

# ZiMUNDA

## FARMING

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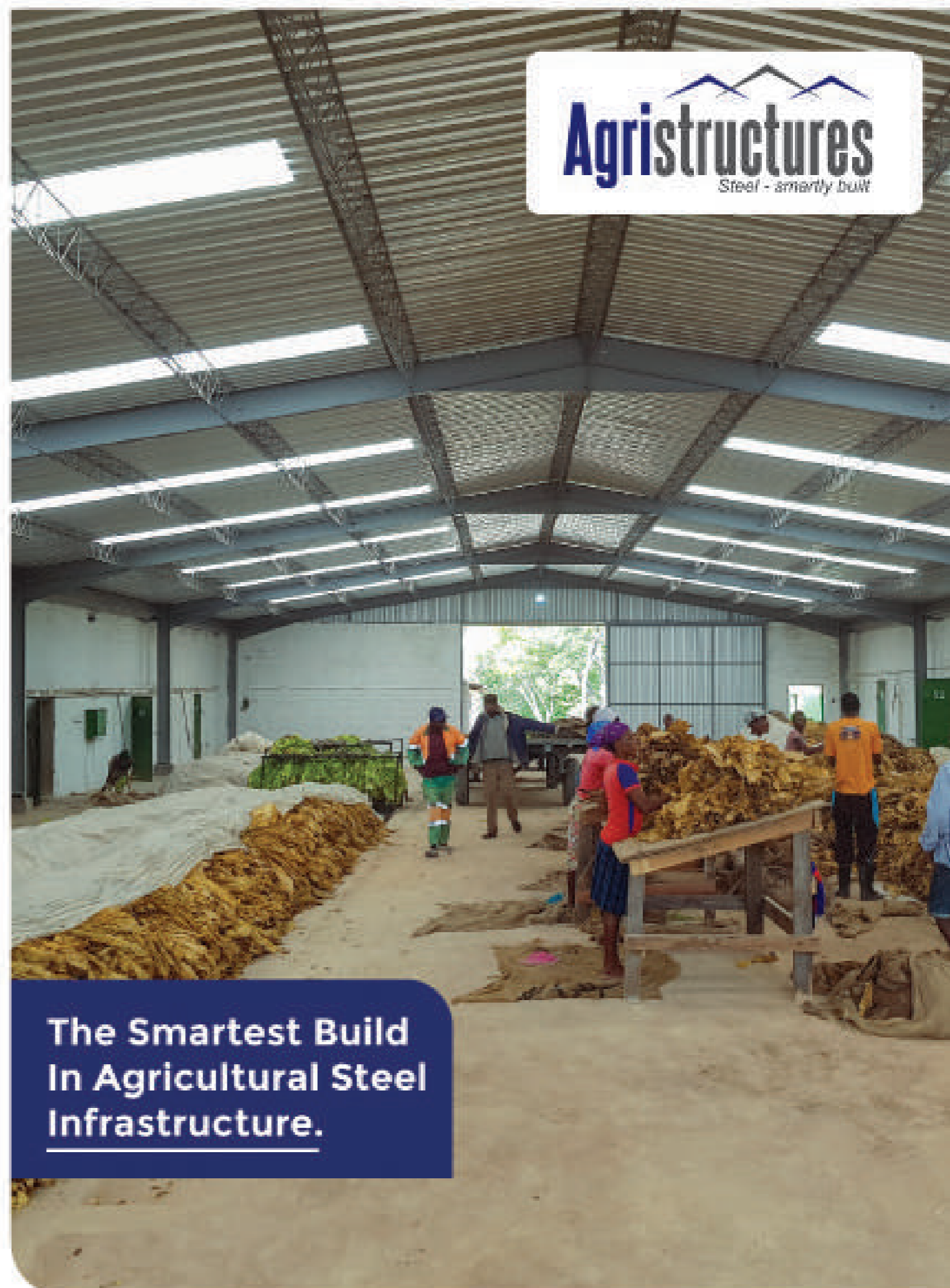
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# From the Editor

**“A woman is a natural incubator that can grow anything, mold anything into life. Any idea that drops in the lap of a woman [is] already on a well fertilised soil, all it needs is watering.”** — Amaka Chukwudum, CEO of Amicable Mondiale Farms.

As the pressures and demands in the farming industry continue to evolve, so too has the role of women in farming. The new cultural norm for working women in farming in most cases looks more equally divided, with both men and women being involved in farm and family management. More often in farming couples, the woman takes the role in farm administration and the man looks after the technical/practical side. And yet, in some farming enterprises, the woman DOES spearhead the whole farming operation. In my career at Bindu Media as a farming journalist, I have the pleasure to meet some of these phenomenal women doing amazing things in the industry; Rose Van De Ruit, an established Dorper farmer; Lianne Herbst and Lorna Joubet, outstanding cattle stud breeders; and Vanessa Mukarati, a groundbreaker in the soilless horticulture. Inspiration from such farmers has seen the industry grow as it empowers other women to get in the business. In this issue we get to celebrate some of the women in farming and I personally also get to reminisce on the adventures I have had with the other ladies from the ZiMunda Farming team during field days.

With this in mind I wish you all a happy and bountiful harvesting period as well as fruitful start to the 2023 winter cropping season.

**Yours in Farming,**

*Nimbai*



**Out and about supporting other lady farmers - Sharai of Paula's Stud.**

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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.

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Cover image photographed by the Precision Aerial Group while conducting crop spray (See Page 38).

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# Cattle Selection Decisions Based on Objectives, Resources and Environment

By Mr P.J Budler, 2022



## About P.J Budler

P.J. Budler was raised on a 5th generation cattle operation in South Africa. At age 15 he founded BonHaven Beef Cattle. Between 1996 and 2012 he grew BonHaven to 5 locations in 3 Southern African countries. The Hereford, Angus, Red Angus, Braford and Brahman herds achieved much success winning numerous National Shows and setting auction records on the continent. In 2012, P.J. relocated to Texas, USA, where he is the International Business Manager for Trans Ova Genetics. This position, together with running the annual "Champion of the World" Competition, judging shows, speaking at events and doing cattle consulting has taken him to 48 US states and 103 different countries thus far. He has judged 83 different cattle breeds in 42 countries. In 2017 PJ became the first ever cattle judge to judge a National Show on all 6 continents. PJ and wife Koula live in Aledo, Texas with their two sets of twins, William and Emma & Sophie and Juliet. **Come and meet PJ. At the Fatstock, Commercial Heifer and 8th National Boran Sale 30th June and 1st July 2023.**



Genetics are the point of the arrow when it comes to the livestock industry. Although genetics are of equal importance to disciplines such as herd management, nutrition, animal health, marketing, forages, record keeping and Human Resources, genetics remain the prime mover.

As the last link in the value chain, the consumer being the first link, genetics determine how the rest of the value chain flourishes or fails. It is the duty of the seed stock producer to act as a scientist with their ranch or farm being their laboratory. By adapting their genetics to the particular environment, resources and objectives they're dealing with, the seed stock producer experiments, invents and proves or disproves genetics. There is an abundance of selection tools available to cattle breeders. These tools vary from traditional to cutting edge and are all used to differing degrees within both the beef and dairy industries.

The selection tools I will discuss in this article include **phenotype, pedigree, in-herd indexes, Production Based Culling, EBVs/EPDs**, and Genomics/Genomic enhanced EPDs. All of these tools can be useful when making breeding decisions provided that they are used in context and with a non-biased and balanced approach.

The first objective to be considered is whether the animal you are wanting to breed is destined to be utilised in a maternal breeding program or as a terminal animal for beef. The selection criteria for these two options is vastly different and I will go into more details in paragraphs to come. A premise to consider is that there are two types of traits in a maternal breeding program.

- **Profit traits** which include adaptability, functional efficiency, fertility and longevity.
- **Turnover traits** which include growth, muscle, milk and marbling. Turnover traits are very important, but are meaningless if profit traits are not used to lay the initial foundation.

Every breeding decision needs to be made according to objectives, resources and environment. Without matching these decisions to these three factors, there's a good chance of missing your target. The **animal's Pedigree** is extremely valuable when making selections. Understanding or remembering pedigrees is fast becoming a lost art in the age of genomics, however, pedigree is the motherlode from

whence all these technologies have sprung. Traits such as mothering ability, libido, temperament/aggression,

Every breeding decision needs to be made according to objectives, resources and environment.

wellbeing and hardiness are immeasurable in any accurate form by any technology. The knowledge of the ability for certain bloodlines and cow families to work together is where the art of breeding comes to fruition. A lot of selection criteria is too nuanced for scientific method.

**Phenotype is extremely useful and I would say essential**, when making breeding decisions. A lot of what data or Estimated Breeding Values/ Expected Progeny Differences are telling you can be seen in the animal itself. The analogy that I like to use is that when you are told that it is raining outside, one can simply open the curtains and take a look instead of checking the weather application on one's smartphone. Growth, Fat, Muscle, Milk, Calving Ease and a host of other traits are as easily observed with the human eye as they are read off of a chart. When doing phenotypic selections, one needs to first consider if the animals are maternal or terminal.

**In maternal animals**, cattle need to be able to eat, walk and reproduce. Focusing on the Profit Traits (adaptability, functional efficiency, fertility and longevity) is first and foremost. Balance is essential. This includes physiological and endocrinological balance, carcass balance (muscle/fat ratio), skeletal balance and hormonal balance. High inherent body condition



The Boran have lived together with man for centuries.

