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ISSUE

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*A resource for Agribusiness*

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1

Livestock fodder replaces crop farming in Zimbabwe's arid areas

21

An ideal market is more than a few companies buying from thousands of farmers

31

Feed standards for animal feeds on the cards



# Table of contents

Editor’s note and contacts .....	II
About the publisher & contributors .....	III
Livestock fodder replaces crop farming in Zimbabwe’s arid areas .....	1
Planning ahead - growing small grain/traditional grains for climate change mitigation .....	4
Underground agriculture in London is gearing up .....	6
Images from space could bolster the global economy – here’s how.....	7
How Costovation through insurance is creating an agricultural revolution .....	9
Seedling production .....	12
Hacking the climate crisis .....	15

Northern California farmers turn to 'regenerative agriculture' for conserving water, growing healthy crops .....	17
An ideal market is more than a few companies buying from thousands of farmers.....	21
Medium-scale commercial farming in Zimbabwe: how has it fared since land reform?.....	23
The Food And Agriculture Legacy Of Mama Sarah.....	25
How COVID-19 is accelerating the use of digital tech in agriculture in East Africa .....	29
Feed standards for animal feeds on the cards .....	31
Cannibalism in chickens.....	33

## Editor's note and contacts

"No race can prosper until it learns there is as much dignity in tilling a field as in writing a poem." – Booker T. Washington  
This quote makes interesting reading.

There are some among us who undermine tilling the land and view the profession as lowly. Yet, without agriculture we all will go hungry. But what is more dangerous is having a farmer who is embarrassed with his/her occupation.

We have to be proud of our farming profession, proud and understand as Thomas Jefferson states that: "Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals, and happiness."

In this edition we carry content on some farmers who are proud of their profession and are succeeding. What would you do if your chickens show tendency for cannibalism?

This is a challenging behaviour in chickens and leads to losses to chicken farmers. Our regular contributor, General Beven

Mundida takes time to highlight solutions for the pecking, tearing and consuming of skin, tissue or organs of other chickens.

We also have an article on livestock fodder, written by Tawanda Karombo, on how farmers are switching from crop to fodder farming in Zimbabwe.

Agronomist Wendy Madzura, as always, shares on yet another important feature to successful agriculture - Planning ahead - growing small grain/traditional grains for climate change mitigation.

I believe that you will find this edition relevant, exciting and inspiring.

### Editor

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# Livestock fodder replaces crop farming in Zimbabwe's arid areas

*Green sanctuaries of lucerne and barn grass sprout in Beitbridge, Mangwe and Pfungwe*



CAPTION PIC NGULUBE - Timothy Ngulube  
PIC - BY Tawanda Karombo

## **By Tawanda Karombo**

Sixty-year-old Timothy Ngulube limps across his smallholder farm in rural Beitbridge, explaining his plans for the almost two hectares that lie fallow adjacent a thriving lucerne and barn grass crop.

His gaiety and confidence over the prospects of his fodder farming business feeds into his surprise energy sanctuary for a man his age.

Even then, and by his standards – he concedes – he has become slower, the allure of fodder farming keeps him going, in defiance

of the natural forces that come with age.

The smile that he frequently plasters on his face as he looks over to his cattle and goat zero-grazing pens betrays the commercial buds of successfully moving away from crop farming to fodder farming for cattle feeding which is essentially what keeps him going.

“It is laborious and for my age it can be much more work compared to when I was young. Despite the labour I have to put in, I am the one who reaps the rewards as I am able to feed my cattle and goats which are my sources of livelihood,” Ngulube explains in an interview.

His smallholder farm, measuring approximately four hectares has transformed from the dry and parched land synonymous with the arid areas of Beitbridge, Hwange, Gwanda, Matobo and Uzumba among others, to a rare aquifer. Infact, Ngulube is now a model farmer for fodder farming, a venture that is becoming more popular in Beitbridge as the effects of climate change result in crop failures.

Catholic Relief Services (CRS) and other organisations are capacitating farmers in arid areas with skills to move away from crop farming to embrace livestock farming and boost their prospects to earn a livelihood from agriculture. Crop yields in Zimbabwe's arid conditions have been declining as climate change conditions mean lengthier dry spells and sustained droughts on more frequent occasions.

The fodder crops grown in Beitbridge are used as animal feed and help in the fight against erosion which is becoming a common problem because of deforestation. Even cabbage is used as cattle feed by other farmers in the area.

However, lucerne grass and barn grass have the advantages that they can be harvested and allowed to re-grow. They can also be stored for later use, which makes them an attractive berth for



*PIC SINGO - Oscar Singo  
PIC BY - TAWANDA KAROMBO*

cattle farmers.

CRS and other organisations are helping these farmers with capacity building, assisting with deep borehole drilling which can be difficult in the rocky and dry areas. Even then, other farmers are using their own resources to drill boreholes.

Oscar Singo, who is 36 years old, has just weaned himself off a community project where villagers in Beitbridge were learning various self-sustaining techniques, including fodder farming. He said under the dark clouds gathering on the horizon that crop farming, especially maize, was failing in the area.

This is why he was now growing cabbages and lucerne grass at a medium sized garden he inherited from his father. He has since expanded the garden and is utilizing an old borehole that his family sunk but which frequently breaks down. This has not dampened his spirit and he is confident that he will have enough resources to sink a new borehole to sustain the fodder garden.

Unlike Ngulube, Singo is growing cabbage and the crop is not for re-sale in Beitbridge town but to feed his cattle. He already knows a lot about the market dynamics and explains that various market segments for cattle have different pricing models. A farmer can sell his cattle to an abattoir, to buyers who come to the villages or to butchery operators.

"There is zero grazing for my cattle. I also buy emaciated cattle from the village and bring the stock to my place for fattening before selling them or auctioning off," Singo says as he harvests some cabbages to feed his cattle.

"You have to be knowledgeable about the market dynamics or you do not make a profit and that is something that is not acceptable to me as a farmer."

Gwinyai Chibaira, the agri-livelihoods project manager for CRS Zimbabwe has seen successive droughts in the country happen alongside floods in other areas and wipe out prospects for farmers, hence the agency is “helping farmers to recover after losing their livelihoods” due to the climate change induced disasters and adverse weather conditions.

He says there has been increased uptake of fodder farming, thanks to the capacitation programmes and research in the nutrition value of fodder for purposes of feeding cattle, goats and sheep in areas like Beitbridge. He says CRS decided to come up with the fodder farming initiative in arid areas as a means of boosting livelihoods for villagers that are suffering from climate change impacts.

Ngulube has over 100 goats and sheep, with half of these on zero grazing and the others allowed to roam nearby bushes under the watchful eyes of a German Shepherd dog. He says he wants to increase his stock so that he can fully boost the venture.

“I want to find money so that I can install solar pumps to irrigate the fodder for my livestock. This is just a small piece of land (about 1.5 hectares) but the fodder grows continuously after cutting and feeding,” said Ngulube.

A new kind of business is now up-shooting for Ngulube and other fodder farmers. As the fodder farming glitters like gold for them, other villagers from the area and from around the country are starting to see the value and are now considering venturing into the business.

This has given rise to opportunities for current fodder farmers who can harvest seed from their plants for re-sale to farmers from other areas. It is a key value addition option that can earn them additional revenue which they believe will be useful in their business.

Relief agencies are banking on the transforming impact of these projects to provide the launchpad for food security in Zimbabwe, apart from the commercial prospects of fodder farming for cattle grazing.

In Zimbabwe, rural dwellers depend on natural rain-watered green pasture for their animals to graze but have been hit hard by droughts in the past few years. The 2020/21 season has seen a shift in fortunes, with excessive rainfall also bringing diseases for cattle that roam communal lands.

Experts say zero grazing cattle have better prospects of avoiding



PIC REUBEN - Reuben Ndou  
PIC BY - TAWANDA KAROMBO

disease outbreaks. At the same time, families and farmers switching to this venture can sustain themselves.

In Fula village, also in Beitbridge, six members of a learning center started a private livestock company in 2015, to raise and sell goats.

They called it the Tusunami Goat Private Company, according to CRS, which trained the company members to care for the animals and provided support to help the group set up the company, in addition to linking them up with the International Livestock Institute.

The institute provided the goat company from Beitbridge with seed capital to “buy an initial stock” of 93 goats. Similar projects are being implemented in Mangwe District as well as in Pfungwe.

# Planning ahead - growing small grain/traditional grains for climate change mitigation



*In the picture White (Top) & Red Sorghum*

**By Wendy Madzura**

In the coming season, 2021/2022, farmers should seek to amplify their efforts in small grain production as this plays a pivotal role in climate change mitigation efforts. The increase in small/traditional grains would greatly fit into the goals of the agriculture recovery plan which seeks to increase productivity through promoting diversified cropping programs.

Speaking at the Seed Co Rattray Arnold field day on the recently, Lands, Agriculture, Fisheries, Water and Rural Resettlement Minister Dr Anxious Masuka emphasized the importance of embracing small/traditional crops significantly as such farmers across the country are implored on to establish small grains in the 2021/22 farming season

The morphological (structural) and physiological (functional) adaptations of small grain cereal crops has enabled them to be grown under heat and drought stress conditions caused by climate change. Small grain cereals play a vital role in food and nutrition security in Zimbabwe.

Cereals such as millet, rapoko and sorghum are among the most adapted small grain crops that can be grown in Zimbabwe. Over the years, they have been recommended for low rainfall areas which include region 4 and 5. However in light of climate change, it has become apparent that going forward every farmer should aim to grow drought tolerant crops even in high potential areas to promote diversified crop production and mitigate the risks of crop failure. These crops can grow with a rainfall range of 450mm – 650mm.

Sorghum is one of the most important small grain cereals grown in Zimbabwe. This crop has the potential to contribute towards food security if it is coupled with other major food crops like maize. Sorghum is bred in two major classes, white sorghum varieties which include Marcia & SC Sila and red sorghum varieties which include SC Smile. White sorghum can be used for human consumption, clear or opaque beer brewing

and livestock feed because of its low tannin levels. Farmers are encouraged to select white sorghum varieties that are high yielding, disease tolerant, short statured varieties which enable high plant populations. Farmers should always grow certified seeds to increase yield levels and ultimately profit margins (a higher return per dollar invested).

