

ZiMUNDA

FARMING



MAGAZINE

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AGRONOMY

Advances in Crop
Genetics

FARM FOCUS

Lesbury Agro
Farming - Rusape

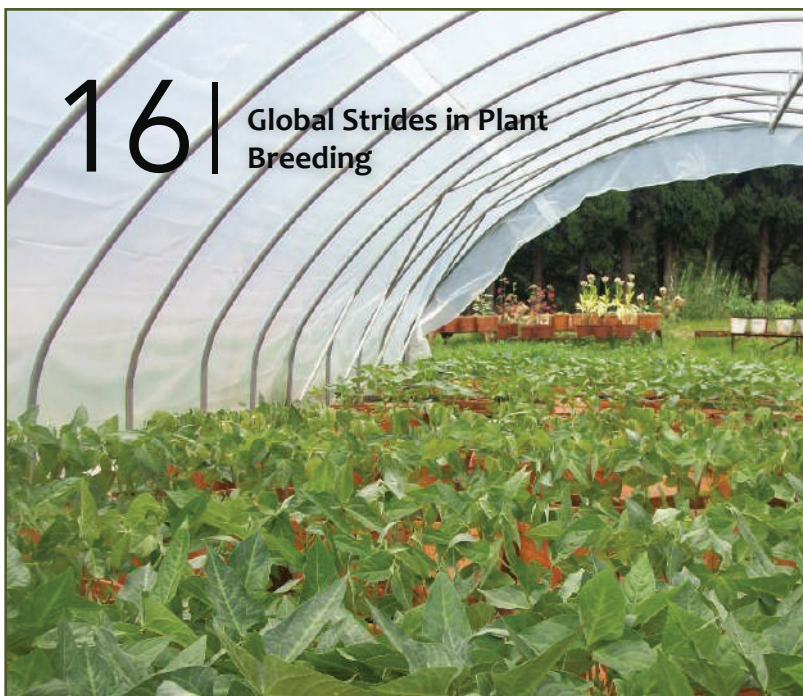
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Common Cattle
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The aim of ZiMunda Farming is to provide correct and relevant farming information to farmers. Every effort is made to check the content of every article, the directors will thus not be held responsible for errors or omissions in such articles. Farmers should thus consult with the references and resource people before making any financial or production decisions.

COVER



Orange Fleshed Sweet Potatoes at Lesbury Agro Farm in Rusape, Zimbawe.



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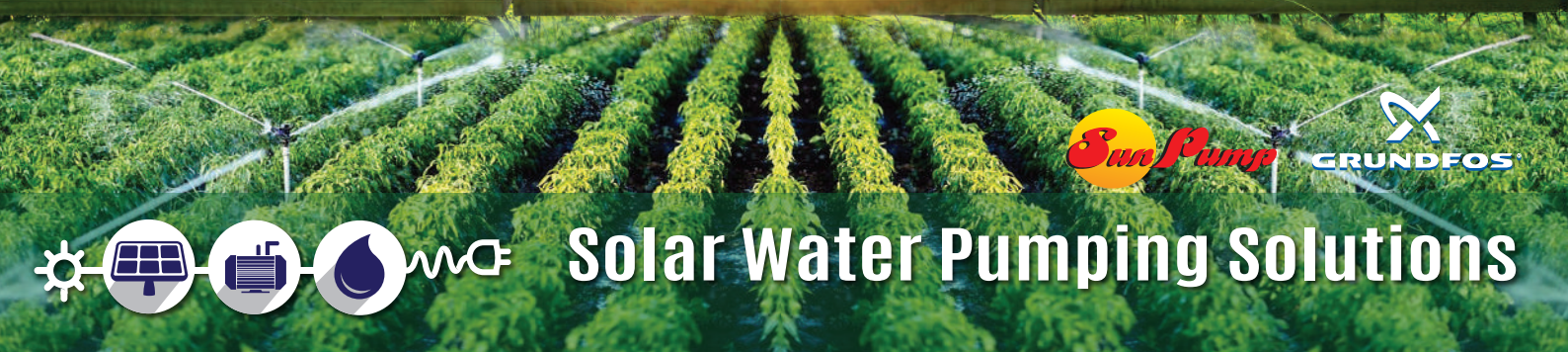


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Orange-Fleshed Sweet Potatoes (OFSP)

Sweet potatoes are generally an easy crop to farm due to their low capital intensity and applicability on small tracts of land. There are two broad categories of sweet potatoes; the staple type with white flesh and white or purple skin has a high starch and dry matter content and the desert flesh and orange skin with a high sugar and beta-carotene content. The general crop husbandry of sweet potatoes is basically the same for the two categories.

GENERAL CROP HUSBANDRY

Temperature - The optimum temperature to achieve the best growth of sweet potatoes is between 21 and 29 degrees, although they can tolerate low temperatures, as successfully grown at Lesbury Agro Farm – Rusape.

Site selection and soil - A well-drained sandy loam is preferred. Heavy clay soils should be avoided as they can retard root development, resulting in growth cracks and poor root shape. Lighter soils are more easily washed from the roots at harvest time.

Soil pH - It should be adjusted to about 5.5 by applying lime or dolomite.

Land preparation - The soil can be deep ripped and then disk cultivated to break up any large clods and provide loose soil for hilling of beds.

Propagation - Sweet potatoes are propagated from sprouts or from slips (vine cuttings).

Cuttings collection -

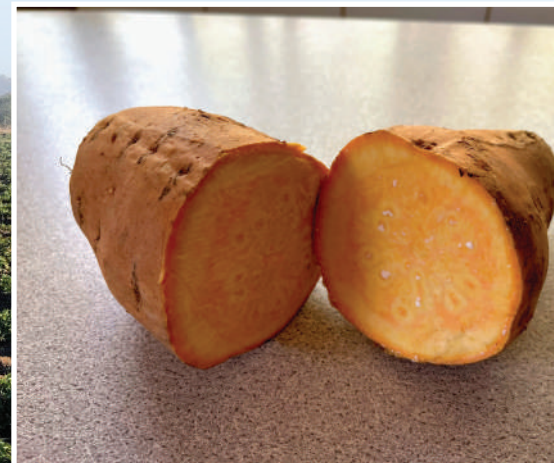
Cuttings of about 30 to 40 cm long with approximately eight nodes are collected from the nursery bed, or the last established planting. Tip cutting should be taken from crops that are old enough to provide material without excessive damage. Avoid “back cuts” as these will have variable maturity and result in significant yield reduction. The lower leaves should be cut away as tearing these off may damage the nodes that will produce the roots. Cuttings can be left under a moist cloth in the shade for a couple of days to promote nodal rooting before planting in the field.