(easy fleshing ability/do-ability/constitution) plus hormonal balance equals fertility.

In terminal animals, the fundamental traits remain vital. In animals bred for a high yielding carcass, factors to focus on are a high growth rate and large rib-eye area. Dimension is essential too, as three dimensional animals produce heavy carcasses. Carcass balance is essential still as fat cover is needed for good grading and fleshing ability whilst muscle is required for yield. Structural soundness is essential in terminal animals too. Structurally unsound animals tend to founder and go lame when in the feedlot. These animals lose their appetite and don't gain appropriately. Also, steers have sisters and mothers out grazing on pasture their entire lives, so ignoring structure in terminally bred cattle is dangerous.

In terminal animals bred for high quality eating experiences like the Japanese and South Korean breeds, the logic remains similar in terms of structural integrity. Carcass balance leans further towards marbling traits with muscle being necessary but not pinnacle. Waxy horns, a sharp poll (or a fine ridge between the horns), oily skin, silky hair coat, flat and fine bone with small joints and a flatter muscle-shape all augur well for high-marbling carcasses.

**Production Based Culling** is a term I use where replacement females and breeding bulls are selected based on the fact that their dams, grand-dams and great-grand-dams have simply jumped over every hurdle the breeder has placed in front of them regarding criteria to remain in the herd. These include reasonable nutritional supplementation, age at first calving, inter-calving-period, short breeding seasons, cow/calf ratio at weaning, minimum weaning weights, unassisted births etc. This is a fast way of building a profitable, consistent, adapted and uniform herd.

**In-herd Indexes** were the primary arithmetic used for cattle selection prior to the arrival of EBVs and EPDs. These in-herd indexes remain a vital tool when customers purchase animals from a reliable seed-stock breeder or when the seed-stock breeder is presenting their product to the market. They give context to how animals have performed in their given environment and herd. It is important to remember that not all herds are the same. A 100 index in a progressive herd is superior to a 100 index in a less progressive herd. However, if one is familiar with and utilizes a registered herd for their seed-stock needs, using in-herd indexes for selection purposes is very valuable.

EBVs/EPDs/Breed Population Indexes are widely used worldwide by animal producers. These numbers are based on the in-herd ratios of the animal itself as well as the in-herd-indexes of its ancestors, siblings,

relatives and offspring. EBVs (Expected Breeding Values)/EPDs (Expected Progeny Differences) can be extremely useful if used in context and with matching them to objectives, resources and environment. As a breeder, one needs to decide whether one trusts these numbers being published by their specific breed society/association. If the breeder believes that they are relevant and that most breeders are measuring everything, all the time, accurately, honestly, in large numbers and in the same environment then it is important to remember that the number being produced is an objective one. Therefore, no EPD/EBV can be good or bad. It depends on one's objectives, resources and environment.

**In maternal breeding programs** it is essential to remember that the sex hormones only start when the growth hormones stop. Therefore, if one selects for high growth numbers, one is directly selecting against fertility. Selecting for fertility starts with high inherent body condition and hormonal balance. On an EBV/EPD chart that would mean higher BACK/RUMP FAT numbers and higher SCROTAL CIRCUMFERENCE at a year of age. Selecting for Top 5% Weaning and Yearling Weight continuously will create higher birth weights, leaner, later maturing and less fertile cattle with higher energy requirements. Selecting for high inherent body condition and early sexual maturity will produce cattle with high relative (reaching mature size early) growth rates, low energy requirements and high fertility. If one feels that the average animal in one's breed is big enough, it makes no sense to require anything more than breed average EPD/EBV Yearling Weight or Mature Cow Size. Similar logic works with all traits.

You will notice that herds that have focused heavily on growth and carcass traits for some time will have a lack of sexual dimorphism in their cattle. There won't be much difference in size and shape between the bulls and females. This sexual monomorphism is an expression of hormonal imbalance and sub-fertility. The bulls tend to be less masculine and the females less feminine. Sexual dimorphism occurs when selection for high inherent body condition and hormonal balance is practiced. These animals are earlier maturing and more fertile. The bulls are significantly larger and shaped and colored differently to the females.

Publishing trait leaders is counter-intuitive in my opinion. For example, why is less fat better than more fat when publishing a FAT trait leaders list? Doesn't it depend on the objectives, resources and environment of the breeding program? Big, lean, late maturing cattle are great for feedlots and processors, but devastatingly expensive to keep for cow-calf operators. What good is giving the tools of a Top 1% for a trait like Milk to marketing companies to run with? Top 1% for milk doesn't even make a profitable dairy cow, never mind how destructive it proves to be for beef cow operators.



**World renowned Cattleman Mr P.J Budler at the Houston Livestock Show and Rodeo**

In terminal breeding programs, traits such as Weaning Weight, Yearling Weight, Ribeye Area and Intra Muscular Fat become important. Managing birth weight to where its functional is important.

Genomic Enhanced EBVs/EPDs are based off the same premise as EBVs/EPDs. However, the actual genetics of the animal are taken into consideration and not just the average EBVs/EPDs of sire and dam at birth are considered. GE-EPDs/GE-EBVs increase the accuracy of an EPD/EBV for an animal with no offspring to having the same accuracy of that same animal if it had had up to a dozen offspring. If the premise of how EPD's and EBV's makes sense to the breeder, then GE-EPDS/GE-EBVs will work for them.

If however, a breeder does not agree that the data being used to create GE-EPDs/GE-EBVs is measured entirely, honestly, accurately, in large numbers, all the time, eliminating environmental influence by most breeders then it is probably better to revert to the other tools in the selection toolbox. These being Phenotype, Pedigree, In-herd Indexes and Production Based Culling.

**Cattle breeding is as much an art as it is a science. Artists and scientists alike are passionate and obsessive about their work. Context and nuance is key!**



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CATTLE

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# The Fatstock Show is Back in Zimbabwe

By the Zimbabwe Boran Breeders Society



Judging Fatstock - Nairobi Show 2018

## What is a Fatstock Show?

Fatstock is livestock that has been fattened, finished and fully prepared for the final market. A fatstock show is where livestock producers are given a platform to display and sell their best perfectly conditioned animals ready for the final market. These animals are presented to a variety of butchers and consumers who are interested in purchasing the livestock. Traditionally, fatstock shows started many years ago. In preparation for the Christmas period, producers would fatten and prepare their produce and invite local butchers to purchase the livestock at the local market. Over the years, this concept has become a yearly event worldwide where professionals judge the animals on show and award prizes for the best-bred and prepared animals. Butchers then get the opportunity to advertise to the market they are supplying the best meat according to the awards given at the fatstock show.



Champion Steer

## Why Have a Fatstock Show?

A farmer who produces market meat should be experienced enough to recognise when their animals are correctly finished and ready for the market with the desired body composition (proportion of muscle, bone and fat on the animal). Ideally, the carcass should have the maximum amount of muscle in relation to the bone structure and no more fat than the consumer requires. Additional fat comes at a cost to the producer because the butcher/consumer trims off unwanted fat. The farmer must be able to follow the process through the meat works and relate the final carcass to the live animal. By supplying the animal directly to the market and being involved in the entire process, the farmer can determine when the animal has achieved the desired body composition and is ready for the market by looking at the live animal, recording weight gains, and monitoring visual cues. Body composition can vary and is affected by genes and management. Management involves monitoring the animal's health and the available nutrition in the form of pasture/grazing and then supplementation feeding.

For the purchaser or consumer, a fatstock show allows the purchaser to be selective and access the best produce the farmers have to offer at the live animal market. They get to view, deliberate and have a direct link to the producer of the animal to allow for a more informed choice of what products they want to purchase and supply to the market.

## The Fatstock Show is Back in Zimbabwe!

The Zimbabwe Boran Breeders Society has established a platform for a fatstock show to be held in Harare on June 30th, 2023. The world-renowned professional, PJ Budler, will be present to train and advise producers and consumers on the selection process of cattle, as well as how to determine their carcasses and body composition before they reach the market.



Champion Pen of Three

# Slurry Management in Dairy Production

By James Kabinda, Animal Production Specialist

**In dairy production a lot of slurry is produced. Slurry management should be part of the dairy plan, as it can accumulate to high levels if not properly managed.**

In dairy systems manure is removed as slurry (solid waste plus water) to at least 100m away or into a sump about 30m away from dairy. There are 3 ways of handling slurry and the choice of which system to implement will depend on herd size.

## 1. UN-UTILISED SLURRY

There are two ways of handling slurry with this system by either using an open cement – line drain or using French-drain or soak-away.

Using an open cement – line drain - This system is efficient for small herds. The drain should be extended 100m away from the dairy unit. The drain should be 0.4 wide by 0.1 m deep to facilitate brushing down and is cleaned daily. The disadvantages of this system are that the potential of slurry as fertiliser is not realised and the area of land around the outflow becomes very wet, vlei-like, and is not utilisable. 10m<sup>3</sup> or (10 000L) of slurry contains 25kg Nitrogen, 10kg Phosphorus, and 45kg Potash.

Using French – Drain or Soak-Away -The French drain or soak-away is used to handle relatively small amounts of slurry. It uses a solid-trap, if all effluent flows to soak-away, it should be emptied daily to prevent blocking. May effectively be used for disposal of washing-up water. The disadvantage of this system is that it handles relatively smaller sizes of effluent and can easily be blocked if heavy solid wastes are involved.