The red sorghum varieties are Brownish red seeded open pollinated varieties (OPV) with good brewing qualities as exemplified by SC Smile. Red sorghum has high tannin levels which give the bitter taste suitable for beer brewing. Tannins may affect protein digestibility in humans and livestock making it unsuitable for consumption. Red sorghum is mostly grown under contract with beer brewing companies making it lucrative for farmers to consider to increase cash flow and make their farming enterprises more profitable.

The best time to plant sorghum is from end of November to mid-January. It is important to take note of the planting window to ensure that productivity is optimized in small grain production.

When planning for next season, farmers should plan to achieve optimum plant populations. Populations have a great impact on the yield per unit area which impacts on productivity levels. The seed rate for sorghum depends on the size of the seed. It can range from 5kg – 10kg per ha with more seed being required for large seeds.

The correct spacing is 75 cm X 5 cm to achieve a plant population of 200 000 – 250 000 plants/ha. After planting, thinning should be done before tilling begins (4 weeks after emergence). All gap filling should be done early to achieve a uniform crop stand.

As farmers plan to embrace small grain production in a bid to mitigate climate change in the coming season it is important for them to note that sorghum can be grown in different soil types but is less adapted to sandy soils owing to their susceptibility to nematodes and low pH levels. Optimum pH levels are (5.5 -6.8 Calcium Chloride scale).

Rotations are a key element in sustainable agriculture initiatives that seek to conserve the environment and hence are encouraged. Farmers are therefore encouraged to do crop rotations from different families for example soya bean or groundnuts.

For any cropping program to be successful, the adoption of Good Agronomic Practices (GAP'S) plays a pivotal role in the drive towards increasing productivity. In sorghum production farmers are encouraged to establish the crop with a light fertilizer application of 150 – 300 kg per ha as this provides phosphorous during the early stages of root development and crop establishment.

Fertilizer rates should be guided by soil analysis results & previous crop history, because sorghum like many crops, has been found to benefit from residual soil nutrients. This is followed with a top dressing of 100 – 200 kg per ha of a nitrogen based fertilizer. Organic fertilizer like manure is highly beneficial to sorghum.



Organic fertilizer also improves the soil structure, promoting sustainable and more environmentally friendly agricultural practices. Competition from weeds should be managed to optimize on yields.

Effective pest control can be achieved if regular scouting is religiously followed so that insect pest such as aphids, boll worms and leaf hoppers are controlled before they reach economic threshold levels that can cause significant yield losses. Farmers are encouraged to seek advice from agronomists for effective pest control.

Having received significant rains across the country in the past weeks, farmers are implored to utilize the rains in applying top dressing fertilizers for effective vegetative growth. The future of our agro – based economy is highly dependent on crop diversification hence in future small grain production should be amplified across the country as a measure to mitigate climate change. Planning ahead is the key to successful farming

**Wendy Madzura is Head of Agronomy Seed Co Zimbabwe**

# Underground agriculture in London is gearing up

*Growing Underground in London is one of the largest underground vertical farms in the world that is controlled entirely by a digital twin at the University of Cambridge.*



**By Maurits Kuypers**

All the good things an old World War II bunker can bring, right? Thirty meters below ground, near the London New Covent Garden food market, two entrepreneurs have been working together for several years with the British University of Cambridge on an underground farm that has great ambitions.

Their intention is not only to significantly increase production on-site over the coming years. The project also serves as an example for the whole world, according to co-founder Richard Ballard,

By 2022, Growing Underground aims to produce 60 metric tons of vegetables across an area of 528 square meters. That should be enough for 10,000 households and is 12x more than what is produced on a regular farm.

## Energy and water

Vegetable cultivation takes place without soil, as the plants thrive on a kind of 'woolen carpet' that uses very little water. "70% less than on a conventional farm," claims Growing Underground. Energy consumption is also low due to the great depth – which ensures few temperature fluctuations – and thanks to the energy-efficient LED lighting.

Nevertheless, energy is the one thing that still stands in the way of a global breakthrough. Ballard: "Vertical agriculture is on the verge of exponential growth due to ever-improving LED technology, the Internet of Things, cloud computing, and wireless sensors. But the really big breakthrough will come once more and cheaper renewable energy becomes available that can also be stored."

Ballard believes vertical agriculture can make a significant contribution to the food problem we undoubtedly have in store as a result of an ever-growing global population. For a techie, the fun part is that it also requires a lot of high-end sensor technology.

## A digital twin

There are 25 sensors in the underground farm that constantly track how the plants are doing. E.g., whether something needs to be done with the amount of CO2 in the air, nutrients, temperature, humidity and light. In total, 89 variables are involved. Even the speed at which the plants grow is measured, says researcher Melanie Jans-Singh from the University of Cambridge.

Jans-Singh: "The digital twin provides us with a 3D representation of the situation in London here in Cambridge. That image is even better than if you were there on site yourself. The digital twin can do much more than a human being. It can monitor, learn, give feedback and make predictions. All factors that will help increase productivity."

A great deal of research into vertical farming is also being done in the Netherlands, such as by the company Plantlab.

**Source** – Innovation Origins



Melanie Jans-Singh

# Images from space could bolster the global economy – here's how



This article is part of the Global Technology Governance Summit

- Data collected from space can help countries tackle issues like water scarcity and food security.
- Free and openly accessible earth observation data is already being used to predict crop yields and measure the impact of transport projects.
- Satellites can map physical, economic and social changes when reliable data from other sources may not be consistently available.
- Harnessing images in this way can help reduce water used to grow crops by as much as 33%.
- This technology can support the UN's 17 Sustainable Development Goals.

Using satellites to track changes in water, land, construction and vegetation can transform economies – and could unlock more than \$2 billion a year of benefits for Africa alone.

This earth observation could be one of Africa's most valuable assets, helping to tackle water scarcity, food security, coastal erosion and deforestation, according to a new Forum report.

The report, "Unlocking the potential of Earth Observation to address Africa's critical challenges", quantifies the potential impact of Digital Earth Africa, a project launched in 2019 to make global satellite imagery more accessible.

And it's particularly useful for developing countries, according to a World Bank blog, since satellites can map physical, economic and social changes where reliable socio-economic and demographic data may not be consistently available.

## How it adds up.

Image: World Economic Forum report: Unlocking the potential of Earth Observation to address Africa's critical challenges

By providing ready-to-use data for decision-makers in government and business, the programme could boost Africa's earth observation industry by \$500 million by 2024 while providing \$900 million in annual gains in agricultural productivity. This includes water savings, improved crop yields, insurance benefits and reduced pesticide use.

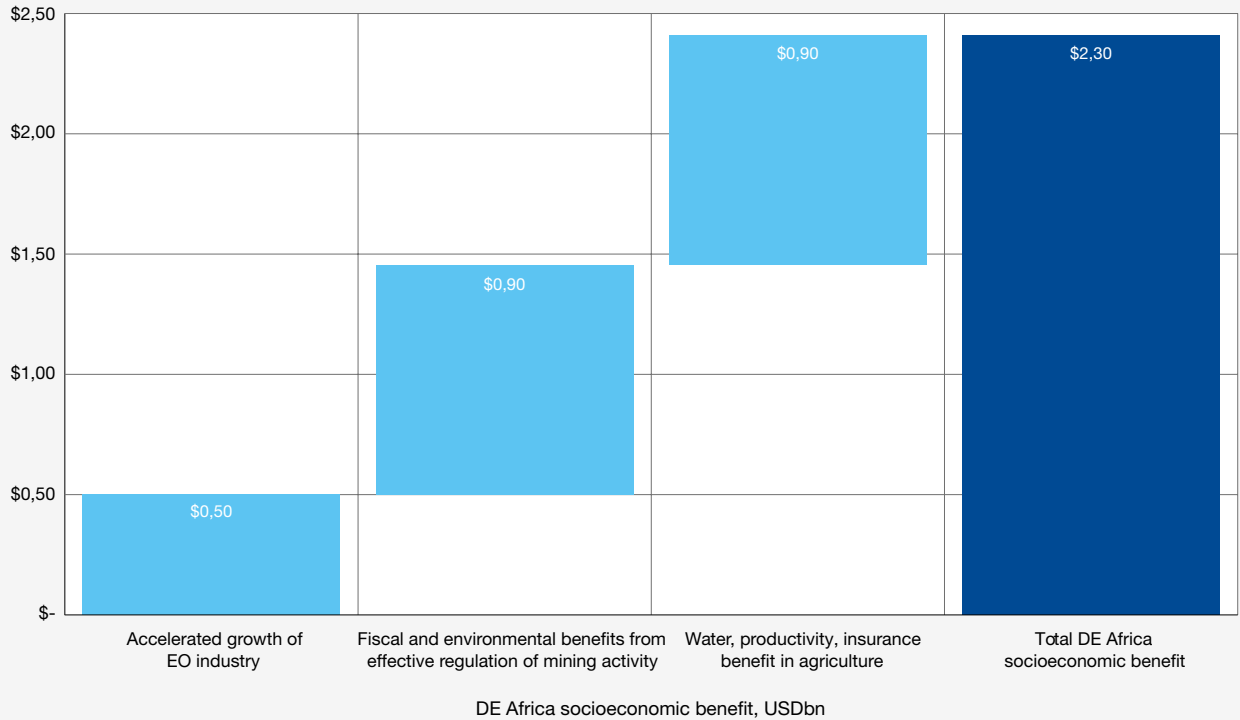
Another \$900 million could be saved through better regulation of gold mining – particularly by reducing environmental damage and tax evasion from illegal mining.

## Building resilience

As the COVID-19 crisis evolves, ensuring earth observation data is widely available will help Africa monitor changes in people and the environment, while building resilience.

