rainfall prospects and what has to be done if the drought continues, four experts in the field of agriculture shared their thoughts and their analyses of the situation. They are Tracy Davids of the Bureau for Food and Agricultural Policy (BFAP), Prof Johann Kirsten, Head of the Department of Agricultural Economics, Extension and Rural Development at Pretoria University, Jannie de Villiers, CEO of Grain SA, and Francois Strydom, Managing Director of Senwes.

Nation in Conversation is hosted by Theo Vorster, CEO of Galileo Capital. The four participants agreed that the current drought is the worst since the big drought of 1992. A study conducted by BFAP on maize as the biggest summer crop and the key staple food of low-income consumers in particular, showed that production declined by 30 percent in 2015 from a record harvest in 2014, dropping to below ten million tons for the first time in eight years. If the drought persists, South Africa will be in a much more difficult position than the previous year, due to lower carry-over stock levels. Maize is a product that is normally exported. At export-parity level the price is around R2 000 a ton. In a shortage scenario the country would go to import parity, which is more than R3 000 a ton at the current exchange rate and world price levels. During the previous big drought in 1992, maize yields fell below one ton per hectare. A lot of progress has been made since. Production practices and technology have improved, so one would expect that the situation would be better than in 1992. If there is a normal crop in the irrigated areas and about two tons per hectare in the rest, production would be approximately seven million tons, which means that maize will have to be imported. Just over ten million tons are needed for local consumption. Considering some regional exports, it means that about 3.5 million tons will have to be imported. Yellow maize is freely available on the world market, but white maize is more scarce. It is produced mostly in Southern Africa. Zambia may have some surplus but looking at the demands of the rest of the region that is experiencing the same drought, it may not be enough. Transportation costs from Zambia are also very high. There is some substitution in the animal feed market.

In years of surplus white maize is used in animal feed, but in years of deficit more yellow maize is imported to use in animal feed. Then almost all the white maize is utilised in the human food market, with yellow maize used as a substitute in the animal feed market. During the 1991-1992 drought the state was able to activate a state guarantee to help farmers restart their businesses because no one was able to repay their loans. If the current drought persists, it will be the first time that the new democratic government will have to deal with such a situation. It will be difficult to put a comprehensive, coordinated plan in place that will accommodate new, emerging farmers, land reform beneficiaries and also commercial farmers, who are important for food security.

The government will have to address rising food prices, the future of new, developing farmers, and the future of rural communities, not only in terms of food production but also water provision. The drought has many political, economic and social implications. It will have a serious impact on economic growth but also on the balance of payments, seeing that the country will have to import various commodities. The drought will also illustrate the importance of agriculture in the national economy. Everyone thinks that agriculture is a small industry as it makes up only three percent of GDP, but if the drought materialises in the form as predicted, the impact on the national economy will be clear to see because the multiplier impact of agriculture is much more than three percent. Also in smaller, rural communities the impact will be hard-felt because of lower income by producers and less disposable income for communities.

In 1992 the government paid out about R2 billion in guarantees. Today, because of inflation, the equivalent amount would be about R9 billion, which the state coffers will not be able to afford. In the current situation farmers have just about exhausted all their risk mitigation measures such as crop insurance. There is also the impact on debt in the agricultural businesses and commercial banks. Whether they will be able to provide new loans to farmers to restart their businesses is quite questionable. The question is what the role of the state in this
situation should be. Taking the NI highway as the central dividing line, the farmers to the east of the line have to plant between mid-October and mid-November to avoid the frost at the end of the season. They have planted about 95 percent of the intended volumes of maize. They can still plant a bit of soya in the east, but the optimum window for maize is over. Some farmers planted in the dust in the hope that the rain will come. It is uncertain what their yields will be, but they have started off the season on a bad note. On the western side, where farmers plant mostly white maize, they have until the end of December. Moisture levels in the soil are extremely low because of the dry season last year. This is the highest risk area in terms of rain, starting on a basis of almost no soil moisture and temperatures that are on average three to four degrees higher. This is compounded by high wind flows, scarcity of fodder and potable water, dropping dam levels, and off-flow of rainfall where any rain disappears very quickly with no down-flow into the soil. The heat has a serious impact. Last year even irrigated maize did not pollenate properly, resulting in a lower yield. This is something new with which farmers and agribusinesses will have to cope.

The drought has a serious effect on the South African economy. The price of maize has already increased by 75 percent, following the weak rand-dollar exchange rate. It affects consumer affordability in a time of slow economic activity. The consumer price index is up from 110 to 116 in October. Consumers are under severe pressure. They look for the cheapest possible maize meal to feed their families. The farming sector bears the brunt of the current slack economic conditions. Especially in rural South Africa it has a marked effect. Forty percent of farmers are already practising some kind of conservation agricultural by preserving moisture levels with no tilling, and using varieties that are more drought tolerant. The government has taken some very positive steps, but drought tolerant varieties will only be available in 2018 or 2019.

There is also a misconception about drought tolerance. Drought tolerant varieties might survive for ten to fourteen days longer without rain, but no plant can survive without water. Agribusinesses have to be very cautious not to respond with knee-jerk reactions. Government is stepping in, but at a much more modest level than in 1992. “To help alleviate the plight of farmers and support the agricultural sector to maintain food security,” announces Francois Strydom, “Senwes has taken the initiative to establish a drought aid fund in collaboration with organised agriculture. The aim is to mobilise funds from outside the farming sector as well. In this regard, Agri SA is acting as medium for Senwes.” Francois says on a social level the aid fund will be used to support farmers, their families and their workers throughout the country, wherever and whoever they may be. “Сlarity of bulk feed for livestock is also a great concern,” he says. “Another initiative of Senwes is to help make fodder available, coordinating its movement from areas of abundance to areas of shortage. On the commercial front farmers will also be supported by way of subsidies on specific products that are mainly centred on the livestock sector.
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