## 2. SUMPS

Sumps with use of a holding or separating tank - This system is used with a cement-lined drain taking all slurry to the sump at least 30 m away. The sump is often emptied every 2 days and contents spread in pasture or crop. On construction the sump should be completely covered for hygiene and to avoid accidents.

Sumps with use of settling tanks - The settling tanks must be 100 m away from dairy, using cement-lined drain to carry slurry to settling tanks. Sequential filtering is used (one tank after another). Settling tanks should be 1.2 m deep, and may use excavated soil to build-up sides of tanks.

The quantity of slurry to be processed determines the size of tanks. Barriers of railway slippers, concrete blocks, or suitable material can be used, placed 23 mm apart to allow fluids to drain to the next tank. Liquid from secondary tanks can be piped into fish ponds, or sumps connected to irrigation. The disadvantage of this system is that it requires

specialised equipment for removing solids from tanks and spreading in field, and it requires light and free draining soils.

## 3. SUMPS TO IRRIGATION SYSTEMS

With this system, all water and manure are pumped out of sump into irrigation of pasture or crop utilising a specialised irrigation system (with very large (14mm) self-clearing nozzles). Irrigation system can only pump slurry at 5% dry matter. This system reduces fertiliser requirement of the farm and conversely reduces cost. Additionally, it reduces the irrigation water requirement.

## Factors to consider when selecting best system for you

- Quantity of slurry produced.
- The frequency of clearing the slurry.
- The type of soil of farm.
- The compatibility of the system with the cropping system.

If the slurry is not properly taken care of in dairy production, it can result in a fly and insect problem; which in turn increases stress in cows. Stress has a negative effect on growth rate and milk production.

James Kabinda is an Animal Production Specialist and can be contacted on 0774225873, or jameskabinda@gmail.com.



Dairy cows at Sommerset Milk Hub - Dawnview Ranch Marondera

# Women in AGRICULTURE

## Wendy Matashu Madzura, Head of Agronomy Services at Seed Co Zimbabwe

The agriculture sector has a vast number of opportunities especially for women across the value chain. I want to encourage women of all age groups to consider agriculture as a good career choice and sustainable business option. In any business venture one should research around the best practices to be employed and apply themselves whole heartedly to get the best outcome. The secret to success is working hard, passionately and consistently. I encourage women to invest time in understanding the different sectors of agriculture and select their best fit and above ALL women need to move away from the bounds of society that hold them back and lower their self-esteem. I believe that women are hardworking and committed to anything they set out to achieve as such the possibilities are endless. So, I say, Women CAN... It is time to jump onto the band wagon, because TOGETHER WE CAN.



## Mrs Gladys Tsambatare, A Diversified Farmer

As a woman farmer, I embrace the joys of diversification as I specialise in commercial maize, soya beans, wheat, potatoes, poultry and livestock. We are currently farming on 200 hactres of land at Chiridza Farm in Mhangura. After my husband passed on in 2021, I vowed to carry on his legacy. Most people expected our farming business to collapse because farming is perceived to be done better by men. I then was now on a mission to demonstrate to everyone that farming can be done by anyone and everyone regardless of gender or age as long as you set your mind to it. I enjoy spending my time in the field and hence I do it whole heartedly. I would encourage woman farmers not be intimidated by the misconception that farming is done better by men - you are a champion in your own right. There are moments where it gets stressful and tough but do not give up, give it your all and keep going!



## Sharai Paula Theresa Dube – Boran Stud Breeder

My name is Sharai a 35-year-old newly established Boran Stud Breeder with an academic background in Software Engineering. It is still amazing how my interest and passion for stud breeding was ignited – a 360 degrees turn from my career path. In December 2021 I visited Panganayi Boran Stud and was inspired to be a stud breeder myself. With the short journey that I have embarked on from purchasing a number of Boran cows, registering my Stud to diversifying into a Boar and Kalahari goats project, I have learnt that being a woman in the industry dominated by man takes a bit of a work around; but believe me you there is so much support that one can get from established breeders and other Cattlewoman. It is my desire to see young women make a sustainable living and becoming financially independent from the natural resources that surrounds them in our case, the Zimbabwean land. I would like to encourage other women to take risks and sit at the big boys table, learn one or two things from them and they also learn something from you!



## Eunah Makoni, Dairy Farmer in Norton

I am a dairy farmer at Kintyre Smart Dairy in Norton in partnership with my husband, Nathaniel. We have Holstein/Friesian, Jersey, and some Holstein/Jersey crosses. Our vision is to be a 100% Jersey dairy enterprise. Breed choice is a matter of personal preference however, guided by the need to match the breed to the production context. I like the jersey as it is feed efficient and hardy. It is also a “beautiful” cow. We started dairy farming in mid-2020 with 7 in-calf heifers. In April 2021 we started milking at an average of 18 liters/cow/day. This is our second-year milking. Initially we sold all the milk on farm because our volumes were very small. We officially graduated from being small-scale producers in February 2022 as our production per cow increased to an average of 20litres/cow/day. Right now, we are diligently approaching the 500 liters per day mark, the minimum for a large-scale producer. I aspire to be a large-scale dairy farmer with an economic business unit (minimum of 50 milking cows) in the shortest time possible to make the business worthwhile. We owe our success thus far to consistent hard work and persevering with our vision. I have some background in animal science, but I had to learn the practical ropes on the job. It is in a way a blessing in disguise that we started small as that has given us an opportunity to grow with our staff and herd. I encourage other women desiring to start dairy farming, particularly the youth, to be patient, put in the required hard work, put systems in place, figure out the markets, focus on their vision, be ready to fail sometimes and pick themselves up and success will follow. I also encourage women to go the full distance by becoming dairy processors; subsequently creating jobs and supply of affordable dairy products at a local level.



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# Cooking Up Compost - A Banquet for Your Soil

By Amanda Moyo, Purple Horizon Farm, Kwekwe

*“Rice, roast chicken, beef stew... is your mouth watering? Hay, straw, manure, maize stalks, peanut shells, banana peels... well, this might not be so exciting to you, but it is for your crops, this is delectable, if you cook it right.”*

Compost is both highly fibrous and nutritious organic material that needs to be ‘cooked up’ and served back to the soil, so that it can give back healthy and robust crops. Composting is deemed an easy, God given, and natural way to give back to the soil. It builds up soil structure increasing its efficiency in retaining moisture and releasing a steady flow of nutrients and minerals to your growing crops.

Basically, bacteria, fungi, worms, grubs and beetles are responsible for breaking down the plant and animal waste material in the compost. When residue materials are strategically brought together at one time and in one place, the breaking down process becomes a pile of goodness that supports new and long life. Therefore, be advised not to overlook all those leftovers from harvest time. Start to ‘Collect and Protect’ the material, and apply the art and science of composting. At Purple Horizons we advocate for the excellent methods, instructions and explanations on composting by the Foundations for Farming Organisation.

**Thermal Compositing** is based on heat creation; where heat (ideally 55-68°C) is created through the decomposing process. The heat kills many diseases and weed seeds. A properly managed compost heap can yield ready-to-use compost within 8 weeks’ time. For small farm holders, an ideal size of compost pile is being 1.5m width, 1.5m length, and 1.5m height. The compost pile needs a great quantity of materials; so, start collecting and protecting. Be sure to measure and keep the compost pile in a square shape for best retention of heat and moisture. It is important to flip the pile weekly, this aerates the composting heap, adding oxygen and managing heat generation. It is important to choose a well-protected area to place away from the reach of livestock that can pose a threat on destroying it. Evenly apply about 100l of water per week to the compost pile.



- A compost heap is built up with layers of approximately:
- 40% Dry plant material –anything that has dried up on the field, weeds or crop residues
  - 40% Green plant material—freshly cut vegetation, weeds, cabbage leaves, etc.
  - 20% Manure and residues from green legume crops, for nitrogen.
  - Extras - Hops from beer making, ashes from wood-based fire, peelings, leaves or spoilt vegetable matter, ashes from crop residue that was burnt to destroy disease or egg shell; basically, anything decomposable.
  - What to avoid - animal fat and proteins, diseased vegetation (if you are concerned it cannot be destroyed in the heat process), and too wet material, such as hops, that will suffocate the oxygen flow.

At Purple Horizon farm, we have made and used compost fertiliser for the past 5 years with marked success. It is important to note that we are on a journey of phasing out all chemical fertiliser from our operations with a vision of only using all natural fertilisers on our crops. We recommend the use of compost to all farmers. The manual labour required in forming the pile, rotating it weekly, and watering it daily, will take some commitment, muscle and time, but the efforts will be well rewarded.

*Whatever you cook up for the soil and crops will surely be served back to you plentifully, so start cooking up compost.*



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# Understanding the Common Internal Parasites of Poultry

By General Beven Mundida, Livestock Consultant

Like other livestock species, domestic birds (chickens, ducks, and turkeys) are affected by internal parasites. An internal parasite is an organism that lives in another organism, referred to as a host, and benefits by deriving nutrients at the other's expense. In poultry, the most common internal parasites are worms and protozoa. They usually reside in the intestines of affected animals. In low quantities, parasites will not usually cause a problem. However, severe worm infestation can lead to reduced poultry production, poor health of birds, increased susceptibility to diseases and poor growth rates sometimes occasioned by sickness and death of the animal. In this article I will look at the common parasites in poultry (especially chicken), signs in infested birds, and how to avoid/ control infestation in your flock. These common parasites can be categorised into worms and protozoa;

**ii. Tapeworms:** Tapeworms are flat and ribbon shaped and can range in length from 1mm to as much as 15 metres. Their bodies have segments that increase as they grow and break off upon maturity and pass out of the body with the faeces. The segments and eggs in the faeces are ingested by intermediate (inbetween) hosts such as a snail, slug, beetle, earthworm, grasshopper, or fly. The chickens get them when they consume the infected beetles, insects, etc.