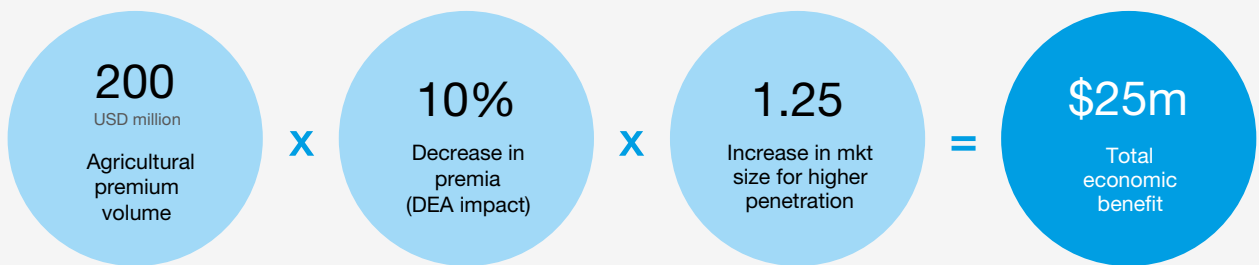
There are also "new opportunities for industry profitability and productivity in many sectors, such as land planning, agriculture and mineral exploration," the Forum says.

FIGURE 1 | Even under conservative assumptions, by 2024 DE Africa socioeconomic benefits could exceed \$2bn per year



Source: Team Analysis

FIGURE 1 3 | By helping develop more sustainable products based on transparency, DEA will decrease premia paid by farmers by \$20m and expand market size by \$25m



Source: The World Bank

Source: UK Space Agency

Source: UK Space Agency

assuming DEA/EO services applied by every African farmer

Source: Team Analysis

*Using satellite data to better manage how water is used could save Africa more than \$880m a year, according to Digital Earth Africa.*

*Image: World Economic Forum report: Unlocking the potential of Earth Observation to address Africa's critical challenges*

Examples in the report include a trial in Salinas, California, where NASA has demonstrated that satellite images can reduce water used to grow lettuce and broccoli crops by up to 33%, relative to standard practice.

Digital Earth Africa uses openly accessible and freely available satellite observations to produce its “decision-ready” products. To help bridge key social and economic inequalities, the Forum has called for more geospatial data to be integrated into business models and political decision-making. It is calling on governments, industry and entrepreneurs across Africa to drive this change.

### What is the World Economic Forum doing about the Fourth Industrial Revolution?

#### Fundamental force

The increasing availability of satellite data is one of the “fundamental forces” shaping economic development, according

to the World Bank, which provides financial and technical support to developing countries.

One of its projects involves using satellite data to help developing countries make progress on the 17 United Nations Sustainable Development Goals. These include ending poverty and hunger and combatting climate change in the run up to 2030.

Satellite tools and measurements have led to innovations in areas such as predicting crop yields in small-holder farms in Uganda, measuring the impacts of transport projects in South Asia and India, access to electricity in rural areas, and mapping land cover and land use dynamics in Vietnam.

“Earth observation data provides valuable information about the nature, evolution and drivers of economic development,” according to the World Bank blog on innovations in satellite measurement.

**Source – World Economic Forum**

# How Costovation through insurance is creating an agricultural revolution

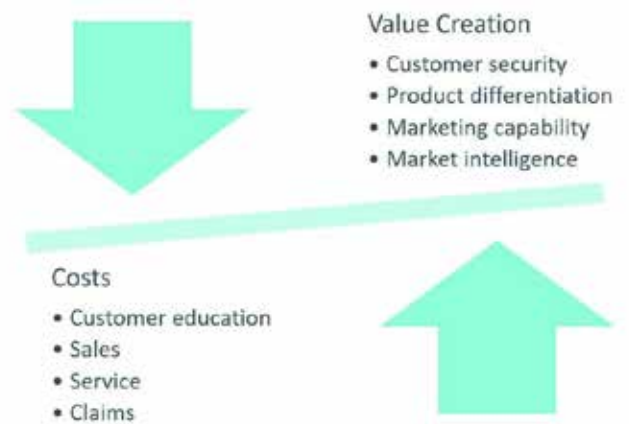
**By Stephen Wunker**

In Africa, there is a product which smallholder farms urgently need, yet which few understand or think they can afford: insurance. Droughts, pests, floods, and other natural maladies can devastate a crop for the year and put farmers – as well as whole communities – at great risk of extreme hardship.

Yet, with few exceptions, the idea of paying a premium seems like wasted expense for populations unfamiliar with insurance. Worse, the cost of selling low-value policies, servicing them, managing claims, and combating potential fraud are prohibitive for an industry that has to keep costs super-low to make its offerings affordable for these target customers. Therefore, although Africa boasts 17% of the world’s arable land, it represents under 1% of worldwide agricultural insurance.

This is a prime opportunity to illustrate the principles of Costovation – the application of innovation tools to achieve dramatically lower costs while still meeting customer needs. The story of Pula Advisors, a Swiss firm that recently closed a \$6 million Series A investment, shows how to reconceive a market in ways that radically shrink costs while simultaneously

benefiting customers:



*Caption: Pula’s microinsurance innovations have created new forms of value while radically lowering costs. NEW MARKETS ADVISORS*

First, Pula sought to Achieve Breakthrough Perspective. Pula’s



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founders had deep experience in the economics as well as attitudes of African agriculture. Many firms before them had endeavored to educate farmers about the virtues of insurance, but it was a costly, uphill task that still left many problems remaining. When customers did see the value, they often held back on purchasing a policy until they could see weather or other risks starting to materialize, which is precisely when an insurer doesn't want customers to seek its products.

So the Swiss-Kenyan team that created the company looked at other cost drivers and strategies across many types of innovation, thinking well beyond the product itself. If they could make insurance very widespread, they would avoid the problems of adverse selection which lead the riskiest customers to be the likeliest ones to seek policies. If they could piggyback on another purchase, they could skip many sales and education costs. And if they could make policy payouts largely automatic, based on crop and weather indexes, they could sidestep having expensive processes for claims adjudication.

Next, they had Relentless Focus on a business model. Pula was determined to swim with the tide of other purchases being made, rather than struggle to create demand for an unfamiliar type of product which demanded money upfront for uncertain returns later on. So it teamed with companies which supply seeds and other crop inputs.

Pula figured that policies should be activated at the Point of Sale when, for instance, bags of seeds were purchased. The shop could educate the farmer about the benefit and activate the policy – this helps ensure the financial health of its customers and aids in upselling customers to more advanced and costly

inputs such as those from its commercial partners. Finally, they had a Willingness to Blur Boundaries. Now that Pula had figured out cost drivers to focus on and had a business model clearly targeted, the company sought to find all the ways to drive value and deliver on stakeholder Jobs to be Done from its unique approach. It realized, for instance, that the process of activating insurance gave the company direct digital access to farmers, often via cellphones, which would enable its agricultural input partners to be able to digitally market to these customers for the first time.

Moreover, it could use these direct connections to activate customer referral programs and provide real-time market data about what products were being consumed in which quantities by whom and where. Complex supply chains had typically obscured this data before. For the input companies, insurance became not just a value-added service but an important route to growing market presence and information.

Pula is now scaling up while expanding its services, for instance working with fodder companies to insure cattle grazers in Ethiopia. While microinsurance has often struggled with cost and claims issues, Pula may have cracked the code in its field on how to keep expenses truly minimal while protecting customers' scarce assets.

Stephen Wunker leads the consulting firm New Markets Advisors and is an author of three popular books on innovation: Costovation (HarperCollins, 2018), Jobs to be Done (Amacom, 2016), and Capturing New Markets (McGraw-Hill, 2011).

**Source - Forbes**

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# Seedling production

## Using the float system technology

**By Fungai Zinyandu**

Tobacco Research Board, Kutsaga Research Station, P. O. Box 1909, Harare, Zimbabwe

Successful and profitable crop production is dependent on, amongst other things, adequate nutrients, moisture and the number of plants that establish and survive to maturity. This can, in part, be achieved by selecting the correct seedling propagation method.

The float system method is a hydroponic, soilless technique for seedling propagation, which eliminates the need to fumigate. Seeds are sown in polystyrene (available from Kutsaga Research Station) or plastic trays. Both have the ability to float in hydroponic ponds and by capillary action, water moves to the surface through the soilless media (GromixPlus® available from Kutsaga Research Station). The technique can be established in greenhouses or in the open field depending on the availability of resources.

### Float system merits

- Efficient water and nutrient utilization: Reduced water requirements and elimination of nutrient leaching.
- Ease to manage: Minimized weed infestation and reduced labor requirements.
- Reduced foliar disease levels: Requires fewer chemicals and in lower quantities.
- Uniformity of seedlings: Facilitates easier field management.
- Superior seedlings: Uniform, drought tolerant seedlings with a robust root system.
- Lower production costs: Float trays can be used for < 5 years when stored properly.
- Shorter production cycle of seedlings: Seedlings take 4-5 weeks to be ready for transplanting.

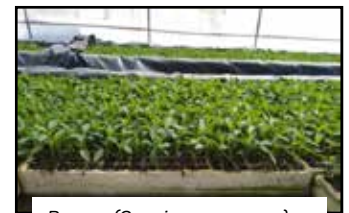
The seedling propagation system is suitable for the production of tobacco, horticultural, flower and forestry seedlings. Seedlings from the following crop families: Brassicaceae (e.g. cabbage and cauliflower), Solanaceae (e.g. tomato and pepper), Chenopodiaceae (e.g. Swiss chard), Compositae (e.g. lettuce), Cucurbitaceae (e.g. cucumber and watermelon), Convolvulaceae (e.g. sweet potato) and flowers such as Chrysanthemum

(*Dendranthema grandiflora*) and gum seedlings (*Eucalyptus* spp) have been propagated successfully using the system.