Planting bed formation - Sweet potato is grown on raised beds or mounds approximately 30 cm high and 40 cm wide at the base. The main consideration is that developing roots remain under the soil within the heaps. Mounds can be formed using hilling disks, and the base fertiliser can be incorporated during this operation.

Spacing - The optimum plant density depends on cultivar, approximately 40 000 plants per hectare. Rows may vary from 1 to 1.25m apart, in row spacing is 15cm to 30 cm, depending on cultivar.

Seeding rate - The number of cuttings required to plant 1ha varies between 30000 and 60000, depending on the specific spacing used.

Fertilisation - Fertilisation rates are 100 kg Nitrogen (N), 90 kg Phosphorus (P) and 200 Kg Potassium (K). All the phosphorous may be applied in the basal along with 50kg of N and 50kg of K. The remaining 50kg N and 150kg K should be divided into two side dressing at 4 to 6 weeks and at 10 to twelve weeks from planting.





OSFP at Lesbury Agro Farm

By Rob Smart and Stu Taylor



Lesbury Agro Farm is located in the Makoni area 30km west of Rusape. The farm is a family run business which has been in crop production for the past 80 years. Lesbury Agro has diversified production of crops such as chillies, paprika, herbs and recently OFSP. We recently ventured into OFSP when we learnt of its growing popularity donated to its health benefits and the demand around the world in their cuisine. We found the crop to be attractive as it has potential in value adding such as flour and fast-food chips.

NOTES FROM GROWING OFSP AT LESBURY FARM

The selection of a variety to grow should always be based on market demand. Varieties are assessed on a number of parameters, including root shape and uniformity, marketable yield, skin and flesh attractiveness and plant vigour.

Vine preparation - Only 1st generation virus-free planting material is recommended for production. Vines should come 30cm in length with most leaf area stripped off and they should be kept moist, shaded

and turgid throughout the planting operation. The vines are dipped in a solution of a suitable fungicide such as Shavit to control any damping-off diseases, as well as a solution of a suitable insecticide such as Karate or imidacloprid.

Planting - Our OSFP vines were planted on ridges, similar to those of tobacco, these can either be double, or single-row, with a planting density aim of 45,000 plants/ha. If planted on single ridges, the ridges from centre to centre should be 1,2m apart and 15cm in-row spacing. If planted on double ridges, the spacing is 1,2m across the top of the ridge and 30cm apart in-row. When planting the vines dig a shallow furrow with a hoe parallel with the ridge and insert the base of the vine approximately 10cm down, leaving a few cm of the tip exposed.

Fertiliser Regime - It is important to start off by adjusting the pH to an ideal 5,2 - 5,5 using the Calcium Chloride (CaCl₂) method. An 8cup of compound C is then placed over the base of each vine. At six weeks apply 150kg/ha gypsum and 150kg/ha calcium nitrate and repeat two weeks later.

Irrigation - After planting a settling-in irrigation of about 15mm will give the OSFP crop a good start - considering you have irrigation. Water requirement of 35mm/week is ideal.

Crop Health - The use of a nematicide is recommended (send your soil to a lab to access for any nematode challenge). A good herbicide to use is Afalon (Neoron) as well as Fusilade Plus.

Harvesting - At about 120 - 140days the crop will be ready for lifting. Some tips for harvesting are;

1. A light pre irrigation is essential 24 hours before lifting to reduce skin damage.
2. A shade house is essential as the crop must not be subjected to too much sunlight.
3. The reaping team must be trained before as a lot of damage can be caused during lifting from rough handling that will blemish the skin.

OFSP are a nutritious and easy-to-grow crop, not only are they an excellent source of energy, vitamins, and minerals for the human diet; their increasing market demand are a good reason to enter into OSFP farming. Good luck!



For more information on OFSP, refer to ZiMunda farming magazine issue 10 and issue 6: Seedbed Recommendations - Sweet Potato Nursery and The Orange-Fleshed Sweet Potato Program by the British Embassy, Harare.

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Liming to Rectify pH

By Damara Bio-Agri

Many cropping areas are significantly affected by soil acidity which occurs as a result of constant cropping, loss of organic carbon, the leaching of nutrients, and the misuse and overuse of fertilisers. As such, soil acidity severely affects crop productivity. This is because as hydrogen ions increase in the soil, the soils' capacity to release essential nutrients for growth is impeded. At low pH levels, macronutrients such as calcium are deficient, whereas at high pH levels, micronutrients such as zinc are deficient.

EFFECTS OF SOIL ACIDITY ON CROPS

Soil acidity can be largely improved by the application of a liming material, which works to offset acidity by raising the pH, consequently increasing nutrients that can become plant-available. The critical threshold of soil acidity is 5. Below this threshold, aluminum becomes plant available and toxic. At an optimum pH of around 6.5 aluminum is not toxic, and simultaneously other soil nutrients become available for uptake by the roots.

In understanding the effects of soil acidity on crops, it is important to note that the tolerance levels to soil acidity of different crops can significantly differ. Typically crops require a pH range of 5.5 to 6.5 (CaCl) for optimal growth.

However, the pH scale at which crops grow differs significantly. For example, chilies and sweet potatoes are able to tolerate slightly more acidic soils whereas many horticultural crops, such as onions, carrots and cabbages are not able to withstand acidic soils and grow optimally in a neutral soil.

RECTIFYING SOIL ACIDITY

In order to rectify soil acidity, you need to raise the soil pH, of which agricultural lime can be applied. The benefits of liming are immense, it works to increase nutrients that become available to the plant whilst reducing aluminum and manganese toxicities in the soil allowing for greater plant uptake of the major plant nutrients, as well as adding calcium and (or) magnesium to the soil and significantly improving the soil environment for the beneficial living microorganisms. These microorganisms promote the rapid breakdown of organic materials in the soil, releasing nutrients for optimal crops growth. Furthermore, raising soil pH improves the soils' ability to store water promoting the crops root development and particularly for leguminous crops, improving soil acidity helps to better the nitrogen fixation by legumes.

DIFFERENT TYPES OF LIME

The application of agricultural lime is the most widely known and economically viable option for addressing soil

acidity. It can be applied in many forms; although, powdered lime tends to be the most common agricultural lime available. However, micronized, and granulated lime has become available within the market offering an efficient and effective alternative to powdered lime.

At Damara Bio-Agri we stock **MicroCal**, a micronised and granulated calcitic lime, and **MicroDol**, a micronised and granulated dolomitic lime. The micronisation and granulation of the lime allows for a mean particle size of 40 micron, which works to increase the reactivity of the lime as well as the neutralising capacity. As well as this, the fine particles are bound together with a biological lignosulfonate binder which works to increase both the granulation and efficiency of the product. Thus, the benefits of granulated lime include the ease of transportation as well as application, that being, lime can be applied either before or after planting. This is due to the effective reactivity of the product which has an immediate effect on neutralising soil acidity resulting in rapid and sustained pH correction.