**iii. Cecal worms:** They inhabit the cecum (a pouch that connects the small and large intestines) of the bird. They cause little or no damage to chicken flocks but can carry the organism that causes blackhead disease in turkeys. Like the roundworm, the cecal worm spreads when birds ingest worms from the environment or insects with worm eggs.

**iv. Gapeworms:** They are found in poultry trachea or windpipes. Affected birds breathe with their mouths open. Though not common, they affect chicks of up to eight weeks and turkeys of all ages. Adult turkeys often act as symptom less carriers.

**v. Capillaria worms:** There are seven species of worms from the genus *Capillaria* that can infect domestic and wild birds, with *Capillaria obsignata* being the most common. They can be found in various areas along the digestive tract. Untreated birds with severe infestations tend to grow slowly.

## 2. PROTOZOA

The other common internal parasites are protozoans. Protozoa parasites are small, microscopic organisms that reside inside a cell. The most common in this class is *coccidia* which causes the condition called coccidiosis.

Chicken with Coccidiosis will exhibit drooping wings and tail feathers, listlessness, loss of appetite, pale combs and wattles, ruffled feathers, huddling like they are feeling cold, blood or mucus in the faeces, diarrhoea, dehydration, and even death.

## Clinical Signs of Parasite Infestation

Birds infested by parasites will show any of these signs depending on the severity of the infestation.

1. Poor growth or decreased egg production;
2. Loss of appetite;
3. Emaciation/ thin coupled with weakness;
4. The ruffled appearance of feathers;
5. Drooping wings and tail feathers;
6. Diarrhoea (sometimes blood stained);
7. Anaemia (indicated by a pale comb) and;
8. In extreme cases death.

## Control of internal parasites

The following management practices can help farmers control internal parasites.

1. Provide your chicken with adequate high-quality feeds.
2. Keep the chicken house clean and dry by changing the litter at least once every week. Damp/wet areas in the house are good breeding sites for eggs and parasites. Dry any spills from drinkers and repair leaking roofs.
3. Clean your feeders and the drinkers every day using soap and water.
4. Isolate sick birds immediately upon detection.
5. Ensure that the birds are not overcrowded; Ideally, each bird should occupy a space of between 1sq foot to 1.5 sq feet depending on the breed.
6. Properly clean and rest the chicken house for two weeks before bringing a fresh flock (an all-in, all-out production)



7. Do not mix birds of different ages. Young birds are more susceptible to parasites as they can pick eggs shed by the older birds.
8. Do not place young birds, especially those under three months, in the same house where older birds have recently been housed. They may develop an infection with coccidia.
9. Try to regularly treat young birds for coccidia (ask your veterinarian for advice).
10. Buy your birds from reputable farms or organisations that will not deliver infected birds.

For more information visit <https://infonet-biovision.org/AnimalHealth/Chicken> or contact call/ whatsapp +263 776 420 161 or email: [gbmundida@gmail.com](mailto:gbmundida@gmail.com)

# Free-Range Chicken Farming

Free-range farming refers to farming where animals are allowed to roam outdoors for at least part of the day, instead of being confined in an enclosure for 24 hours per day. Free-range chicken farming is growing popular with poultry farmers. Its growth in popularity is due to the fact that it is extensive agriculture and the market demand for free-range meat is increasing. Extensive agricultural production system uses minimal inputs of labour and capital, relative to the extensive land area. The low capital requirement is linked to some of the following points;

**Housing** – Free-range chickens forage outdoors during the day and are sheltered at night for safety. The pasture confinement or the larger outdoor space attached to the roosting coop is fenced off so as to confine the chickens to a specific area as they forage during the day.

**Feed** – The chickens will get most of their food from scavenging the surroundings, as a result feed input costs are minimized. For commercial purposes however, supplementing their diet with commercial stock feeds, or a homemade feed such as worms from a worm farm, maize, sorghum, wheat and rice grains is encouraged.

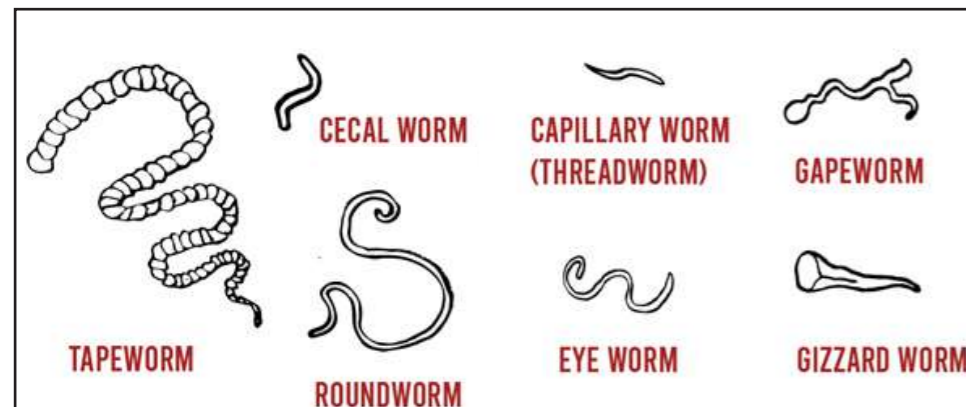
**Hardiness** - Free-range breeds have good resistance to many diseases, so this reduces the veterinary costs. Their hardiness is linked to the fact that they are kept outside on open space and are not confined in chicken runs where most diseases sprout. Although a vaccination regimen has to be followed.

**Prolific Breeders** – Taking into account the fact that free-range hens are good layers and excellent brooders, building up numbers of your flock will be a quick endeavor.

**Meat Flavour** – The chickens are can exercise more and have access to fresh and diverse plant and animal food sources (organic), this results in lean, nutrient-rich, low-fat meat for the table.

**Labour Extensive** – Free-range chickens spend most of their day outdoors foraging hence less time spent refilling feeders with feed and less frequency in cleaning the chicken coop.

There are a number of free-range breeds to choose from when planning to start a free-range chicken project. The major advantage presented by pure breeds is that they have known genetic characteristics; (expected weight after a number of weeks, how many eggs they can lay, their growth potential etc). There exists a number of breeds that are profitable as free-range chickens such as the Road Island Red, White leghorn, Sussex, Boschveld breed, Black Australorp and Potchefstroom Koekoek.



## 1. WORMS

**i. Roundworms:** The most common worms are round worms also called ascarids. These are large worms that can cause obstructions in the intestines when in large numbers. Birds get infested from ingesting eggs of the worms from the environment or ingesting insects with worm eggs in them.



# Are You Looking to Improve the Profitability of Your Egg Business?

By Elizabeth Lisa Makura



Whether you are using a deep litter system or battery cage system in egg production the following points play a pivotal role in the hen's output and hence your profitability; biosecurity, housing and space requirements, lighting, feed and water intake, quality of feed and water, deworming, laying facilities, vaccinations, pest and rodent control as well as bird weight (weight tracking).

For a profitable egg business, ideally, one wants a high laying percentage (at least 80%), good quality eggs and long laying period ((on an average of 52weeks (with 300 eggs/bird/year)) and minimise any losses; feed or hen related. But how can this be achieved, keeping in mind that the genetic makeup of the bird also plays a prominent role?

## 1. Biosecurity

Biosecurity refers to the deliberate actions taken to safeguard living organisms (in this case our layer hen) against harm from disease causing organisms. To reduce the introduction and spread of pathogens, the farm needs to be isolated from both human and animal interference. This can be achieved by fencing both the farm and site, disinfection protocols as well as effective pest and rodent control program. Disinfection includes that of vehicles coming on-site (wheel bath and vehicle spray). All persons entering the farm

are to strictly adhere to foot bath and hand washing system. Any personnel requiring entrance into the site (fowl houses) to shower-in and wear clean protective clothing. Disinfection has to be done on gaining entrance to each house. Health monitoring for personnel is also critical and this may include salmonella monitoring. Observe at least three days between visiting different chicken farms. It is crucial for the farmer to ensure that the above mentioned are strictly adhered to in order to reduce the bioburden on farm and hence possible disease outbreaks.

## 2. Water and feed quality

The quality of feed and water plays an important role in the growth and maturity of the pullet. It also directly influences productivity of the hen. Poor quality water or feed may contain harmful microbes such as E.coli, Salmonella or other toxins. Poor quality feed poses anti-nutritional risks which might hinder development of your pullets. Poor quality feed also refers to feed not meeting the requirements of the pullet at any stage in its growth period. All this counteracts efforts to make the enterprise more profitable. Consider water treatment, feed testing and flushing water lines.

## 3. Caring for the day old chicks

Place the day-old chick in a pre-heated brooding house, with sufficient feed (pullet starter) and water. Use at least 3 water drinkers and 3 feeders per 100 chicks. The addition of stress pack to the drinking water is recommended from day 1 up to 5. To encourage consumption, keep the water cool and fresh, as well as the drinkers full especially during the first 3 days of life. Maintain availability of feed and water for early adaptation to avoid mortality when the yolk-sac depletes (at day 4 or 5). In-house temperatures should be maintained at 33oC and only 2 hours of darkness for the first 3 days.