The hydroponic basal fertilizer, Kutsaga Floatfert® (available from Kutsaga Research Station) is used as a nutrient source for the seedlings and no additional fertilizer is required for horticulture seedling production. The basal fertilizer is applied at predetermined times according to the type of crop. The recommended nutritional information by seedling type is presented in the tables below:



Cabbage (*Brassica oleraceae*)



Pepper (*Capsicum annuum*)



Lettuce (*Latuca sativa*)



Tomato (*Lycopersicon esculentum*)



Sweet potato (*German II and Beaurigard*)



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**Kutsaga Research – Maximizing Economic Value**

<b>FERTILIZER PROGRAM FOR TOMATO SEEDLINGS</b>
<b>1. At sowing - first Floatfert® application (37.5 mg N/L - 21 ml/tray):</b> First check water levels before fertilizer application.
<b>2. 14 days after sowing - second Floatfert® application (37.5 mg N/L - 21 ml/ tray):</b> First check water levels before fertilizer application.
<b>FERTILIZER PROGRAM FOR OTHER HORTICULTURAL SEEDLINGS</b>
<b>1. At sowing - first Floatfert® application (25 mg N/L - 14 ml/tray):</b> Before any fertilizer is applied, check water levels (rule of thumb).
<b>2. 7 days after sowing - second Floatfert® application (50 mg N/L - 28 ml/tray):</b> First check water levels before fertilizer application.
<b>3. 14 days after sowing - third Floatfert® application (75 mg N/L - 42 ml/tray):</b> First check water levels before fertilizer application.
<b>FERTILIZER PROGRAM FOR GUM SEEDLINGS (128 cell trays)</b>
<b>1. At 7 days after sowing - first Floatfert® application (1 L / 88 trays):</b> Before any fertilizer is applied, check water levels (rule of thumb).
<b>2. 21 days after sowing - second Floatfert® application (2.5 L/ 88 trays):</b> First check water levels before fertilizer application.
<b>3. 35 days after sowing - third Floatfert® application (3.5 L/ 88 trays):</b> First check water levels before fertilizer application.
<b>4. 42 days after sowing- ammonium nitrate application (600 g/ 88 trays):</b> First check water levels before fertilizer application.

The float seedling production system will substantially lower total seedling production costs, facilitate easier crop management in the field, and consequently improve quality and yield.

**For more information,** contact the Tobacco Research Board's Kutsaga Research Station Crop Productivity Services Division on telephone # VOIP +263 86 8800 2604, Sales: +263 712 881 814/ +263 712 886 946 or email: tobres@kutsaga.co.zw; sales@kutsaga.co.zw.

# Hacking the climate crisis

Shana Rappaport, Vice President & Executive Director, VERGE, had an interesting conversation she had with Sanjana Paul a 23-year old scientist, electrical engineer and environmental activist on a mission.

The interview was first published in the VERGE WEEKLY.

We publish here the conversation between Rappaport and Paul which raises pertinent issues around climate solutions and technology innovation and environmental justice.

The interview has been edited for clarity and length.

Paul has worked at NASA. But her mission isn't to explore the outer edges of the solar system. Instead, it's to harness the full power of technology and the ingenuity of young people to solve our most pressing environmental challenges – right here on Earth.

In addition to her former role as a junior atmospheric science software developer at NASA, and her current work as a researcher at MIT, Sanjana is the founder and executive director of Earth Hacks, an organization that hosts hackathons for college students to combat the climate crisis.

**Shana Rappaport: Before we get into Earth Hacks' mission, let's start with your own passion for innovation. What technologies are you personally most excited about or inventions are you most proud of?**

**Sanjana Paul:** That's a great question, and not an easy one because the answer changes every few months! The technology landscape is evolving so rapidly and always reflective of the society that we live in.

I think I'll have to stick with a classic and choose harnessing the photoelectric effect through solar panels. The trajectory we're on of being a planet powered by the sun is such a powerful way to support a growing, thriving society.

**Rappaport: You also have some inventions of your own. Can you speak briefly to those?**

**Paul:** I've been fortunate to work on a number of different hardware prototyping projects that I'm very proud of. One



is what's now the Sentinel Project at Conservation X Labs, which is a next-gen camera trap for wildlife conservation that harnesses the power of artificial intelligence to assist wildlife conservationists. Another is a robot that I created with a partner of mine, called FLOATIBOI, that captures marine plastic debris in coastal areas using visual identification. [Editor's note: FLOATIBOI is short for Floating Long-term Oceanic Autonomous Trawler Incorporating Buoyant Object Identification.]

**Rappaport: You founded Earth Hacks in 2018 to leverage the power of the hackathon innovation model in direct service of climate education and solutions. Talk a little bit about what set you on this journey.**

**Paul:** I used to go to hackathons as a way to boost my coding skills and supplement what I was learning as an electrical engineering and physics student. But, I'd go to these hackathons and find myself stunned because the problems that they presented seemed completely out of touch with the reality that we are living in. They seemed like things only third-year computer science majors would care about.

So, I started to wonder: If hackathons are a place where really smart people come to essentially give up their whole weekends to work on problems, why are we not presenting societally-relevant problems? And why are we not presenting really time-sensitive problems, like climate change, which is the most time-sensitive issue we have ever faced as a species?

I got a group of my friends together, and we decided to have environmental hackathons as a space to engage with environmental issues and actually start imagining what we can do about them. It all spiraled from there. We started out with one in Richmond, Virginia, and then started getting contacted by students across the country and eventually across the world. We formed an organization around it, and now we're fortunate to have worked with people from every inhabited continent on the planet — on hackathons ranging from creating urban heat island maps to creating better tools for conservationists working with endangered species.

**Rappaport: The EarthHacks model is also working to ensure that great ideas don't just get generated at these student-driven hackathons but are actually implemented. What are some of the real-world projects that have come out of them so far?**

**Paul:** That's a great question, and before I dive into it, I just want to say that one amazing part of all this is that nothing is ever really lost at these hackathons. Even if no cool inventions or startups come out of them, we're still fortunate that this is an educational opportunity — students still walk away learning about these issues and engaging with them more closely than they did before.

That said, we've seen some really incredible projects come out, already being put to work in really interesting ways. We collaborated with a startup called Urban Canopy and with scientists from NASA's Jet Propulsion Lab — working with satellite data from the International Space Station to create the world's first public map of urban heat islands. We basically gave students data, said, 'Pick a city, plot the land surface temperature, and put it on a map.' This told us where urban heat is most concentrated, which we can hand over to city planners or researchers, and hopefully guide policy so that people have to deal less with extreme heat.

Another example is endangered species conservation. We worked with a bunch of nonprofit organizations who focus on vaquitas — a very endangered porpoise that lives in the Sea of Cortez. We were able to create technical tools for the conservation teams to better track the animals and some of the key issues surrounding them; and to engage law students to draft a white paper that is going to go public soon with real recommendations to lawmakers about how to deal with wildlife crime. We also created a public outreach campaign, because no one is going to do anything about endangered species if they don't know about them.

**Rappaport: Let's talk about the intersection of tech, climate and social issues. What are your aspirations for how EarthHacks, and the tech industry more broadly, can**

**work to advance environmental justice?**

**Paul:** First, I just want to acknowledge that, for a long time, I think the environmental movement as a whole was really focused on environmental issues as somewhat abstract, as separate from us. Maybe they affect species in far-off places or natural landmarks whose beauty we marvel at but we've never seen in person.

But fundamentally, the climate crisis is about people, right? It's about whether or not we're going to have the ability to live happy, healthy lives. Because of that, the climate crisis is inherently tied into social justice and social crises. That's why I think that taking a more complete view of climate is so critical.

Second, it's the practical thing to do. If we ignore how social issues are a huge chunk of the climate problem, and how it's actually playing out, we're not going to be able to meaningfully solve either. For the tech industry, specifically, the movement for social, racial and gender equality needs to become integrated into all of the core actions that we take — not just an extra thing to do. Social equity needs to be included in decision-making processes and planning from the very start.

If we don't work to address these issues now, we're not going to be able to when we're overwhelmed by changing temperatures and extreme storms. Even though these can be uncomfortable conversations, we need to expand the cultural window of where they happen and make sure that they happen everywhere all the time.

**Rappaport: You're speaking to an audience of business leaders. What kind of support can the private sector provide to you and other young technologists committed to solving environmental challenges, either as corporate partners or as intergenerational allies?**

**Paul:** I love the phrase 'intergenerational allies' — and I think that's key. The single biggest thing that business leaders today can do to help young people with aspirations is to take drastic action on climate, so that we have the time and space to grow up and to be business leaders ourselves.

The other smaller step that everyone can take is, put simply, to engage. All of the students we work with at our hackathons are always looking for more opportunities. They're looking for people to learn from, to come and speak at their events, to mentor them. They're looking for places to work that are advancing sustainability. So, just engaging with us, reaching out and saying, 'Hey, we'd like to support you in some way' — that's hugely meaningful to us. There are so many different ways to get involved, but it's always going to start with just reaching out.

**Source - The VERGE WEEKLY**

# Northern California farmers turn to 'regenerative agriculture' for conserving water, growing healthy crops



*caption: Tony Rose is the vineyard manager at the Michael David Winery in Lodi. Recology delivers compost there from its North Bay recycling centers. (Larry Strong photo)*

## **By Susan Wood**

Sonoma County organic farmer Bob Cannard has the dirt on what's killing the Earth and refuses to bury his head in the sand about it.

He's part of a growing movement of farmers, vineyard tenders and conservationists who care for the soil as much as the crops.

The outspoken crop whisperer of sorts studies the leaves, sprouts and buds of his herbs, vegetables and fruits on his 40-acre Green String Farm in Petaluma like a microbiologist examines specimens.

"We, (as a society, wrongly) think we need pesticides on everything, perpetuating the concept that there are pests. It's a genetic perversion," he told the Business Journal in early March.

The conventional agricultural system, as he describes it,

rewards herbicide and pesticide use to the detriment of many living species like the monarch butterflies that used to blanket the meadows of milkweed and other pollinator-friendly plants. Now they're near extinction – at last count, down to under 2,000.

"I grew up in Kenwood. We used to see thousands of butterflies," Cannard said.

An early adopter of organic farming in 1976, through the years, Cannard has moved to non-traditional ways of cultivating the growth of his crops. He grows in diversity because "people eat diversity."

Cannard describes keeping a steely eye on his plants and feeding them with raw volcanic rock – calling the growing practice "re-mineralization." He also uses compost from a variety of substances to nurture their growth.

"I'm giving (the land) a smorgasbord. It knows what it wants," he quipped.

Cannard has also tapped into using the little hooves of his livestock, moving them around in sections to fertilize and tenderize the soil.

"There's no reason not to grow the soil, while growing crops," he said.