For more information, please get in touch with us at sales@damarabioagri.com or +263 772 334 764.



Varietal Selection- A Key Profitability Unlocker in Vegetable Farming

By Francis B. Mapindani and Brian Nyandoro

Varietal selection plays a crucial role in unlocking the profitability of any vegetable farming business. It is one of the earliest and most important decisions a vegetable grower has to make at the onset of every planting window. They must live with this single decision all season long, from seed sowing all the way to produce marketing.

The key elements to take note of when choosing a vegetable seed variety are yield potential, produce quality, response to management, uniformity of performance and market acceptance. Region or climate specific factors are of paramount importance as well and these include time to maturity, disease resistance and stress tolerance. From this standpoint, Seed Co Vegetables, through its extensive research, has

introduced hybrid varieties that exhibit most of the aforementioned factors suited for a wide range of Zimbabwean climates.

Another very important factor that is variety-centric is the ability of a vegetable crop variety to be produced outside of its traditional planting window. This property alone has the potential to increase the return a grower can earn after marketing. A notable example is that of Dina F1 and Ada F1, two onion varieties that Seed Co Vegetables markets. These can be grown in summer for early winter harvest. Traditionally, onion plantings are known to start from Mid-March until end of June. The two aforementioned onion varieties can be transplanted from Mid-January which will allow the growers to start marketing

their onions from end of April to mid-May when the supply will still be relatively low and the produce prices will be very ideal.

Seed Co Vegetables has Sales Agronomists in all the provinces of Zimbabwe who can offer after sales support. Thus, any current or prospective Seed Co Vegetables farmers that have any enquiries can get in touch with their respective agronomist for assistance. For any quick Whatsapp enquiries, get in touch with the Digital Desk on +263 785 883 702.

ABOUT THE AUTHORS - Francis B. Mapindani, Seed Co Vegetables Sales Agronomist – Mashonaland East tel:0778138897 and Brian Nyandoro Seed Co Vegetables Product Development Assistant tel:0779270369.



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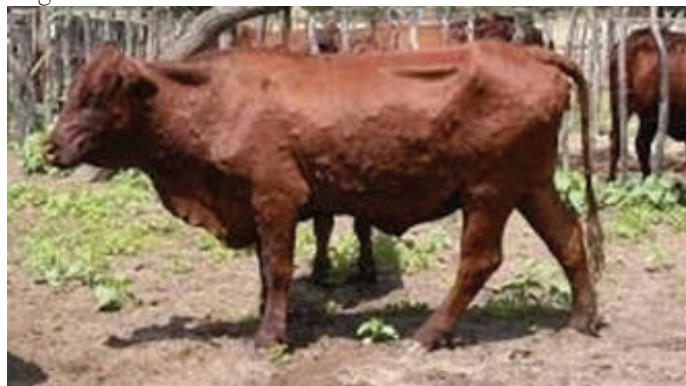
Common Cattle Diseases

By Wallace Mukoka, Farm Hut



The basic role of herd health is to control or eliminate diseases and management inefficiencies that impact on animal welfare or limit productivity. Knowing the most important cattle diseases and disorders in your locality or region is the first step to managing your herd health. The vigilant implementation of disease control is crucial in a cattle farm, if an animal is exposed to an infectious agent, it is susceptible to suffer from disease. As a cattle farmer you are advised to routinely vaccinate against the following common diseases:

Lumpy Skin Disease - Cattle are annually vaccinated between August and October.



Brucellosis (Contagious Abortion) - Animals between 3 and 8 months are vaccinated once only. Bulls and pregnant animals should not be vaccinated. Avoid using antibiotics at the same time when vaccinations are made.

Anthrax - Cattle should be annually vaccinated in endemic areas.

Tick Borne Diseases - Animals are vaccinated in winter. The vaccine protects the animal for its entire life.

Trypanosomosis - Cattle are vaccinated annually using Samorin.

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In case of disease occurrence, knowing how to identify a disease in order to properly treat and/or control it is important. Without a proper diagnosis, treatment and prevention is more likely to fail.

TICK BORNE DISEASES

Gall Sickness (Anaplasmosis)- A common summer disease. Aged animals are highly susceptible to infection. The clinical signs of gall sickness are; fever; loss of appetite, weakness and incoordination; pale mucous membranes and jaundice; increased frequency of urination and the urine is normally golden yellow or amber coloured; and constipation, and at times the dung is covered with mucous

Post-mortem results include; jaundice (yellow discolouration of mucous membranes and of whole carcass; watery blood; enlarged spleen; the liver is enlarged friable and yellow orange in colour; the bladder is distended with thick bile, hence the common name of the disease and; rectum contents are dry and faeces are covered with mucous.

The diagnosis of the disease is achieved by accessing the animal's history, investigating clinical signs, results of post-mortem findings and by the identification of parasite on peripheral smears.

The treatment medication are Oxytetracyclines - Imidocarb dipropionate (imizol).

Control procedures that reduce the risk of disease are dipping and vaccinations

Red Water (Bovine Babesiosis) - It is a common disease in summer and older animals are more prone to get the infection as compared to young animals. The causative agent, a protozoan, is transmitted by blue ticks.

Clinical signs of red water include fever, loss of appetite, dullness and staring coat, laboured breathing, pale or yellow mucous membranes, red urine and nervous signs



When conducting a **post-mortem examination**, findings will reveal a pale to yellow carcass and mucous membranes, red urine in the bladder and an enlarged spleen

The diagnosis of the disease is achieved by investigating clinical signs, results of post-mortem findings and by parasite identification on peripheral smears, spleen smears or brain crush smears.

Treatment is done by Diminazine aceturate (Veri ben or Berenil).

Control procedures that reduce the risk of disease are dipping and vaccinations

January Disease (Theileriosis) - The disease is common in summer between the months of December and March with most cases being observed in January hence the name of the disease. It is transmitted by brown ear ticks. Young cattle are more prone to get the infection as compared to older animals and deaths are higher in exotic breeds than in indigenous breeds.

Clinical signs are;

- The disease is usually fatal fever.
- Swelling of lymph nodes.
- Loss of appetite.
- Lacrimation and cloudiness of the eyes.
- Listlessness (slowness).
- Terminally there is laboured breathing and froth exuding from the nose and the animal collapses and dies.

Post-mortem will include;

- Generalised swelling of the lymph nodes.
- Froth in windpipe and fluid in the lungs.
- Cloudy eyes.
- The abomasal wall will be swollen and haemorrhagic ulcers may be seen.

The diagnosis of the disease is achieved by accessing the animal's history, investigating clinical signs, results of post-mortem findings and by parasite identification on the lymph node and spleen smears.

Treatment medication include Butalex and Clexon.