**From Day 4 to day 7** - At this age, closely monitor feed and water which are fundamental to the development of the organs and immune system. Water intake is expected to be thrice as much as feed intake. Adjust brooding temperatures to 30oC with lighting hours reduced to 21. Continue feeding ad libitum (at free will) and on day 7 can you commence weight tracking following the breeder's chart.

**From day 8** - At this stage we further reduce the in-house temperature to 28oC and light exposure to 20 hours per day. As a recommendation, make use of products that will neutralize chlorine and stabilise the vaccine water. From day 14, continue to feed pullet starter ad libitum and tracking weights weekly. Adjust Temperature weekly by reducing 2oC each week up to 36 days and light time by reducing 1 hour for each week up till 70 days of age.

### Vaccination Programme

Age	Disease
Day 10	Newcastle Disease / Infectious bronchitis (ND/IB)
Day 12-16	Infectious Bursal Disease (IBD)
Day 22	(ND/IB)
4 weeks	Fowl Pox / Avia Encephalomyelitis (FP/AE)
5 weeks	Infectious Laryngotracheitis (ILT)
6 weeks	Mycoplasma Gallisepticum (MG) (ND/IB)
7 weeks	Infectious Coryza



Free range layer chickens at the Foundations for Farming farm in Domboshave

**Onset of week 9** - Introduce the pullet grower gradually and taper off the pullet starter, follow the same whenever you are changing over feed. As the birds grow, their energy demand increases. High energy diet will also stimulate egg production and pave way for maintenance of a good shell quality when laying time arrives. The pullet develops most of the adult structural components such as muscles, bones and feathers during these weeks. This development stage is critical as it influences the hen's productivity. The amount of mineral reserve available for egg shell formation is directly related to the hen's skeleton size. To reduce cannibalism and feed wastage consider de-beaking at 10weeks of age. Keep the houses dry and well ventilated to avoid build-up of moisture and bacterial infections.

### Vaccination Programme

Age	Disease
10 weeks	De-worming
11 weeks	Infectious Laryngotracheitis (ILT) Fowl Pox
13 weeks	Infectious Coryza Egg Drop Syndrome (EDS)
14 weeks	Newcastle Disease / Infectious Bronchitis (ND/IB) Mycoplasma Gallisepticum (MG)
16 weeks	(ND/IB)
TO BE REPEATED AFTER EVERY 6 WEEKS	De-worming and (ND/IB)

At 16 weeks introduce the pullet developer feed and keep track of weights in preparation for the laying period. Ideally, body weight during the laying period should be around 1.5kg. An excessive weight gain can result in a fat pad leading to problems such as hen loss due to egg peritonitis. Underweight pullets more normally give eggs with poor eggshells starting from around 40 weeks. The bird weight at the onset of weight also impacts on the egg size throughout laying. A uniform egg size will reduce laying related mortalities and make your business more profitable.

### Specifications for mature pullets

Items	Specification
Number of feeders /100	2 feeders with 22kgs or more capacity
Number of drinkers /100	2 drinkers with 12litres or more capacity
Number of laying boxes /100	20, with 1 box per 4-5 hen
Lighting	12hours/24hours
Daily feed intake	110-120g/bird/day
Daily water intake	500ml/bird/day
Space	8 birds/m <sup>2</sup>



Healthy laying hens at Bushman Rock

Laboratory tests such for feed and water quality as well as vaccine effectiveness/ disease surveillance tests can be useful in truly optimising your business. Employ methods to control pests such as mites, fleas and flies.

**Disclaimer:** This compact management guide is for educational purposes and therefore cannot possibly be all encompassing contact your veterinarian with questions or specific issues.

# Algae Control and Management in Fishponds

By **Lorraine K Salimu & Milton T Makumbe** Fisheries and Aquaculture Resources Production Department

**A**lgal blooms are a common cause for concern for fish farmers posing both positive and negative effects on the fish stock under culture. It is imperative to keep tolerant algal levels in one's pond to ensure a natural source of feed is always available for fish stock aiding in desirable growth performance and disease resistance. However, large quantities of algae prove harmful and only achieve the reverse. Fish mortalities tend to be high due to competition for oxygen during the night and it is important for fish farmers to be aware of the 'good' and the 'bad' algae and foster high productivity for their fish stock. There are three types of algae that your pond may be susceptible to. These are: Planktonic, Filamentous and Macro-algae.

### 1. Planktonic (What the Farmer Wants and the Fish Need!)

Planktonic algae (phytoplankton) are essential to the fishpond ecosystem providing food to zooplankton which are consumed by fish. The algae are noticed from the green colouration of pond water and is an excellent source of oxygen. It is advisable to maintain the presence of this type in your fishpond as they provide supplementary feed consequently reducing costs associated with commercial feed acquisition. An analogy best suiting a clear pond, is the release of cattle on bare, fallow land with no vegetation. Regardless of the cattle being offered commercial feed full time, there is need to supplement with grazing. The same applies for your fish stock! The green colouration is essential and you are likely to harvest more fish at the average body weight of 400g after 8 months. To put a suitable cap on the algae concentration one needs to maintain the visibility of their palm at a depth of 20 to 25cm in the pond. There is need to provide adequate nutrients and to maintain hardness and alkalinity at 30mg/l. It is recommended to add lime to the empty pond at least every 3 to 7 years depending on the alkalinity. Keep in mind that phosphorus is the limiting nutrient in water therefore phosphorus-based fertilisers are most suitable. Adequate fertiliser application can give you excellent reaping whilst a little extra can prove fatal to your fish stock as very dense algal blooms will ensue.



### 2. Filamentous Algae (What You Need to Get Rid of ASAP!)

This is often termed "pond moss" or "scum" as it forms long visible intertwining threads. The filamentous algae are unpleasing to the eye and often hinders activities like fishing. The algae grows at the bottom of the pond and eventually floats to the surface and forming a blanket-like appearance that takes over the pond surface. This inhibits sunlight and consumes the bulk of the oxygen from the water allowing the algae to float. The bubbles that result in the floating mechanism are the oxygen trapped in the filaments and contribute to less oxygen for your fish stock even during day time. Due to this, one needs to get rid of the filamentous algae as it results in dire consequences.



Filamentous Algae



Macro-Algae

### 3. Macro-Algae (The Large and Possibly Useful)

If one encounters a large, submerged aquatic plant, they possibly have a macro-algae infestation. These are primitive plants with no roots, stems or flowers and produce spores. The two common macro-algae belong to the genera Chara or Nitella. These proliferate quickly and carpet the bottom. Chara is a natural source of limestone (calcium carbonate). This is due to their ability to produce calcium carbonate as a by-product of photosynthesis. Chara does well in alkaline, hard, and calm waters. A good Chara concentration serves as a natural cover from predation for fish in the pond, mimicking a natural ecosystem. Nitella, also termed stonewort prefer low hardness waters that are more acidic. The macro-algae are soft and have no odour.

#### Control and/or Algae Maintenance

Algal blooms can be controlled using several measures. These are chemical, biological, and physical. The pros and cons are as depicted in the table below.

All copper-based compounds are likely to be toxic to fish if applied at the wrong rates. One should test water's alkalinity (only apply at alkalinity above 50mg/l).

#### Prevention of Algal Blooms

Algal bloom prevention is always better than treatment. The best method is to control the nutrient composition in your pond thus, curbing your problem before it has begun! If possible, aerate your pond. This promotes aerobic bacteria that feeds on decomposing matter significantly reducing the excess nutrients that may promote algal blooms.



For consultation on fertiliser, algacides, and herbicide application rates as well alkalinity tests, please get in touch with us:

Facebook-Department of Fisheries and Aquatic Resources, Zimbabwe  
Twitter-@DeptFisheriesat  
Instagram- Department of Fisheries and Aquatic Resources, Zimbabwe

Control Measure Category	Algae Type	Control	Pros	Cons	Examples
Biological Control	Filamentous Macro-algae	Introduction of fish species that prey on algae	No environmental accumulation	-May pose adverse ecological effects if species is invasive. -Limited control as each species is selective to specific algae and can only consume a little at a time.	-Mozambique Tilapia (Oreochromis mossambicus) -Grass Carp (Ctenopharyngodon idella) -Red-breasted bream (Coptodon rendalli)
Physical Control	Filamentous Macro-algae	Physical removal of algae in the ponds	No environmental accumulation	-Laborious -Short-lived -In the case of dyes, suppression of natural ecosystems by also targeting phytoplankton	-Seine Netting -Raking -Wire Screen -Non-toxic drugs that colour algae and shade from sunlight hindering growth/survival
Chemical Control	Filamentous Macro-algae Phytoplankton	Chemical Application	Over 90% success rate when applied at the manufacturer's recommended rates. (General application rates: 2.3kg copper sulphate dissolved in 11.4l water for a 4,050m <sup>2</sup> pond)	-May be toxic to fish in high temperatures eg. Copper sulphate -Require controlled conditions eg. copper sulphate is less effective in hard water -Environmental accumulation	<b>a. Algacides containing copper.</b> -Copper sulphate -Chelated copper complexes -Aqueous copper <b>b. Herbicides</b> -Diquat -Flumioxazin -Sodium carbonate -Peroxy -hydrate

# Reproduction Management in an Ewe

By **Admire Dube**

**Reproductive rate is defined as the number of live lambs born per ewe exposed for breeding. Optimal reproductive rates are essential to profitable sheep production. The optimal reproductive rate varies by farm, production system, and geographic area.**

Reproductive rate is defined as the number of live lambs born per ewe exposed for breeding. Optimal reproductive rates are essential to profitable sheep production. The optimal reproductive rate varies by farm, production system, and geographic area.