To him and other environmental advocates endorsing sustainable, "regenerative" farming, these methods of operation work much better than tilling the topsoil entirely off the land, leaving any hopes of growing a bounty of crops in the dust, he lamented.

"If we don't change our ways, we'll go from the rainforest to a Dust Bowl," he said, referring to the 1934 environmental disaster in the Midwest. "We're well on our way to ruining the richness of our natural soils."

## **Bay Area continues to chip in**

The San Francisco Bay Area has long been considered ahead of its time in pursuing sustainable farming before its practices became fashionable.

The Recology recycling center based in San Francisco, with North Bay satellite locations in Santa Rosa, Novato and

Petaluma, celebrates a quarter century this year in turning the mass curbside collection of food scraps into programs supporting healthy soils.

Over the life of the program, the employee-owned organization has diverted 2.5 million tons of compostable material from disposal and transforming the scraps into nutrients local farmers may use on their properties.

"Compost switches on the 'life web' in the topsoil, which helps grow more food," Recology spokesman Robert Reed said.

### **How does it work?**

"Good quality compost is a natural sponge that attracts and retains water," said Reed, who made these vital points in a new Netflix documentary titled "Kiss the Ground."

Reed explained composting can pull carbon and nitrogen from the atmosphere and transform the damaging compounds into nutrients for the soil and consequently the plants. Some of the benefits show substantial benefits above ground.

Recology supplies about 4,200 tons of compost annually to Michael David Winery, where Vineyard Manager Tony Rose has 200 truckloads applied to the grounds of the vineyards producing a dozen varietals. At the Lodi winery where Zinfandel rules, the soil has become so rich with biodiversity that the mustard weed growing in the 8-foot wide rows has shot up more than 7 feet high between the vines.

"It's the tallest mustard I've ever seen," Reed said.

Also, rich blankets of crimson clover and snow pea plants have attracted many butterflies and bees pollinating in the vineyards.

"It helps with organic matter and fertilizer and makes the soil happy," said Rose, who refrains from using any synthetic fertilizer. Rose pays \$450 a truckload and \$5 per ton to Recology and insists the expense is well worth it.

"Some (farmers) have bought into it. I just know you have to spend money to make money," he said.

### **Our climate's quest for water, fueled by drought**

Another advantage to "feeding" the soil in a region plagued with persistent drought involves the tremendous water savings. On March 18, the National Oceanic and Atmospheric Administration predicted this summer's drought conditions will probably inundate the U.S. West and High Plains. NOAA described the weather event as "the most significant U.S. spring drought since 2013, impacting approximately 74 million people," according to spokeswoman Jasmine Blackwell.

California's Department of Water Resources recorded the winter's third manual snow survey early this month and found a reduced spigot of storms descended on the Sierra Nevada Mountain Range this winter, diminishing the snowpack.

DWR uses the snow survey calculations to determine water allocations for consumers to drink and farmers to hydrate their land. More than 750,000 acres cover the state.

With below-average precipitation in California, its reservoirs are showing the impacts of a second dry year. Lake Oroville stands at 55% of average and Lake Shasta, California's largest, now stands at 68%.

Most eco-conscious activists agree that, with the climate's changing patterns that lead to decreasing water supplies and die-offs of pollinators, a lot more needs to be done to help keep our water and food supplies plentiful.

### **A teaching moment, healthy recipe for our planet**

One such effort to help the process includes demonstrations and instructional webinars from conservation districts in which farmers learn climate-smart agricultural methods designed to save water and grow flourishing crops.

Rath recommends farmers seek new ways to compost their soils and use cover crops intended to woo and feed pollinators. In turn, they can feed us as a society, he said during the "Building Healthy Soils and Creating Wildlife" webinar put on by the Solano County Resource Conservation District.

There's evidence of shocking signs of near extinction events of these pollinators, as summarized in scientist Jessa Kay Cruz's presentation on "Creating On-Farm Habitat for Pollinators."

"We've lost 50% of our monarch butterfly population over the last 30 years," she said during the webinar, attributing their demise to habitat loss, pesticides and climate change conditions. With summer imposing higher temperatures into the fall, the butterflies are essentially fooled by what season they're in and don't follow normal migratory habits.

"It's the worst we've ever seen," she later told the Business Journal.

Bumblebee and North American butterfly populations are also on the ropes.

"Pollinators are declining at an alarming rate. It's a really dire story," she said during the webinar, while referring to the Xerces Society's annual count along the California shores through northern Baja.

To get a clear picture of why it matters to the agricultural industry and appreciators of nature, consider this: 85% of flowering plants require an animal to move the pollen. The process enables 35% of crop production in the United States worth at least \$18 billion, according to the Xerces Society.

"That's one in three food bites," she said.

Are farmers on board with new methods of growing crops through "regenerative" agriculture that supports caring for the

soil and using cover crops?

It's an industry that's operated a certain way for generations and one that looks for things to "pencil out" economically.

Still, Cruz is optimistic that most growers have turned the tide to a way of thinking that has proven unsustainable for the industry.

"I really do see farmers reading the writing on the wall," she said.

Recology Account Manager Erin Levine pitches the program to many of the more than 300 farms the organization serves. Not all farmers buy into the climate-changing science, but the work in progress is gaining ground when it becomes an economic issue to these salt-of-the-earth types, she noted.

The motivator for green initiatives is the greenbacks they deliver, Levine explained.

"They're finding the financial incentives. (The practices) increase their yield and they get more, healthier crops," she said. "Biodiversity is the name of the game."

**Source - THE NORTH BAY BUSINESS JOURNAL**





# An ideal market is more than a few companies buying from thousands of farmers



***By Charles Dhewa***

Every marketing season (March to August) in East and Southern Africa is characterized by people from cities camping in rural areas to buy agricultural commodities at very low prices. Farmers will have produced surplus commodities but with no capacity or space to store, process or preserve.

Many buyers from cities take used clothes, shoes, kitchen utensils and other items for bartering with maize, groundnuts, sugar beans, chickens, goats and other commodities. The fact that this practice has persisted for decades is a sign that formal marketing systems have failed to meet the needs of the majority.

## **Local markets as foundation for local economies**

In most cases, urban buyers and middlemen who mobilize grain and other commodities from rural farmers, masquerade as farmers and sell the commodities to marketing boards, benefiting from prices gazetted by governments at the expense

of authentic farmers. This demonstrates the extent to which colonial marketing systems preferred by African governments are rigged against smallholder farmers. Most policies are in favour of middlemen and consumers.

A more viable solution is building strong local markets to anchor local economies and ensure value addition happens in local production zones. African governments should get rid of the colonial model where one or two companies buy commodities from thousands of farmers for a song and go on to do all the value addition in the city. Building the collective common wealth of farmers is about empowering them to do most of the value addition and earning more from their sweat.

## **A case for data collection and interpretation at local level**

Since much of the value addition happens in the cities, nutrition knowledge tends to be concentrated in cities and as you go down to rural communities there is less talk about nutrition. Food diversity is also more pronounced in cities where markets



aggregate as opposed to rural communities which may be stuck with their particular food. Mass markets and processing companies aggregate food for urban dwellers already embedded in nutrition.

Instead of treating farmers and rural communities as data sources only, policy makers should ensure data interpretation happens at community level where impact should be visible. This means parastatals such as ZIMSTAT have to change the way they present data to show what the data means in terms of nutrition at local level, for instance.

Data should be interpreted at community levels. When that happens early warnings will no longer just be about deficits of staples but the entire food basket from community to national levels. Appropriate data collection and interpretation tools should be at community knowledge hubs where information from various sources can be consolidated and adapted.

Local communities are generators of indigenous knowledge. They also play a fundamental role in disseminating what is coming from local experts, local leaders at the grassroots and outsiders. When they own the data collection and interpretation process, farmers and rural communities will participate in processing indigenous knowledge and creatively combining it with external knowledge for the benefit of local communities.

### **Demystifying nutrition at community level**

A major barrier to the adoption of nutrition messages is the scientific language in which nutrition is largely conveyed to ordinary people. This is worsened by the fact that African countries have not invested academic knowledge into indigenous knowledge systems. For instance, nutrition and

related knowledge is abundant in indigenous fruits, herbs, vegetables and other commodities but the amount of quantities someone should consume in order to attain the right nutrition balance remains under-researched and unknown.

When communities are part of data collection and processing, they will assist in demystifying nutrition from being considered a science to a living practice. Working with communities will enable governments to identify their own indigenous food systems. It is easy to facilitate consumption of commodities which local people are already consuming.

To that end, identifying nutrition in existing commodities is a good entry point than, for instance, introducing peas to communities that know nothing about the new commodity. Nutrition is part of people's food systems but what lacks is identification and expression of nutrition in what communities are already consuming. It is as if nutrition is only found in imported foods.

The Western world has taken time to align its food systems with nutrition. Western countries, food systems are derived from processing of food, for instance, into tinned beef, vegetables and other processed foods produced by experts using academic research and expertise. Conversely most African food systems have not subjected to experiments like processing by experts. For at least 99% of the food consumed in Africa, consumers do not know if they are meeting or surpassing nutrition requirements. Imported energy drinks are flooding African markets but people just consume irrespective of energy deficiency levels.

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# Medium-scale commercial farming in Zimbabwe: how has it fared since land reform?

***By Ian Scoones***

Contrary to assertions that A2 medium-scale farms allocated during the land reform are largely occupied by 'cronies' and that they are unproductive and under-utilised, a more differentiated picture emerges, with important implications for policy and the wider politics of Zimbabwe's countryside following land reform.

The paper is based on in-depth empirical studies in Mvurwi (a higher potential area to the north of Harare) and Masvingo - Gutu (in the drier south). The findings are important as they show ways forward for supporting the revival of commercial agriculture in the country.

This has been seriously hampered by lack of finance, sanctions affecting donor investments, uncertainties around the lease arrangements, poorly designed support programmes (notably the Reserve Bank of Zimbabwe (RBZ) mechanisation scheme and Command Agriculture) and selective capture and corruption by elites, during and after the land reform programme.

## **Surprising findings**

The research was carried out during 2019 and involved a representative sample of 90 farms across the two sites, representing around 20% of all farms in the areas. This was a small, random sample, but the challenges of researching A2 farms are well-known to any field researcher in Zimbabwe.