Control procedures that reduce the risk of disease are dipping and vaccinations.

Heartwater- It is common during the rainy season. The disease is transmitted by bont ticks. Young stock can resist the disease. Exotic breeds are highly susceptible.

Clinical signs of heartwater are;

- Fever.
- Loss of appetite, depression and laboured breathing.
- Nervous signs: exaggerated blinking of eyelids, twitching of the eyes, walking in circles and a high stepping gait, convulsions lying on one side with limbs making running movements followed by coma and death.
- The disease can also cause sudden death.

The post-mortem findings will reveal;

- Fluid in heart sac, chest and occasionally in abdominal cavity.
- Oedematous lungs and froth in the trachea.



- An enlarged spleen.
- Haemorrhage on the surface of lung and in trachea.

The diagnosis of heartwater is achieved by analysing the animal's history, investigating clinical signs, and parasite identification on brain crush smears.

Treatment is effective during the early stages of the disease. When the animal is recumbent, the drug can be given intravenously to have a reasonable chance of success. The drug of choice is an Oxytetracycline line.

Control procedures that reduce the risk of disease is dipping.

Having the discussed the above diseases, some of the key actions to take in order to protect your herd health are;

- Know the common cattle diseases in your locality and whether they are likely to affect production.
- Implement a disease management plan using veterinary advice.
- Vaccinate against specific diseases that can infect cattle and people.
- Seek veterinary advice for any unexplained health problem.
- Develop a biosecurity plan to prevent the introduction of infectious diseases.
- Review all factors affecting the welfare of your cattle herd.

A well-planned approach to managing cattle health and welfare controls the risk of disease in a cost-effective way and maximises the production potential and profit of your herd.

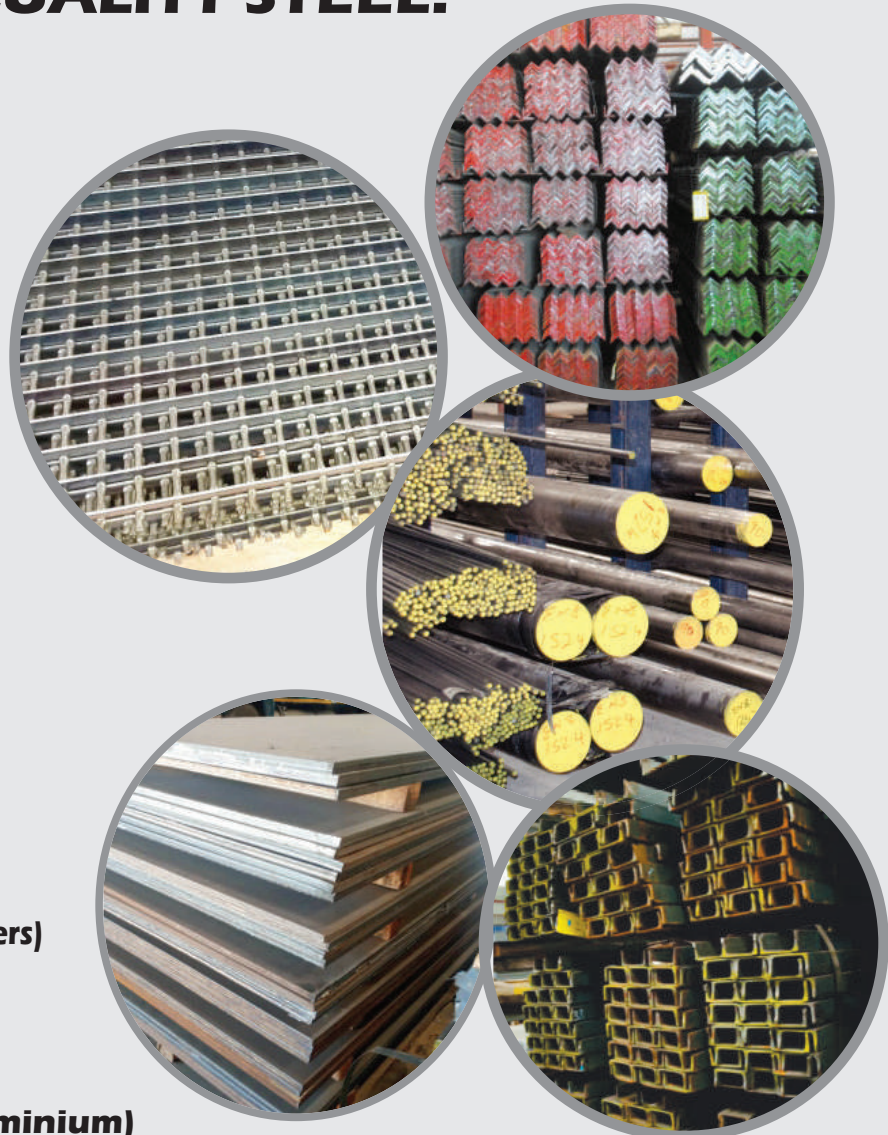




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Understanding Agrochemical Labels

By Doug McClymont

AGRONOMY



Pesticide burns on vegetable leaves.



Post herbicide injury on a maize crop

'Agrochemical labels are legal documents providing directions on how to mix, apply, store, and dispose of a product. It is the manufacturer's main way to give the user information about the product'.

Manufacturers of agrochemicals furnish the product packaging with significant information in regards to the safe and effective use of the chemical. It is worth reading what is written on the labels and more importantly, understanding what the implications are of the various terms used on the label. One ought to trust what is written on the label as it is from a reputable source.

Generally, on usage one can overlook the information on the agrochemicals and every now and then some tragedy occurs; the labels are then brought into the spotlight. An overall appraisal of the main points held on every label will provide you with information and this knowledge is valuable.

BRAND, TRADE, OR PRODUCT NAME

Agrochemical labels have the trade name usually highlighted as this is a major selling point for the manufacturer and distributor. Different names are used by different manufacturers even

though their products contain the same active ingredients. The brand name (or trade or product name) is a unique name used to advertise the product. Most trade names include some vital information, which may not be obvious, but is included by reputable manufactures as a matter of course. This information relates to the **FORMULATION** and the **CONCENTRATION** for example WONDERKILLER 250 EC. Wonderkiller is the trade name and 250 EC is the accurate technical bit which is often over looked. The number 250 relates to the concentration of the product in the bottle. In general terms it can be either 250 or 25; if it is 250 then usually the concentration is 250 grams/litre or per kg whereas in older products the 25 means a 25% solution or formulation. The EC - Emulsifiable Concentrate relates to the type of formulation and there is a standard abbreviation for the main types. Listed below is a list pesticide formulation abbreviation, with the more common ones highlighted in bold.