## Puberty (sexual maturity)

Puberty is when an ewe reaches sexual maturity and exhibits oestrus (heat) for the first time. The age of puberty is influenced by breed, genetics, size (weight), nutrition, and season of birth. Most ewe lambs reach puberty between 5 and 12 months of age. Ewe lambs will tend to reach puberty during their first autumn. For this reason, spring-born ewe lambs tend to exhibit puberty earlier than fall-born ewe lambs. One way to select for early puberty is to expose ewe lambs for breeding and scan them for pregnancy, culling any ewe lambs which fail to become pregnant. High levels of feed pre- and post-weaning reduce the age at puberty. Single lambs' cycle at a younger age than twin and triplet-born ewe lambs, due to their size advantage.



**Dan Bosman teaching about femininity in ewes. (See ZiMunda Issue 9)**

## The Oestrus (or heat) cycle

Reproduction in non-human mammals is regulated by an oestrus cycle. In sheep, the length of the oestrus cycle ranges from 13 to 19 days and averages 17 days. There are four phases to the oestrus cycle: proestrus, oestrus, metestrus, and diestrus. Oestrus is the period of time when the ewe

is receptive to the ram and will stand for mating. It lasts approximately 24 to 36 hours.

Ovulation (release of eggs by the ovary) occurs in mid to late oestrus. Metestrus begins with the cessation of oestrus and lasts for about 3 days. Primarily it is the period of the formation of corpus luteum (CL). The corpus luteum produces progesterone and maintains pregnancy in the ewe. Diestrus is the period of the oestrus cycle when the CL is fully functional. Proestrus begins with the regression of the CL and drop in progesterone and extends to the start of oestrus. Rapid follicular growth is occurring during this period. It usually extends from day 4 to day 13-15 of the cycle. Anoestrus refers to a state where the normal cycle stops. Oestrous cycles are usually affected by season. The number of hours daily that light enters the eye of the animal affects the brain, which governs the release of certain precursors and hormones. Most sheep are seasonally polyoestrus and short-day breeders. They will begin to exhibit oestrus when length of day begins decreasing. They will come into heat every 16 to 17 days until they are bred or return to anoestrus. NB - Some sheep breeds are less seasonal. They breed almost year-round or have an extended breeding season.

Signs of oestrus in the ewe are much less pronounced than in the cow or doe and can usually not be detected unless a ram is present. When mature ewes are in heat, they will seek out the ram and stand still for him to mount them. Sometimes they wag their tails vigorously. They may nuzzle the ram around the belly or scrotum and even try to mount the ram. Young ewes rarely exhibit these behaviours. There is evidence to suggest that rams and ewes prefer to mate with their own breed, but when there are no options ewes will mate with almost any breed of ram.

## Pre-Breeding

Prior to breeding, ewes should be evaluated for their need for deworming. They should have their hooves trimmed, if necessary. If there is a history or risk of abortions in the flock, ewes should be vaccinated prior to breeding. It goes without saying that only healthy, reproductively sound ewes should be exposed to rams for breeding.

The udder of every ewe should be examined. If the ewes exhibit the following characteristics they should be culled:

- Unsound udders.
- With history of prolapsed vaginas in the previous lambing. There is a high probability of reoccurrence.
- That did not raise a lamb previous breeding season.
- With poor body condition due to age and/or missing teeth.

Ewes with chronic hoof problems (e.g. foot rot).

## Gestation (pregnancy)

The average gestation length in sheep varies from 142 to 152 days. The average is 147 days. Individual pregnancies may vary from 138 to 159 days. There are breed differences in gestation length. Ewes carrying multiple births tend to have shorter gestations. Male lambs and heavy birth weight lambs are usually carried longer than female lambs.

The period of early gestation most critical to success during the lambing season is the first 30 days after fertilisation. The first 21 to 30 days after breeding is when embryonic implantation occurs and also when most embryonic mortality occurs. Thus, anything that can be done to reduce embryonic mortality and should result in more lambs born.

Shearing, vaccinating, working ewes, pronounced changes in feeding practices should be avoided during the first 30 days of gestation. Ultrasonic pregnancy scanning can be done on ewes from 35 to 60 days after breeding, depending on equipment used and operator skill. Nutrition during early gestation is quite simple. Ewes need only slightly above maintenance levels of nutrition for the first 15 weeks of pregnancy. Mid-gestation is important for development of the placenta.

Late gestation (last 4 to 6 weeks) is a critical period for ewe reproduction. This is when the majority of foetal growth is occurring, placing increasing nutritional demands on the ewe. Ewes consuming inadequate diets are prone to pregnancy toxemia and milk fever. Nutrition in late-pregnancy affects the size and vigour of lambs and the milk-producing ability of the ewe.

## Parturition (lambing)

There are three stages to parturition (lambing): dilation of the cervix; expulsion of the foetus(es); and expulsion of the placenta. Stage one usually takes 3 to 4 hours. The birth of a lamb usually occurs within an hour or less from the rupture of the first water bag. An ewe lambing for the first time or with multiple births may take longer.

If labour takes over an hour for mature ewes and over 2 hours for ewe lambs, assistance may be required. The placenta is passed 2 to 3 hours after delivery is finished. In multiple births, there are separate afterbirths for each lamb. After the lamb is born, the ewe will lick and nuzzle it to begin the bonding process.



**Healthy ewe and lamb. Image provided by Yara Hanssen. (See ZiMunda Newsletter Issue 5)**

## Breeding Ewe Lambs

Ewe lambs should not be bred until they achieve approximately 70 percent of their mature size (weight). At the same time, care should be taken not to overfeed replacement ewe lambs. Research has shown that overfeeding pre-pubertal females (2 to 4 months of age) has a detrimental effect on mammary development (they deposit excess fat in their udders) and affects subsequent milk producing ability. Replacement ewe lambs should be fed separately than market lambs or ram lambs being fed for market. Ewe lambs should be fed higher forage diets. Frame growth is more important than fat deposition.

Pregnant and lactating ewe lambs should be kept separate from mature ewes. Ewe lambs require extra nutrition because they are still growing. They will not compete well at the feed bunk with mature ewes and will not gain weight properly. Ewe lambs that are forced to run with the ewe flock will lose weight in late gestation and lactation.

## CONTROLLING REPRODUCTION IN EWES

When satisfactory results are not obtained under natural breeding conditions, it is possible to artificially manipulate the reproductive cycle of sheep.

**Hormonal control** - A common method of inducing oestrus in non-cycling ewes is progesterone-based therapies. Progesterone prevents the ewe from returning to oestrus and ovulating. When progesterone is introduced artificially, it fools the body into thinking it is pregnant and the animal will not ovulate or come into heat. When the progesterone source is totally removed, the body realises it is no longer pregnant and will ovulate within a very predictable period.

**Prostaglandin** - Prostaglandin-based protocols are only applicable to cycling ewes and are restricted to use during the breeding season. Prostaglandins cause regression of the CL, telling the body that no pregnancy exists. The ewe will ovulate within a very predictable time.

**Melatonin** - Melatonin treatments have been shown to be an effective method of inducing oestrus in non-cycling ewes. Melatonin is called the "hormone of darkness," because it is released by the pineal gland during the night. Treatment with melatonin therefore mimics the short days of fall and induces oestrus after a minimum of approximately 35 days of treatment.

**Light Control** - Controlled lighting can be used to initiate oestrus. Short-day breeders like sheep may be programmed to cycle if they are maintained in a light-tight building where the photoperiod is reduced gradually over an 8 to 12-week period. Rams should be exposed to the same light regiment to obtain high fertility. Light control is usually impractical for most producers.



**A mature ram at Nguni Persian Stud – Dr Doug Bruce. (See ZiMunda Issue 9)**

The “ram effect” - The “ram effect” is when non-cycling ewes are stimulated to ovulate by the sudden introduction of an intact male or “teaser” (vasectomised) ram. Rams produce a chemical substance called a pheromone, the smell of which stimulates the onset of oestrus. When ewes and rams are in constant contact (sight or smell), the pheromones are much less effective at inducing oestrus. Ewes that are not cycling when a ram (or teaser) is introduced will generally ovulate in 3 to 4 days. This first ovulation will be a “silent” heat, which cannot be detected by the ram. Following this silent heat, there will be two normal oestrus peaks, with some ewes cycling around day 18 and the remainder around day 25. Ewes that do not conceive at either of these times may return to heat in another 17 days. It is expected that 60 to 70 percent of the ewes will conceive at the first normal oestrus. Of the remaining ewes, 60 to 70 percent should conceive at the second struts. Although recommendations vary, rams should be isolated from ewes for at least 6 weeks in order for the ram effect to work. Ewes must have no contact with rams by either sight or smell, which means that

they must be separated by distance. The ram effect is not as effective with ewe lambs. The ram effect is most effective during the transitional period when ewes have not begun to cycle, but are almost ready to. The greatest value of the ram effect is the synchronisation of oestrus activity which will result in large numbers of ewes ovulating, conceiving, and lambing in a relatively short period of time. To be effective, it is important to have adequate numbers of young, healthy rams.