They are scattered over long distances, owners are often not present and because of on-going threats of audits talking to people is often challenging. In the end, we managed to speak to everyone in the sample, generating fascinating reflections on farmers, managers and workers documented in the paper.

The findings were a surprise. In the mid-2000s, we undertook research on a small group of A2 farms across Masvingo province and our conclusions were rather dismal. By-and-large, they were not occupied and if so very little was happening, except for a few individuals where external investments were driving recapitalisation of the farms. When we undertook the recent study, there was much more happening, although anecdotal evidence suggests that this has tailed off as the economy has declined further in the last year or so.

A key period in our reconstruction of the fates and fortunes of each of the farms since the early 2000s was the small window of



*The experience of A2 resettlement farms*

relative stability around the time of the Government of National Unity (2009-2013) and immediately afterwards. At this time, it was possible to raise funds and invest, and markets were relatively stable and commercial agriculture was thus feasible.

Before and after this period, this has not been the case, and over the whole period the lack of financing for agriculture has been a major constraint for all farmers. Without leases being issued, as promised, farmers cannot raise bank credit with their farm as collateral, although some have used houses in town to do so.

Meanwhile, the external financing schemes have not supported production. Across our sample not that many received equipment through the RBZ mechanisation scheme in the 2000s, but as we discussed back then (p.99), and reinforced by recent BSR revelations, this proved a hopeless investment, and mostly a source of patronage-based corruption, with well-connected elites linked to the party-state and military benefitting and so appropriating public resources.

Much the same applies to the Command Agriculture scheme. Since 2016 this has been a loan/subsidy scheme supported by the party-state. In our sample, 43.7% in Mvurwi and 12.0% in



Gutu-Masvingo benefited from the scheme to some extent in 2018-19. Although higher maize yields were achieved on average, it clearly was not a good use of public funds, and much of the investment was wasted, with benefits accruing mostly to the financing 'cartels'.

Indeed, many recipients complained to us that their allocations were late or grossly insufficient, and that it is only a very few well-connected people who can jump the queue and get inputs – fertiliser, seed, fuel and so on – as part of the programme.

### **Patterns of accumulation and differentiation**

Our data show a growing pattern of differentiation emerging between A2 farmers. The standard narrative that A2 farmers are all 'cronies' of the party-state and military and that the land is unutilised and unproductive does not hold up.

Yes, there are those who are beneficiaries of patronage for sure, including via Command Agriculture, but only an elite few gain the full package, and most of those who were recipients in our sample got very little, and complained bitterly.

Equally, there also some who have large areas unutilised, but this is far from the whole story. Indeed, patterns of 'underutilisation' are not hugely different to what was observed during the 1980s and 1990s when these farms were settled by white farmers. It all depends on the focus of production (intensive on small areas or extensive) and the type of operation (irrigated or dryland cropping or livestock, for example), as well as the nature of the land (many areas have extensive rocky areas, unsuitable for agriculture, but great for grazing).

In terms of accumulation patterns, some have access to external finance (from jobs, diaspora investment and so on) and can make a go of it, even under very difficult circumstances. In the two sites, we have some quite successful tobacco farmers in Mvurwi and livestock farmers in Gutu-Masvingo – proper commercial farmers by any standard. Others are more aspiring, and lack the financing, while others are really struggling, farming only a small portion.

Some have managed to mobilise joint ventures with former white farmers or with other investors, including Chinese firms involved in tobacco around Mvurwi, while others benefit from close relationships with tobacco contracting companies. Meanwhile,

others have effectively abandoned farming or may be holding the land speculatively for future generations. Across these groups, especially the aspiring farmers, some are investing in 'projects' on small areas, while others have been joined by other families and are creating 'villages' on the farms.

Perhaps not surprisingly the patterns were very similar to what we found in our study of a former 'purchase area' (small-scale commercial farming area) near Masvingo – again supposedly commercial farms of a similar scale on average. Here we found very similar categories, but perhaps fewer commercial farmers than in the A2 study, in part because of lack of state support of any sort in these areas. And this was 80 years after their establishment, not just 18 as in the A2 farms we studied.

### **Ways forward**

A more differentiated view therefore suggests ways forward for the A2 areas. To ensure more effective, commercial use of A2 areas requires investment based on sustained financing and secure leasehold tenure. A2 farmers we talked to wanted to be independent, not reliant on state patronage, but able to get financing on time to produce successfully. Successful production can also be facilitated through land administration policy – including land audits and forms of taxation – that encourages more intensive, commercial use.

But farm investment will only flow if the conditions are right, which means getting the leases issued, the contestation over land resolved through land compensation and private and public finance made available in flexible forms, and not through state schemes that are prone to corruption and patronage.

Contrary to assumptions – including our own before undertaking this latest research – A2 medium-scale farms do have future, but those with potential need investment and support, while others need to be encouraged to pass on the land they received during the land reform. The next blog will discuss the political consequences of the emerging pattern of differentiation on the A2 farms, and the implications for policy.

This post was written by Ian Scoones and first appeared on ZimbabweLand.

# The Food And Agriculture Legacy Of Mama Sarah



Aug. 26, 2006, then U.S. Senator Barack Obama, right, walks with his grandmother Sarah Obama at his father's house in Kogelo village, western Kenya. (AP Photo/Sayyid Azim, File) ASSOCIATED PRESS  
The farm, which her famous

***By Daphne Ewing-Chow***

Before his 2008 election, former US President Barack Obama's step grandmother Sarah Ogwel Onyango Obama or "Mama Sarah" as she was affectionately known, was best known in her rural village of Nyang'oma Kogelo, in Western Kenya for bringing mandazi or sugar coated doughnuts and porridge to schools in the community.

As a farmer, an agricultural ambassador, a food security activist, a market vendor, a philanthropist and a food entrepreneur, Mama Sarah's story was one that could be told in food.

The farm, which her famous step grandson would refer to in his memoir, as "a small plot of earth, an ocean away," was Mama Sarah's primary source of income, from which she would raise and educate his father, her stepson Barack Hussein Obama Senior, and help orphans, many of whom would eventually come to live with her.

A member of the Kenya's Luo ethnic group, comprised mainly of pastoralists, Mama Sarah was no stranger to food insecurity. Croft, Marshall and Hallett (2016) refer to Western Kenya as "a prime example of the interconnected and complex issues of poverty, malnutrition, and low agricultural productivity which has created many food insecure communities." Eighty per cent of Western Kenya's farmers are women, the majority of whom do not own the rights of the land on which they work.

## **PROMOTED**

Mama Sarah "had no formal schooling, and in the ways of her tribe, she was married off to a much older man while only a teen," said Barack Obama, of Mama Sarah's life.

"She would spend the rest of her life in the tiny village of Alego, in a small home built of mud-and thatch brick and without electricity or indoor plumbing. There she raised eight children, tended to her goats and chickens, grew an assortment of crops, and took what the family didn't use to sell at the local open-air market," recounted her famous grandson.

Mama Sarah was a poultry farmer. Joe Ombuor, a journalist for Kenyan newspaper, The Standard depicted large numbers of free-range chickens that indiscriminately roamed the Obama property, many choosing to settle atop the adjacent gravestones of her husband Barack Obama's grandfather, Hussein Onyango,

who had been a great chicken lover, and Barack Obama's father, Barack Hussein Obama Senior.

According to Kenyan tradition, a visitor's significance is symbolized by the size of the chicken slaughtered in their honor and Mama Sarah said that she had slaughtered cocks for her grandson on three occasions— first when he visited upon the death of his father, then as a US senator, and finally as the President of the United States.

### ASSOCIATED PRESS

Mama Sarah's shamba or farm was also a home to cattle, exotic birds and a variety of crops such as avocados and bountiful mango trees that littered the soil with their fresh fruits.

There was a dairy unit from which milk was sold at subsidized prices to the local schools, as were eggs from the chickens and fish from the farm's pond.

Mama Sarah would frequently attend the Nyang'oma market where she had a small stall selling produce from the farm and foods that she had made at home, such as Sukuma Wiki, a spicy dish of braised collard greens.

As a farmer in the early 1940's, the family matriarch relied on ox-drawn ploughs but would later substitute these for tractors. But even as farming practices in Western Kenya became more automated and commercialized, she continued to rely on traditional farming techniques.

When Joe Ombuor interviewed Mama Sarah for The Standard, in advance of President Barack Obama's much-anticipated visit to Kenya in 2015, he marveled at how she would thresh maize— a post-harvest practice that is typically automated— by using her bare fingers, as she engaged with other women on her compound.

Mama Sarah was a naturalist and would become a well-known ambassador of ecological push-pull farming, an organic practice that relies on natural insect-plant and insect-insect relationships rather than toxic chemicals to deter pests from food crops such as maize. She began to promote the farming method due to its positive impact on yields and food security.

The interconnection of economic development and food security was not lost on Mama Sarah. After all, the majority of the proceeds from her farm went towards the education of her stepson and the orphans in her community, and agriculture would eventually become one of the pillars of her philanthropic initiatives.

Mama Sarah would use her fame as a platform for her philanthropy, through the Mama Sarah Obama Foundation, which provided food and education to orphans.