CODE TERM - COMMON PESTICIDE FORMULATION ABBREVIATIONS

- AB** Grain Bait
- AE** Aerosol Dispenser
- CB** Bait Concentrate
- CF** Capsule Suspension for Seed Treatment
- CG** Encapsulated Granule
- CL** Contact Liquid or Gel
- CP** Contact Powder
- CS** Capsule Suspension
- DC** Dispersible Concentrate



- DP Dispersible Powder**
- DS** Powder for Dry Seed Treatment
- DT** Tablet for Direct Application
- EC Emulsifiable Concentrate**
- ED** Electro chargeable Liquid
- EG Emulsifiable Granule**
- EO** Emulsion, Water in Oil
- EP** Emulsifiable Powder
- ES** Emulsion for Seed Treatment
- EW** Emulsion, Oil in Water
- FG** Fine Granule
- FS** Flowable Concentrate for Seed Treatment
- GA** Gas
- GB** Granular Bait
- GF** Gel for Seed Treatment
- GP** Flo-Dust
- Gr Granule**
- Gs** Grease
- Gw** Water Soluble Gel
- Ls** Solution For Seed Treatment
- Mc** Mosquito Coil
- Me Micro-Emulsion**
- Mg** Microgranule
- Mv** Vaporising Mats
- Od** Oil Dispersion
- Of** Oil Miscible Flowable Concentrate (Oil Miscible Suspension)
- OI** Oil Miscible Liquid
- Op** Oil Dispersible Powder
- Pc** Gel or Paste Concentrate
- Po Pour-On**
- Ps** Seed Coated with A Pesticide
- Rb** Bait (Ready for Use)
- Sa** Spot-On
- Sc Suspension Concentrate (Flowable Concentrate)**
- Sd** Suspension Concentrate for Direct Application
- Se** Suspo-Emulsion
- Sg Water Soluble Granule**
- Sl Soluble Concentrate**
- So** Spreading Oil
- Sp Water Soluble Powder**
- Ss** Water Soluble Powder for Seed Treatment
- St** Water Soluble Tablet
- Su** Ultra-Low Volume (ULv) Suspension
- Tb** Tablet
- Ul** Ultra-Low Volume (ULv) Liquid
- Vp** Vapour Releasing Product
- Wg Water Dispersible Granules**
- Wp Wetttable Powder**
- Ws Water Dispersible Powder for Slurry Seed Treatment**
- Wt** Water Dispersible Tablet

ACTIVE INGREDIENT

The ‘active ingredient’ is most important information on the label, as this is basically what makes the

pesticide work. It is the actual name of the ingredient and/or ingredients which tells you what the product is. Many a time farmers rely on the trade name for the product but it is the active ingredient that is the common denominator. If the active ingredient states “glyphosate” then that is what the product is despite it being called Roundup®, Sting®, Glyphogan®, Drive Weeder®, whatever. Never be taken in by a new trade name – always check the “active” on the label. This is especially important with “combis” or mixes. You must know the percentage of each active ingredient to get an idea of the activity of the product. Many herbicide mixes contain two or more active ingredients and one must have enough of each of these at the correct level if the desired spectrum of weeds is to be controlled.

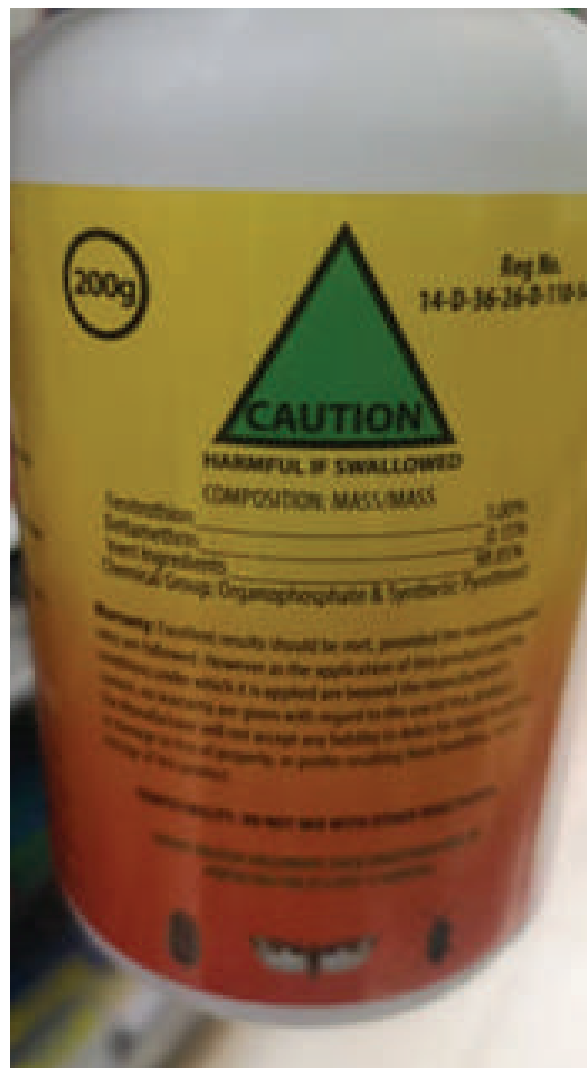
- Be careful of products labelled xxxx Plus. Always check what the “plus” that makes up the product is. Often these mixes are punted as a cheap one-shot control, but especially under Zimbabwe conditions, one must make sure that all the active ingredient are there in sufficient quantities.

SIGNAL WORDS WARNING ON LABEL

The signal words Caution, Warning, or Danger indicate the acute toxicity of the product to humans, based on one or more potential routes of exposure. The statement “keep out of reach of children” must also appear with signal words on the label of agrochemicals.

- **CAUTION** — Pesticides that are the least harmful to you.
- **WARNING** — More toxic than those with a Caution label.
- **DANGER** — Very poisonous or irritating and should be used with extreme care because they can severely burn your skin and eyes. Most pesticides with DANGER signal word are restricted-use pesticides and are not available to the general public.

From the trade name one can tell whether the product is water-soluble, what its general application method is and how much active ingredient should be in the product formulation.



- Green triangle, it informs the user on the level of danger that one is exposed to in an event of use without proper protection.
- Caution - a signal word that indicates the relative acute toxicity of the product to humans and animals.
- An Ingredient Statement which provides the common and/or chemical name, the amount of each active ingredient and the total amount of inert ingredients in the container.

For more information on the colour-coded hazard warning of agrochemicals labels, please refer to **ZiMunda Farming Issue 20.**

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- Days to maturity - 135
- Yield Potential 8 -14 t/ha¹

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An extremely high yielding disease tolerant variety

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- Low ear placement with excellent standability
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- Good all round disease resistance
- Days to maturity - 135
- Yield Potential 8 -15 t/ha¹

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Recognising a Young Zimbabwean Scientist

Ensuring food security amid the impacts of climate change is one of the biggest challenges facing the global community. Experts in many countries are looking into nuclear techniques to help introduce genetic diversity to develop new and improved crop varieties for cultivation – in order to improve crop adaptation to a changing climate.