**Artificial Insemination (A.I)** - Artificial insemination is possible in sheep, but not a common practise. This is because the ewe has a very complicated cervix which makes trans-cervical A.I. as is done with cattle, swine, and goats more difficult. As compared to other livestock, the ewe shows few visible signs of heat (oestrus). Breed improvement in the sheep industry has been much slower to develop and the industry lacks the means to identify superior genetics.

*I hope that these breeding care tips will help you improve the reproductive performance of your flock.*



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# Biosecurity on Pig Farms

By Yolanda Dehwe, Piggery Section Supervisor



Biosecurity refers to all the measures that are aimed at preventing the introduction (bio-exclusion) and /or spread of harmful organisms to animals or plants hence minimise the risk of infection. Although the farmer cannot entirely eliminate the entry or spread of disease causing organisms, biosecurity has a huge part in ensuring there is limited entry and spread of diseases. The three cornerstones of any biosecurity program have been identified as:

- Bio-exclusion- preventing the introduction of unwanted disease agents into the farm
- Bio-containment- preventing the spread of disease agents

to neighbors or even long distance transfer

- Bio management- combined effort to control economically important infectious diseases that are already present in the farm population

There are other various points to be considered on a pig farm to minimise risk of entry and spread of diseases. These considerations are discussed in this article;

### 1. Training of farm personnel

The training of all pig farm personnel includes management, drivers and everyone who is directly linked to your farm. The trainings will contribute to reduce unintentional exposure to pathogens. A common misconception about biosecurity is supposed to prevent the entry of pathogens into your farm. However, this notion is nearly impossible because the pathogens exist naturally in the farm 's environment. It would rather be true to look a biosecurity as a measure to minimise the entry of microorganisms/pathogens that the herd has not had exposure to.

### 2. Location

The location and siting of a pig farm is an important aspect of upholding the biosecurity standard of any pig herd. The piggery unit should be located away from other pig farms to minimise the spread and transmission of diseases. When deciding on a location the farmer should take into account factors such as wind direction. The farm should also be away from their farms such as those of cattle to minimise spread of diseases such as the foot and mouth disease (FMD) which is common to both species. The pig herd must not be too close to the public or main road. This is to minimise the risk of spread of disease from other animals in transit.

### 3. Limited / restricted entry

Because people can be vectors of pathogens, it should be the farmer's priority to limit entry of unauthorized personnel into a piggery unit. Upon entry the farmers should provide a sign in document that includes details such as name and whether or not there have been in contact with other pigs. In case of any disease outbreak this information will assist in tracing a possible source of pathogen or diseases. Signages at entrances can help enforce such regulations.



### 4. Physical barriers

In addition to restricted access to the farm, the farmer must also put into place physical barriers. This may include fence, wire mesh or barbed wire depending on the available material and that which the farmer can afford. This will help prevent the entry of any stray animals into the pig housing or the farm. The most common animals a pig farmer wants to keep out are the wild boars, African warthog and bush pigs. Common to Zimbabwe is the African warthog which is an asymptomatic carrier of the ASF virus. The danger with the warthog is it can get infected with ASF but will not present a clinical signs of the fatal disease. The pig farmer must also seek to prevent entry of dogs as they carry the risk of spreading transmissible gastro-enteritis (TGE) and other gastric related infections. Birds are quite difficult to keep away, one must use mesh wire if they are using open sided buildings to house the pigs. Birds are able to spread diseases through their droppings such as avian tuberculosis and erysipelas. Rats and flies can also be a menace as they may spread meningitis into the herd. An effective pest control program should be in place in order to keep these animals under control.



An example of a physical barrier

### 5. Incoming pigs

If outsourcing pigs the farmer should always strive to get pigs from a reliable and reputable supplier. When the pigs get on the far they should be quarantined first for about six weeks before being mixed with your original herd. This will give enough time for the pigs to adjust to the new environment and also give time to be able to inspect any diseases they might carry.

### 6. General hygiene

Ensure the pig housing is well cleaned before loading a new batch in. there should be a proper cleaning procedure in place. Use cleaning agents and disinfectants from a well reputable source to keep the bacterial load down. A foot dip or footbath must be provided at any entrance to the house.



SMALL STOCK

### 7. Disposal of dead animals

This should be done daily in a designated area away from the live animals to avoid disease build up.

### 8. Showering facilities

If possible a pig farm should provide showering facilities on the piggery unit. Any personnel who intends to gain entry into the piggery unit must shower in beforehand. The farmer can even go as far as ensuring the visitors or anyone who works on the farm showers their hair too. The showering facility should clearly separate the dirty and clean sides. The dirty side should be where the personnel leaves all their personal belongings as clothes jewellery and others. The clean side is where the personnel changes into provided farm clothing. The farm overalls shall not be moved outside the farm premises

### Conclusion

Before a farmer can initiate a successful biosecurity he /she has to have basic knowledge of the diseases endemic to their area and how to control them. A good biosecurity program will only be as effective as you are in adhering to it. About the author - Yolanda Dehwe is an Animal Scientist specialising in piggery production with a degree in Animal Science from University of Zimbabwe and currently towards MSc degree in Animal Breeding and Biotechnology. She is also currently working as a piggery section supervisor (3yrs).

For more information on pig farming, call/whatsApp: +263716882428/+263776630766 or email: yolandadehwe16@gmail.com

# TIMB's Statement on the 2023 Tobacco Marketing Season

By TIMB's Karen Mufumha



As the tobacco marketing season commences on the 8th of March 2023, the (TIMB) will be there to promote, protect and maintain the sale of tobacco at all authorised selling places. In working towards increasing efficiency, the Board has also crafted the **Contractors' Compliance Administration Framework** aimed at promoting orderly marketing, fairness, lawful conduct of licenses, advancing farmer viability, promoting sustainability and punishing offenders such as side marketers.

This season we encourage farmers to shun away from side marketing. Failure to do so, the offenders will be managed according to the **Statutory Instrument (SI) 77 of 2022** which prohibits Side marketing as well as the Contractors' Compliance Administration Framework. We have also extended the arm of our Inspectorate Department, which will be conducting random inspections of farms, sales floors, and warehouses throughout the season. TIMB Inspectors will also conduct intelligence-led operations in partnership with law enforcement agencies for example surveillance patrols stops and search at roadblocks. As a Board, we continue to educate and carry awareness campaigns targeted at all tobacco industry stakeholders so that they know the implications and negative effects of side marketing.

During the 2023 Tobacco Marketing season tobacco growers shall be paid 85% of their sales proceeds in foreign currency and 15% in local currency. All tobacco merchants and contractors have been made aware that they are supposed to pay growers within 48 hours of sales completion. Failure to do so will be met by stiff penalties therefore, we encourage tobacco growers to notify us if they are not paid within 48 hours. Growers are also encouraged to work with transporters who have permits from the TIMB.

Moreover, growers are urged to adhere to COVID-19 regulations as outlined in Statutory Instrument (SI) 228B of 2021. Due to the expected large numbers of farmers at tobacco selling points in and out of Harare those entering sales points must be fully vaccinated (2 doses) with the booster dose (3rd dose) being an added advantage. Farmers are also encouraged to always wash their hands with soap and running water, sanitise, observe social distancing and wear masks properly.

**Ultimately, we wish all stakeholders a great and successful 2023 tobacco marketing season.**



# The Tobacco Selling Season Kicks Off

By the ZiMunda Farming Magazine

On the 8th of March 10, 2023 more than a hundred people gathered at the Tobacco Sales Floors (TSF) Harare to witness the start of the 2023 tobacco-marketing season. The Guest of Honor, the Vice President of the Republic of Zimbabwe Dr C.G.D.N. Chiwenga was pleased to officiate this ceremony which marked the start of the 2023 tobacco marketing season. During his speech he noted that "Agriculture contributes to export earnings and the flagship is tobacco. Then the next thing we want to do is to ensure that there is more value addition and beneficiation. We export 98% of our tobacco in raw form, therefore, exporting jobs and value."

This year's season opened much earlier compared to last year where the selling season kicked off on March 30 and closed on October 21. Applauding to the growth of the industry during a speech by the Chairman of the Tobacco Industry and Marketing Board, Mr Patrick Devenis noted that. "The TIMB register boasts of 148,527 growers doing 117,928 hectares of tobacco during the 2022/23 tobacco production season as compared to 110,155 hectares of tobacco by 122,841 growers in the season 2021/22 – there are around 3,283 new growers."

### Key Notes from the Opening Ceremony

- To offtake this tobacco, the TIMB has licensed 2 auction floors and these are Tobacco Sales Floor (TSF) and Premier Tobacco Auction Floor (PTAF). The Board also licensed 25 "A" Class buyers and 32 contracting companies.

- Sales will be conducted in Harare as well as 5 decentralised centres which are Karoi, Mvurwi, Bindura, Marondera and Rusape.
- The industry together with the Reserve Bank of Zimbabwe have jointly put in place improved payment measures to ensure that tobacco growers get full value for their crop and are simultaneously paid within the shortest possible time. To enforce this, it will be guided by the Contractors' Compliance Administration Framework. All tobacco merchants and contractors have signed it and have been made aware that they are supposed to pay growers within 48 hours of sales completion.
- Errant behavior will become an issue of the past as the TIMB Inspectorate unit has been expanded and now armed with SI 77 of 2022 as well as the Contractors' Compliance Administration Framework prohibiting side marketing.
- Due to the expected large movements and congregations of farmers at tobacco selling points in and out of Harare, the marketing season will be guided by COVID-19 regulations as outlined in Statutory Instrument (SI) 228B of 2021. Those entering sale points this season must be fully vaccinated (2 doses) with the booster dose (3rd dose) being an added advantage.