The foundation promoted farming as a means of improving food security and reducing poverty and supported the alleviation of waterborne diseases by providing clean water to the communities



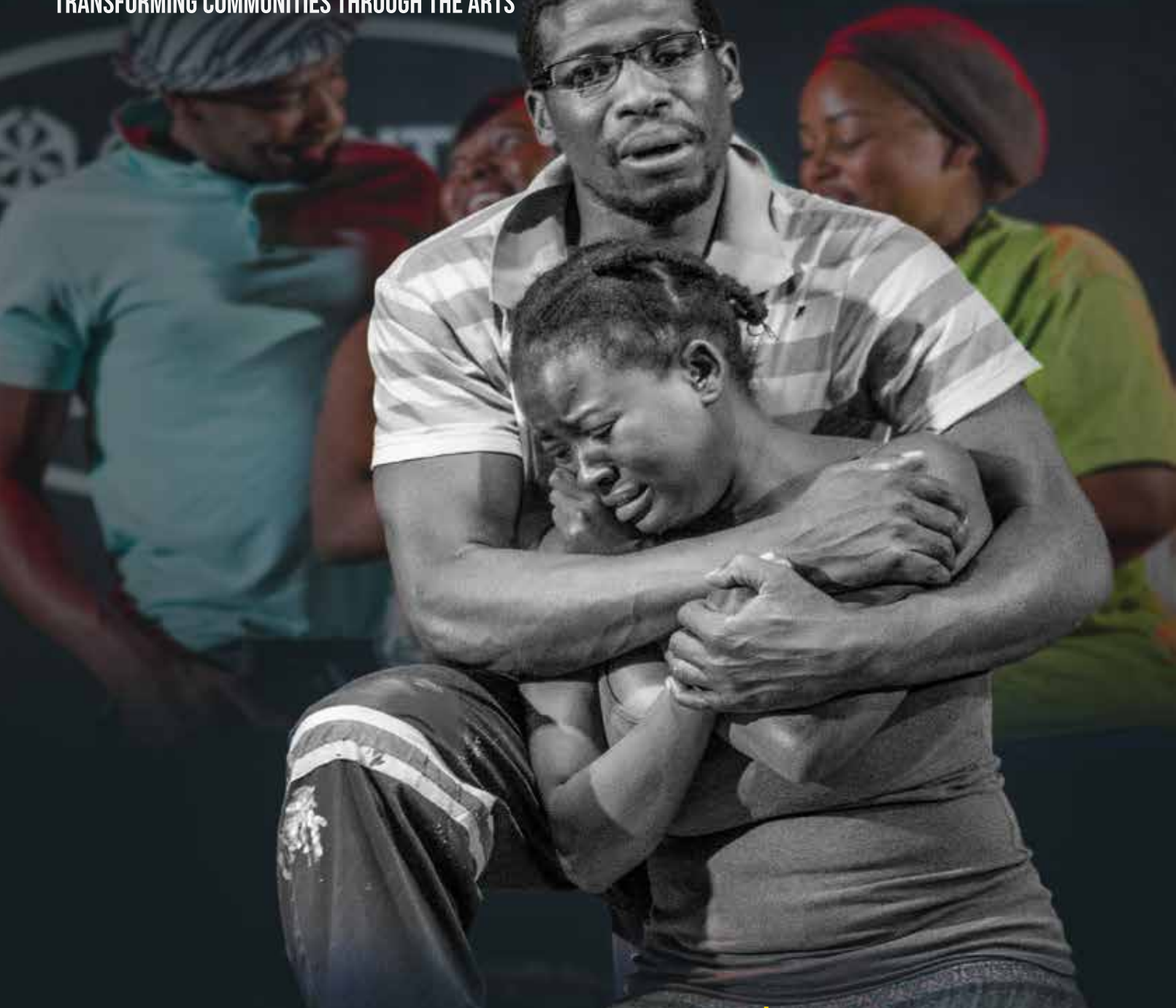
*Push-Pull' technology was developed by scientists at the International Centre of Insect Physiology and Ecology (icipe), in Kenya and Rothamsted Research, in the United Kingdom and is ideal for resource-poor smallholder farmers in Sub-Saharan Africa. DAPHNE EWING-CHOW*



*Aug. 26, 2006, then U.S. Senator Barack Obama, right, walks with his grandmother Sarah Obama at his father's house in Kogelo village, western Kenya. (AP Photo/Sayyid Azim, File)*

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which it served.

As she became more immersed in her foundation, Mama Sarah's daughter, Marsat Onyango took over the operations of the family farm.

Onyango would collaborate with Amiran Kenya, a Kenyan farming company focused on creating opportunities through modernized crop production techniques.

Through the collaboration, they would demonstrate how modern methods and technologies, such as greenhouses, can help to make ideal use of small plots of land so that subsistence crops such as beans and maize could be converted into cash crops.

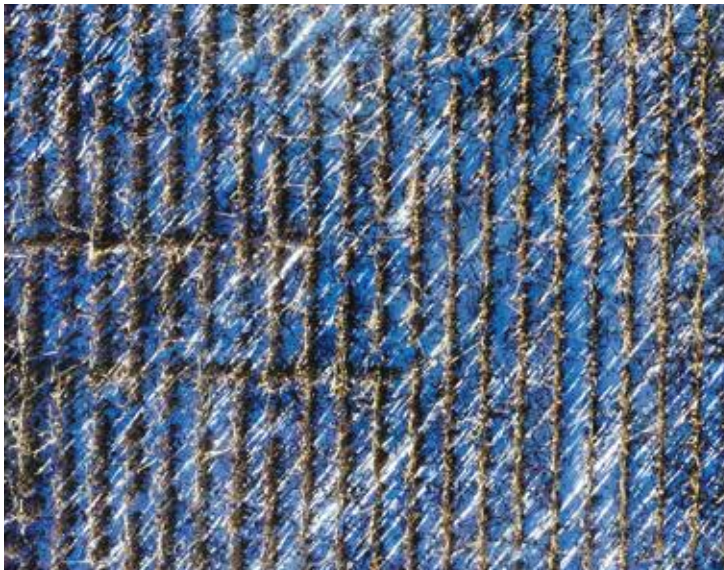
In recognition of her many achievements, Mama Sarah was granted the inaugural Women's Entrepreneurship Day Education Pioneer Award by the United Nations in 2014.

When Mama Sarah passed away on March 29 2021, she took exactly eighty years of farming knowledge with her. During her eight decades as a farmer, she used food to lift herself and others, including Barack Obama's father, Barack Obama Senior, out of poverty.

Mama Sarah Obama was buried on March 30 2021 at her home, beside her husband and stepson. Governor of Kisumu, the capital of Western Kenya, Professor Anyang' Nyong'o said at her funeral that the Obama home in Nyang'oma Kogelo should remain a shrine to the world as it produced men and women who had made history, despite coming from humble beginnings.

Daphne Ewing-Chow is an environmental writer with a focus on food and agriculture, and commute between the Southern Caribbean (Barbados) and the Northern Caribbean (Cayman Islands)

**Source - Forbes**



# How COVID-19 is accelerating the use of digital tech in agriculture in East Africa

**By Max Mendez-Parra**

The COVID-19 crisis has generated sudden and significant changes in the way that people work, produce, consume, trade and live. There has been the widespread turn to working from home (especially for typical white-collar activities), and the deepening reliance on e-commerce for groceries and other daily goods, which has affected notoriously traditional retail.

However, with the exception of the temporary impact of the pandemic on travel and other leisure activities, activities like the use of e-commerce and working from home are not new to the world and to the people in East Africa.

The technologies that have facilitated these changes have been available and were in use before the crisis. Working from home had been increasing in creative industries and other services. E-commerce companies such as Amazon, eBay and Jumia were giant corporations even before the pandemic. The use of electronic means of payment has been spearhead in many regions, notably in East Africa.

What has changed has been the speed at which these changes have lately occurred. Different analysis has shown that COVID-19 has accelerated e-commerce growth by 4 to 6 years.

## **Impact in agriculture: Digital platforms in Uganda**

Technology, even before the pandemic, was transforming the agriculture sector in East Africa. Biotechnology, robotics and smart warehousing have increasingly been employed to produce and commercialise products there. For example, remote sensing using drones is used in Tanzania to monitor the state of crops such as cassava, beans and maize.

Of the technologies increasingly adopted by East African farmers, digital agriculture platforms (apps) are becoming a critical means to engage in e-commerce. Of the firms providing agtech solutions in the region, 75% were providing apps. Apps offer farmers a wide range of services, including obtaining market information, finding buyers, purchasing materials used in production and obtaining credit, among many others.

In Uganda, more than a million farmers were using apps before the crisis, and they particularly valued the ability to access buyers, buy necessary materials and obtain advisory services and real-time information on prices and weather.

Apps have helped to enhance productivity by increasing the access of critical inputs and services and promote diversification, especially into new markets. However, a gendered digital divide still exists with the use of these platforms, in terms of access to the internet and productivity-enhancing benefits.

It should come as no surprise that the use of these type of technologies in agriculture has accelerated during the pandemic. This acceleration was in part fuelled by government requirements related to the pandemic and crisis management (e.g. mobile payments to farmers).

But fundamentally, apps are an existing cost-effective solution to remain in business, procure materials and commercialise products in the context of stay-at-home orders. Without such platforms, it would have been impossible to continue to do business or comply with government health directives.

Cost, complexity and capabilities explain why apps have become a norm rather than an exception during the pandemic. Digital platforms are a low cost and low complexity solution. The capabilities required for their operation are relatively low, and the urgency generated by the crisis has removed any fears or preconceptions that farmers may have in using them.

However, the ability of farmers to use such apps varies considerably as many of the production, exchange, and trading and sharing platforms require high technical abilities, given their larger scope compared with ag-platform business models.

The impact of these technologies goes further than just the agriculture sector, as digital platforms are also transforming the way the retailing of food is done in East Africa. Normally bustling street markets in Kampala have been seriously disrupted due to stay-at-home orders. The adoption and increasing use of e-commerce platforms (such as E-voucher, MUIIS, KOPGT and EzyAgric) has facilitated people's access to essential groceries



and vendors (with a majority women), and business has continued during the crisis.

### Perspectives

Digital platforms and other technologies will be a distinctive feature of agriculture value chains moving forward. The COVID-19 crisis has accelerated the digital transformation of agriculture and economies across the world.

The sudden acceleration of these changes may be generating serious disruption, but the direction of these changes was known well before. Despite this, digital platforms are critical in increasing productivity and boosting the participation of women and.

Moreover, the crisis has made urgent the adoption of certain policies and actions to facilitate and manage the digital transformation process. In the case of Uganda, for example, the support provided by the government for the development and operation of digital platforms and to farmers to use them has been minimal. Although the crisis may have constituted a saviour for many of these initiatives, the policy gaps remain.

In addition, 98% of all digital platforms in East Africa exist only within national boundaries. This points to the need to understand the various regional policy gaps that prevent the proliferation of apps regionally. Creating more comprehensive ag-e-commerce regulations, with complementary actions on regional ICT skilling, could boost the necessary regional e-commerce.