Through the cooperation between International Atomic Energy Agency (IAEA) and the Food and Agriculture Organisation of the United Nations (FAO), assistance is provided to experts in member countries worldwide in using nuclear techniques in agriculture, including support with irradiating seeds or other plant material in order to develop plant varieties with characteristics such as drought tolerance or increased yields. This process called **plant mutation breeding** uses the plant's own natural genetic resources to mimic the spontaneous process of mutation in the evolution of plants. It increases the pace of genetic change and allows plant breeders to select the most desirable ones from many mutant lines.

THE 65TH GENERAL CONFERENCE

On the occasion of the 65th General Conference of the International Atomic Energy Agency (IAEA), FAO and IAEA recognised the contributions to plant mutation breeding from 28 researchers and research teams of institutions from across 20 countries - honouring them with awards for outstanding achievements. Awards were presented by the Director-General of the IAEA, Rafael Mariano Grossi and, virtually, by FAO Director-General, QU Dongyu, in a ceremony in Vienna. This recognition included; **11 Outstanding Achievement Awards, 10 Women in Plant Mutation Breeding Awards, and 7 Young Scientist Awards** for significant efforts in the last decade in the development of new mutant varieties using irradiation.

“The positive impacts of improved cultivars on food security and nutrition at local, national and regional levels are ensuring more stable crop production in stress conditions due to the climate crisis. As well as sustaining farmer’s livelihoods and achieving the Sustainable Development Goals,” said Qu Dongyu during the ceremony, also noting that “with the technical support provided by the Joint Centre, plant breeders in many countries have achieved substantial improvement through mutation breeding in a wide range of crops.”

THE YOUNG SCIENTIST AWARD

One of the Young Scientist Award granted by the FAO/ IAEA Division of Nuclear Techniques in Food and Agriculture for Excellence in Plant Mutation Breeding was awarded to Prince Matova, a Zimbabwean scientist. This award is given to scientists younger than 40, who have made a significant contribution and impact in the field of plant breeding.

Matova is a crop scientist who works at Mukushi Seeds (Pvt) Ltd in Harare as a Research and Agronomy Manager, as well as the company's Maize and Legumes Breeder in the Research and Agronomy Department of the company. He has worked on mutation breeding since 2007. For almost 16 years, he worked on breeding cowpea and maize with Crop Breeding Institute (CBI) in Department of Research and Specialist Services in the Ministry of Agriculture (DR&SS).

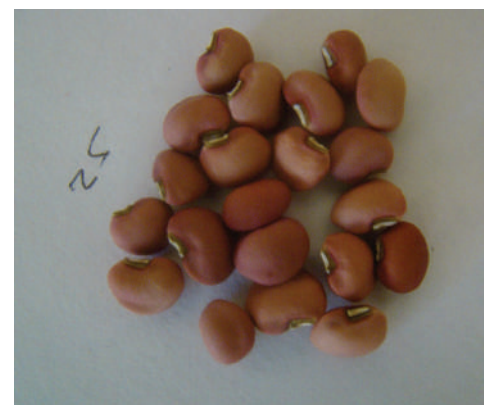
In his mutation breeding work, he developed elite varieties of cowpea and maize including the mutant variety CBC5. At least five mutant varieties endowed with good agronomic performance traits have been widely disseminated into various farming communities of Zimbabwe. These varieties carry drought and heat stress tolerance, adaptation to poor soils and farmer preferred traits (such as, having pods above canopy, earliness, high grain and fodder yield and large grain size).

Matova has generated information important to further mutation breeding of cowpeas and maize. He is recognised as an expert in mutation and general plant breeding with the IAEA, hence he is occasionally assigned to train other researchers in Africa. Further to that, Matova facilitated the modernisation of maize and cowpea breeding programs at CBI-DR&SS by introducing modern equipment which includes the bar code printers, seed counters, near-infrared (NIR) equipment for nutrition analysis in breeding stocks, digital weather station among other things.

A DISPLAY OF EXCELLENCE

1. In Cowpea Breeding

During Matova's time as a Cowpea Breeder at the CBI of the Ministry of Agriculture in Zimbabwe **he released Zimbabwe's first cowpea variety developed with a nuclear technique** that can be grown in regions with very little annual rainfall. This first mutant variety in Zimbabwe was released in 2017 and commercialised in 2018. The cowpea variety CBC5 that is drought tolerant, has 10% seed size advantage over its parent CBC1 and performs 20% better in terms of grain yield potential compared to



most farmer varieties in the country. To this regard, Matova partnered with researchers in South Africa to publish a book chapter that reported on the benefit of using mutation breeding on cowpea and tepary bean. Both important legume crops grown in the semi-arid – arid environments of Africa.

2. In Maize Breeding

Since 2018, Matova has been studying the potential of breeding FAW resistant maize hybrids in Zimbabwe and sub-Saharan Africa, a pest that has caused significant maize crop yield and economic losses across Africa. The study was part of his PhD work with the University of Free State, DR&SS, International Maize and Wheat Improvement Centre (CIMMYT) and the University of Zimbabwe.

“More than 300 million smallholder farmers across sub-Saharan Africa rely on maize for food and livelihoods. These farmers have limited capacities to control the pest. They are using insecticides, which we have seen to effectively provide immediate control of the pest. However, these pesticides have environmental and health issues. It is against this background that we, as plant breeders, felt it was important to develop varieties that are resistant to the pest. It is a more environmentally friendly, less expensive, and more sustainable solution,” explains Matova.

The study investigated the possibility of using mutation breeding in maize crop improvement, with the intention to enhance FAW-resistance in maize genotypes. This research optimised gamma mutation induction in maize OPVs and inbred lines. Moreover, he evaluated the breeding potential of exotic FAW-resistant donor lines from Mexico with local lines. He also investigated the resistance response and stability of local cultivars and inbred lines against FAW. Matova introgressed FAW resistance into the elite breeding materials at both DR&SS and Mukushi Seeds, where he is currently working. Intergression is the transfer of genetic material from one species into the gene pool of another through crossing followed by repeated backcrossing of the interspecific segregating hybrid to the recurrent parent. Matova believes that although FAW resistance is currently a nice-to-have trait, going forward, all maize varieties released should have a baseline resistance to FAW.



Maize crops affected by the Fall Army Worm.



Ultimately, Matova’s work has generated important information that can guide research in maize breeding for FAW resistance in Southern Africa and all this information is free for researchers to use for the betterment of Africa and the world.

For more information on Fall Army Worm Invasion and Control Practices by P. M. Matova refer to ZiMunda Farming Issue 14.



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Causes of Poor Growth Performance in Broiler Production

By General Beven Mundida,
Livestock Consultant.

Question - What are the causes of poor growth performance in broiler production?

ANSWER - In broiler production the important goal is to produce table sized birds with a dressed weight of 2-2.3kg at 5 to 6 weeks. Achieving this weight is vital as it will determine the profitability and the viability of the enterprise. In practice this goal might be unachievable due to a number of causes, which include;

Lack of experience - In broiler production, to attain the desired and recommended body weight goes beyond buying chicks and feeding them on a daily basis. It is common to jump into broiler production without undergoing any form of training and sometimes those who do go under training receive it from fellow farmers who acquired their knowledge through trial and error over the years. In as much as this knowledge can be passed across from farmer to farmer, it is advised to seek training with academic background as poultry management is science based.

Lack of Professionalism - Professionalism in broiler production plays a major role in raising the birds to an expected size and weight - a little deviation in expected size at cull can seriously lower profit of the venture. An unfortunate reality is that most farmers lose their profit without realising it. This is because they hardly keep an up-to-date financial record of their flock hence, they erroneously believe they are making profit but in

the real sense of it, they are making losses and their capital erodes with each production cycle.

Buying birds from an unknown source/ dishonest breeder or dealer - While there are a lot of very good breeders with very high-quality birds, there are some that either are not knowledgeable about the birds they raise, or are just plain scammers. Procurement of chicks from unscrupulous breeders (unknown source/ dishonest breeders or dealers) is a very risky for many reasons;

- The birds might have health issues or carry diseases that may not be apparent at first. Diseased parent stock and poor hatchery conditions lead to excessive dehydration of chicks and poorly healed navel which can greatly contribute to poor growth performance of chicks as this will prevent the chicks from having a bouncy start.
- The chicks could have been exposed to excessive stress especially during hot seasons which affects their health.
- You might not get what you bought. For instance, if you put in an order for broiler chicks, an unscrupulous seller/ breeder might supply you with white cockerel chicks instead which have very slow growth rates. New farmers are more susceptible to this scam as they might not realise what they bought until it is late into production.

Before stocking chickens, make proper research on where to get quality birds. Remember good, healthy and quality birds will help you make more profit on production.

Shortage of good quality water -

Water is one of the vital nutrients for poultry. Fresh potable water must always be available as it is the highest nutrient that a bird will consume throughout its life cycle. A bird will consume water double or triple of the daily amount of feed consumed depending on the season and the prevailing weather conditions.

Water is the number one carrier of infectious agents to birds as more than 50% of poultry diseases are water borne. During an early stage of life, chicks are very fragile due to their poorly developed immune system, therefore, management should protect them from exposure to pathogens. When exposed to a rather huge amount of





disease-causing agents at this stage, their health becomes compromised leading to poor appetite, poor growth, and huge mortalities if not timely attended to. For this reason, a supply of clean and cool water is very vital for the smooth take off of chicks.

- Note that the fact that a water sample is clear does not imply that it is free from pathogens. It can be that the clear water supplied to birds is laden with serious levels of pathogens and to achieve good water sanitation, water treatment with chlorine/iodine-based sanitiser becomes necessary.

Poor chick nutrition - The first few weeks of life post hatch is very important to poultry in actual fact, the first few hours (24-48 hours) play a vital role in the life of chicks generally. Accessibility to highly digestible feed at this stage of life helps in laying a solid foundation for outstanding future performance. This enhances not just proper growth and development of chicks but also, yolk utilisation, gastro-intestinal development, immune system stimulation. Although it might not be practicable to expose chicks to feed a few hours after hatch due to factors such as sorting, boxing and transportation. Farmers must ensure that chicks get on to a very good start by exposing the birds to feed as soon as possible i.e. immediately as the chicks get to the farm or a few hours after stabilisation. In order to achieve this goal, the brooder unit must be readily prepared and warmed up to the right brooding temperature prior to chicks' arrival. It should be furnished with all necessary equipment (chicks' feeders, chicks' drinkers, thermometer etc.). These must be in the right quantity and evenly distributed to give each chick easy and equal access to feed and water.

Important points to note on chick nutrition are to;

- Use broiler starter feeds which are more digestible and make it easier for the chicks to digest and assimilate the nutrients locked up in the feed.
- Feed the chicks according to the standard expected daily feed allocation as advised for each breed. The chick will thereby fully manifest their full genetic potential in terms of growth if fed according to their breed standard. 70% of

the feed fed to birds generally is used for maintenance, the remaining 30% is split between growth and fighting off diseases. Any chick which is seriously underfed will have its growth seriously impeded. Assuming it is recommended that a chick should be supplied 20g of feed on a particular day but just 15g is supplied by the farmer, the increase in weight for that very day is jeopardised. If wrong portions are repeatedly fed to the chick, it will not grow to standard and after a while stunting will set in.

- At times, appropriate portions are fed to the flock but due to wrong equipment or the malpractice of dumping all the feed for the day early in the morning in feeders, chicks scratch on the feed and it is wasted. Apart from wastage, dumping of feed makes feed lose the fresh and enticing savour making the flock less interested in feed subsequently resulting in poor growth performance.

Disease Occurrence - Diseased birds will not perform optimally since most diseases cause depression of appetite and the little feed that is consumed is predominantly utilised for body maintenance and fighting disease, while little or nothing is spared for growth and development. Some poultry diseases like coccidiosis cause serious injury to intestinal linings reducing the rate of nutrient absorption along the intestine. Majority of the end product of digestion will be lost in faeces.

Overcrowding - Stocking a pen beyond its actual capacity results in poor growth performance, poor meat quality, disease outbreak, vices such as pecking, increased feed conversion ratio, increased morbidity and mortality.

Remember that effective chick management begins before the day-olds arrive and that the handling of the birds and the management of the brooding program has a direct relationship on life-time production of the bird – whether breeders, layers or broilers. It is important to be vigilant in the points discussed above for a success broiler enterprise.

For more information on livestock production call/ WhatsApp +263 776 420 161 or email: gbmunda@gmail.com



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Global Farmers Connect Sets Target to Revolutionise Farming in Zimbabwe

As technology gradually sets pace into Africa, an Agri-tech start-up, Global Farmers Connect has set its target and vision on revolutionising the Agriculture Sector in Zimbabwe. The Agri-tech company was launched in January 2021 and has since shown remarkable strides in the short space of time by strengthening the market linkages for small scale and commercial farmers across the 10 Provinces of Zimbabwe.

ABOUT GLOBAL FARMERS CONNECT

Global Farmers Connect is an artificial intelligent tool used to provide farmers with a platform to reach and sell their agricultural products directly to end consumers. It enables retailers to buy directly from farmers and sell online within their area at affordable prices.