Traditional constraints such as trade barriers have been

hampering the development of e-commerce and limiting the benefits derived from digital platforms, including during the COVID crisis. Longer customs processing times cause delays, or there is the impossibility of bringing products from other regional partners. But there are also new challenges such as low digital trust and lack of consumer protections.

Finally, but not less important, digital platforms before the crisis contributed to the economic empowerment of women in East Africa and in Uganda in particular. Such platforms allow more time and resources to be spent on women's education and healthcare, women can report abuse more easily and they can increase their economic autonomy.

Accelerating the adoption of digital platforms may contribute to accelerating female economic empowerment. In the context of the pain generated by the crisis, this is an extremely welcome outcome, but still insufficient. Addressing the digital gender divide requires more targeted investment into apps that involve women in the decision-making process, or that are women-centric from the start.

*This piece is part of a dedicated series to spur dialogue, conversations, and debate alongside the WTO's Aid for Trade Stocktaking event taking place from 23 to 25 March. The piece responds to the event's Theme 3: Digital connectivity and e-commerce.*

Dr Max Mendez-Parra is Senior Research Fellow, ODI.

**Source – Trade For Development news**

# Feed standards for animal feeds on the cards

Feed standards for dog and cat, pig, poultry and cattle feeds, drafted by members of the National Technical Committee, and overseen by the Standards Association of Zimbabwe, have been widely circulated for comment before they are finalised. It is anticipated that the new Standards will be finalised in the next few months.

Maricho Magazine (MM) engaged Kudzai Dzapasi (KD), Standards Officer, Standards Association of Zimbabwe for more details on the Feed standards.

**MM:** Kindly share more details on the feed standards and what they seek to achieve?

**KD:** Standards are voluntary documents that provide a benchmark for best practice in a given context. The term “voluntary” means no one is forced to implement the standards. However, regulators can use standards to address the safety, health and quality aspects pertaining a situation or product for the general safety of the public. In such a case, implementation becomes mandatory for any player who is affected by the gazetted regulations that make reference to standards.

**MM:** What responsibilities do the standards place on producers of dog and cat, pig, poultry and cattle feeds?

**KD:** Standards provide technical support to ensure that producers of dog and cat, pig, poultry and cattle feeds align to the best practice when producing feed for those animals. The standards specify the minimum requirements of nutritional requirements that are sufficient for animals at various stages of their growth.

They also specify what is expected in terms of managing the process of manufacturing the feeds. These requirements came from research and were agreed upon by the various stakeholders who constitute the technical committee that developed these standards. Therefore, producers of the feeds have the responsibility to align to those requirements should they decide to implement the standards.

**MM:** What should dog and cat, pig, poultry and cattle farmers expect?

**KD:** For dog and cat keepers, pig, poultry and cattle farmers who buy feed from stock feed manufacturers who claim to implement standards, they should expect animal feed that conforms to the specified nutritional requirements for the good health of their animals and assurance that the feed has been produced in a safe and clean environment.

**MM:** What are some the benefits of the standards to:

## **KD: a) Feed Producers**

- Feed producers can gain market access. For example, some domestic, regional and international markets require producers to conform to standards in order to supply their feed to farmers within that market.
- There is cost reduction because to some extent the research and development to come up with best nutritional requirements for animals is already being taken care of by standards.
- Feed producers can use standards to avoid cutting corners, avoid product recalls and thus maximize efficiency in their processes.
- The above benefits correlate to making profits. Farmers who buy stock feed will have confidence and trust in feed producers who claim and can prove to conform to requirements of specification standards.

## **b) Farmers**

- They are guaranteed of quality feed that does not harm their animals i.e. for pet animals and for animals that are kept for their meat to be consumed. For meat producers, quality feed correlates to premium quality of meat, gaining market access and making good profits.
- They can use the standards to form associations.

## **c) Consumers**

- The confidence level of animal meat consumers is boosted when they know that the meat they are buying from the market comes from a farmer who fed their animals with feed that conformed to nutritional requirements that are specified in a standard. For consumers who keep pet animals like dogs and cats, they are assured that their animals are of sound health.

Both stock feed manufacturers and meat producers who export use standards to gain market access and also standards help to align to regional and international trade protocols.



# Cannibalism in chickens



*Question: My chicken was pecked by others after it was injured. Does it mean that my chickens lack some nutrients?*

## **By General Beven Mundida**

All birds have a tendency for cannibalism – the pecking, tearing and consuming of skin, tissue or organs of other chicken. Cannibalism is a learned behaviour that can quickly spread in the entire chicken flock. If not controlled, it can result in losses of the flock. Some of the reasons for cannibalism and how you can prevent them include:

**Crowding:** Birds housed in a chicken house without adequate space tend to get stressed and develop tendencies for cannibalism. Provide your chickens with adequate space for movement to reduce crowding. The general recommendation for stocking density is 7-10 birds per square metre

**Feed and water:** Provide your birds with adequate feed and water at all times. Well-fed birds rarely engage in pecking and cannibalism.

**Temperature:** Hot temperatures make chickens uncomfortable causing irritation. Such stressed chickens pick the feathers, comb, toes or vent on other birds. Provide them adequate fresh and cool water and proper ventilation.

**Excessive light:** Long periods of light (more than 16 hours per

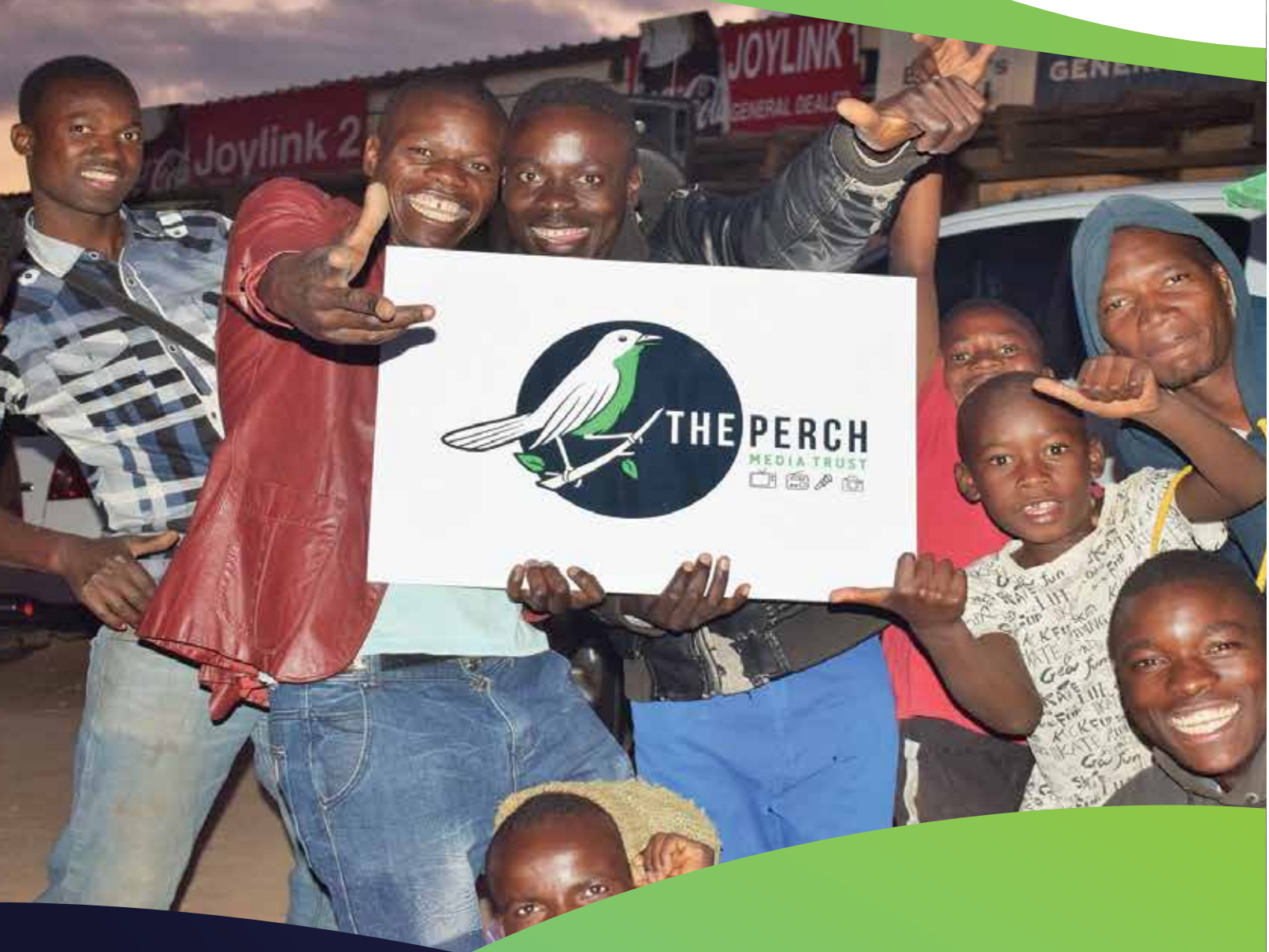
day) make chickens hostile. Avoid using white bulbs if needed for heat. Use red or infrared bulbs instead.

**Nutrient deficiency:** Deficiency in nutrients especially methionine and salt can increase chickens craving for feathers and blood. Provide the chickens with a well-balanced diet with enough carbohydrates, protein (especially the amino acid methionine) and fibre. Protein requirements of chickens change, so it is important to adjust the ratios as chicks grow.

**Parasites:** Pests and parasites can cause birds to peck and injure the skin, resulting in cannibalism. Other measures you can put in place include isolating sick, weak, small birds or the coloured ones as other birds will attack them as a survival instinct.

If the pecking and cannibalism problem cannot be controlled by these measures, it may be necessary to debeak (nip the beak). Debeaking chicks is not recommended in organic farming. The best remedy is for farmers to create adequate space for all animals. This reduces stress in chickens and minimises cannibalism in the flock.

General Beven Mundida is a Livestock Consultant and can be contacted on 0776420161 Email: [gbmundida@gmail.com](mailto:gbmundida@gmail.com)



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