The consumers can buy from the nearest shop or directly from farmer with complete traceability of the products. The revolutionary online farmer community app, is unique as it connects farmers on a global scale; it is not just for local markets but even cross boarder markets as well by means of directly connecting farmers with consumers. The vision is to give the farmer their rightful ownership of crops and produce without including unnecessary and expensive middlemen, while both the farmer and consumer benefit.

Global Farmers Connect gives farmers access to information about their daily requirements such as; farm equipment's, green house needs, animal farming, fertilisers, feeds and qualified agronomists' advice

Speaking to one of the Co-Founders and CEO of Global Farmers Connect, Mr Aaron stated that they envision at least a 50% digitalised transformation in the agriculture sector by December 2022 in Zimbabwe.

"Having been put in direct contact with farmers, we have established that there is a big gap which needs to be covered and a problem that needs to be solved to get our economy (agriculture) back to becoming the breadbasket of Africa. We are excited to be a part of the growth and the transformation of our economy as we get closer and closer to providing dedicated services for farmers. Our digital footprint has quickly grown, and it has occurred at a time when the opportunity capacity that we can give to our farmers has become overwhelming. As the company grows in Zimbabwe and expands across the borders from Botswana, South Africa, Tanzania, Malawi to Zambia our services have been well recognised, and we are humbled to provide this service." Mr Aaron.

Global Farmer Connect empowers agricultural markets through technology. The platform will bring people together, make the world smaller, support farmers and grow agricultural markets, while reducing costs and inefficiencies on a global scale.

For more Updates stay linked to Global Farmers Connect on these platforms Facebook: [GlobalFarmersC1](#), Instagram: [global.farmers.connect](#), Twitter: [globalfarmersc1](#) or email: globalfarmersconnect@gmail.com





Health and Wealth

By Rob Jarvis

At A.R. T. Farm we have embraced the concept of **Regenerative Agriculture** and are doing all we can to keep up with all the information, ideas and practical experience that can be found on the Internet, through contacts and through our own trial and error. My own belief is that there will be many ways to skin this particular cat and there are going to be glitches along the way, but there will also be moments where the ideas come through and the output meets expectations.

At our home at A.R.T. although we have fairly limited water we set a target to be producing all our own fruit and vegetables within a year of moving into the house. The condition was however that the proof of concept of adherents to **regenerative principles** is that ultimately by harnessing the full forces of Nature, you will be able to grow crops without the intervention or boost of pesticides, herbicides, fungicides and synthetic fertilisers.

Our home patch is just the other side of a high-intensity drip irrigation scheme where we grow vegetables on a commercial scale as A.R.T. At home we have used absolutely no chemicals, fertilisers and no tillage of any kind other than digging holes initially for fruit trees. Nutrition and crop protection comes from compost, home-made and from the choice of plants to maximise biodiversity. The disruption of many

healthy plants growing together in a small area will confuse potential pests flying past. Undoubtedly they will go onto the well-grown properly managed crops grown so invitingly across the fence. In time we expect the principles and success of regenerative agriculture to apply to our own A.R.T. crops across the board. But initially it is small steps to make sure that the ideas work and that there will be no sudden drop in income and a crash in cash-flow.

We have all experienced the anger of finding sub-standard fruit and vegetables at the supermarket, usually only found when you unpack at home. This however is perhaps the least of the average housewife's problems. Of much greater concern is exactly what chemicals were applied to produce the crop, when was it last sprayed and what impact will it have upon you and your family.

So at the very least we should grow our own food to pick on demand and eat with confidence that they really are healthy.

Our forest garden is only 1 month away from proof of concept!

For more information on regenerative agriculture, refer to ZiMunda Farming Issue 17 – an Introductory Topic by John Wilson, issue 15 for a wide array of subjects on the practice.





Starting From Scratch

By Shane Brody, Farm Hut

Compared to other livestock such as sheep, goats and cattle, pigs are sensitive animals requiring a higher level of management. However, when farmed properly, they can yield a better financial return because of their breeding rate (10 piglets in a good litter) and a feed-to-meat conversion ratio that is far better than that of other livestock hence market-ready far sooner.

The novice pig farmer must consider the following factors and answer important questions before taking the plunge;

Plenty of water - Do I have a reliable supply of clean cool water available?

Water is often called the 'forgotten nutrient', and an unreliable supply can lead to serious loss in productivity, disease and even mortality. A young, growing pig requires up to 10l of water a day while an adult pig can drink 25l to 50l a day. To keep up to 20 pigs, you will need a 2 500l water supply per day or more.

- Keep at least two days' water in reserve in case something goes wrong with the water source and repairs have to be made.

To breed or not to breed - Do I plan to

breed pigs or buy young pigs (weaners) to grow out and sell?

It is better to start with weaners, grow them out and sell them a few times before attempting to breed them. This will give you experience and an indication of costs. You will also get to understand pigs and therefore, be better able to develop management protocols. Your management skills should be sound when you start breeding, as this process is far more complicated and difficult than rearing pigs.

Infrastructure, disease and overcrowding

- Pigs are strong animals but are easily stressed by factors such as insufficient feed and water, and severe weather if not housed properly. This will decrease productivity, leading to losses. Pigs need solidly built infrastructure including housing, water troughs and fencing. Poor management (husbandry) can lead to disease which can quickly destroy your pig farming enterprise. Pigs are susceptible to several diseases such as diarrhoea, particularly in intensive farming systems where crowding may be a problem.

Feed availability - What feed will I use? Will it be pigs will or leftovers from restaurants or supermarkets? Since pigs grow much more slowly on unbalanced

diet, will you feed the pigs a commercial balanced pig ration, which is more expensive?

Before buying your first pigs, make sure you can afford to vaccinate and feed them until they are market-ready.

Good genetics - Buy good pigs; never purchase pigs just because they are cheap. Poorly bred pigs may carry disease, be genetically inferior or take longer to grow to marketable size. They may also have poor body conformation or a poor meat-to-fat ratio. The market may not be satisfied with such pork, and this will affect your good name as a supplier.

Do your homework- Other factors to consider include providing enough shade in a free-range set-up (pigs are susceptible to sunburn), access to straw or sawdust for bedding and a reliable market for the pigs.

Also answer the following questions;

- Do I have transport available to take the pigs to the market?
- How will I manage daily tasks - do I have enough time for daily tasks such as feeding, cleaning and care?
- Do I see my pig operation as a long-term hobby or one I plan to grow into a full-time business?

My advice to you is to first buy a few weaners to grow to adulthood to see if you have a 'feel' for pig farming. This will help you decide whether to farm intensively or free-range.

For more information on pig farming contact Farmhut on +263 77 344 2311 or visit us at 57 Trinity Road, Greendale, Harare.



To read more on pig farming refer to Zimunda Farming Issue 6, 13, 19, 21 and 23.