*In closing the Chairman expressed his gratitude to the Board, management and staff for their continued dedication to delivering value to our stakeholders and wished everyone a healthy, peaceful, and successful 2023 tobacco marketing season.*



SEASONAL	TOTAL AUCTION	TOTAL CONTRACT	TOTAL 2023	TOTAL 2022	% CHANGE
Mass sold(kg)	48,938	-	48,938	94,453	(48.19)
Value(US\$)	125,095	-	125,095	243,503	(48.63)
Avg.price US\$/kg	2.56	-	2.56	2.58	(0.85)
Rejected %	7.96	-	7.96	10.00	(20.38)
Bales laid	628	-	628	1,310	(52.06)
Bales Sold	578	-	578	1,179	(50.98)
Rejected Bales	50	-	50	131	(61.83)
Highest Price	4.66	-	4.66	4.96	(6.05)
Lowest Price	1.40	-	-	0.80	(100.00)
Avg.Bale Weight (kg)	85	-	85	80	5.69

Tobacco Industry & Marketing Board Auction and Contract Tobacco Seasonal Sales Statistics - Date 08/03/2023 Day 1



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## Adjuvants

By Stu Taylor

Adjuvants are compounds formulated to enhance the efficiency of any given chemical when applied to a plant or crop. The materials are added to spray solutions to improve the performance of plant protection compounds, like herbicides, insecticides, miticides and some fungicides. Crop spray application can be affected by factors such as, wind speed, boom height, distance to susceptible vegetation and spray particle size. There's really little one can do in controlling the wind and could be mechanically limited on boom height changes hence managing chemical droplets is the next best option, by using adjuvants. These can either be built-in adjuvant (manufactured with an adjuvant) or add-ons.

### Adjuvants can enhance product performance by:

- Providing more efficient delivery of active ingredients.
- Reducing the level of active ingredient required.
- Extending the spectrum of effectiveness.
- Replacing high-value or high-toxicity active ingredients with lower value surfactants.

### Which leads to:

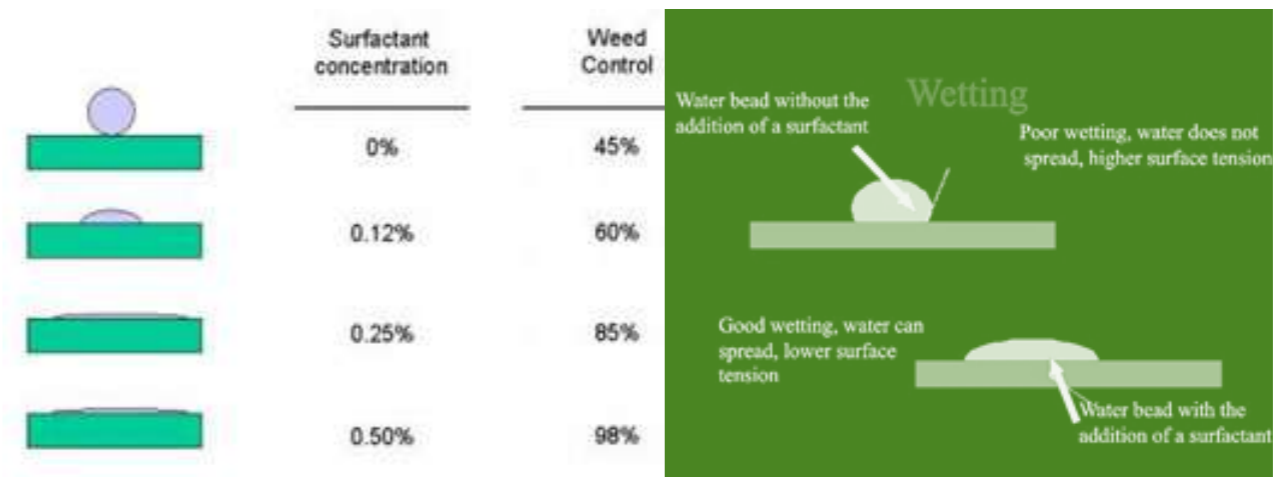
- Better chemical performance and therefore increased yields.
- Less chemical environmental pressures.
- Reduced costs as one spray can be enough.
- Improved environmental safety due to lower residue levels.

In the market, adjuvants form a broad range of products including surfactants, spreaders, penetrants, stickers, crop oils, anti-foaming agents, buffering agents and compatibility agents.

### Surfactants

A surfactant is a chemical substance that increases the spreading, retention (sticking) and/or penetrating properties of a liquid by lowering its surface tension. These include;

- **Wettters/ spreaders** – these enable the chemical to be evenly spread over the whole plant area, thus allowing the chemical to penetrate the plant evenly throughout.



A boom sprayer in action at ART Farm Pomona

The effect of a spreader on herbicide activity is due to more than a simple reduction in spray droplet surface tension. Role of spray adjuvants with post emergence herbicides by Bob Hartzler.

- **Stickers** – enable the chemical to adhere to the plant and render it rain fast extreme weather, also allowing the chemical maximum time to work to its optimal potential. The addition of a spreader sticker can be especially important when you are using it to control anything that the spray needs to touch. Since most sprays work best by contact type activity, pests like aphids or cutworms, or fungus in a lawn, are ideal situations under which you'd want to add a spreader stick.

### Buffering Agents

Some pesticides, particularly carbamate and organophosphate insecticides, undergo a chemical reaction in the presence of alkaline water (water that has a pH value greater than 7). The reaction is known as alkaline hydrolysis, and it reduces the effectiveness of the pesticide's active ingredient. The fastest way to determine the pH level of water is to test it with a pH meter or test paper. Buffers are compounds that adjust the

pH of the water used in a spray mix, thus enabling the chemical to perform to its maximum potential. The product MUST be added to the spray water BEFORE any chemical is added.

**Always READ THE LABEL before using a chemical.**



# Timeous Soil Sampling and Early Land Preparation

By Dadirai Chinamo, Soil Chemist at the Tobacco Research Board

This note serves to remind growers to conduct early land preparation and to ensure soil samples for lime and fertiliser recommendations are collected and sent out for analysis. Timeous and effective land preparation and soil testing are essential components, among several others, for profitable tobacco production.



Figure 1: Good soil tilth

## Soil sampling

Before the lands are prepared, it is necessary to have the soil for individual lands tested around March to May to establish concentrations of available nutrients and determine fertiliser requirements for optimal crop growth. Soil testing also gives an indication of the level of acidity or alkalinity of the soil (pH).

For the correct amounts of fertilisers and liming agents to be determined it is important that soil sampling is done correctly and that a sample representative of field conditions is submitted for testing. An improperly collected sample will give biased result, and the corresponding recommendations will be poorly suited for the actual soil conditions. Soil samples should be taken at the end of the season soon after the crop harvest using the Z-sampling method (Consult the TRB or its publications for in-depth guidance). The method involves sampling at 10 points in a 'Z' pattern in each field (Fig. 4).



Figure 3a



Figure 4

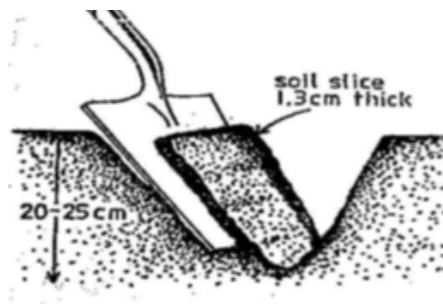


Figure 3b

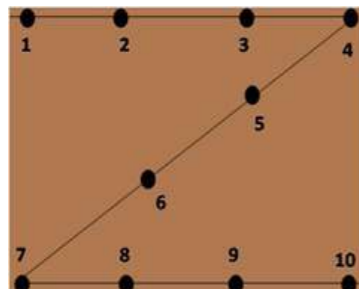


Figure 5



Figure 2: Timeous land preparation

Sampling can be done using a spade or an auger (Fig. 3a & 3b). The sub-samples are then mixed thoroughly, divided into four parts using the 'quartering technique' (Fig. 5), and small portions are taken from each quarter until there is one representative composite sample of 1 kg. When sampling, growers should avoid anthills or where fertilisers are normally off-loaded. Once soil sampling has been done, fields are then ploughed in preparation for the following season's crop.

## Land preparation

The timeous preparation of land ensures optimum soil conditions that enhance the successful establishment of transplants. When done late growers may face problems such as build-up of insects and weed seed bank, poor stand establishment and nutritional deficiencies leading to high costs of production. Ploughing from January to March/April may be considered as early-ploughing and from July onwards as late ploughing. With early-ploughing, the grass is normally disced in before the end of January or February and the field then ploughed in March or April, that is before the end of the rains when the soil is still moist depending on the extent of the rainy season. Ploughing depth should not be less than 3 cm.

Early ploughing is usually ideal before the end of the rains when the soil is still moist in slow growing regions (Norton, Bromley, Marondera and Headlands), medium growing regions (areas like Darwendale, Bindura, and Chegutu) or infertile sand. This allows early and uniform decomposition of organic matter and promotes



Figure 6: Tobacco growing well under an early ploughed land.

mineralisation of nitrogen that is then utilised at the time of planting. Research done at Kutsaga has shown that deep early ploughing can release the equivalent of 90 kg/ha of ammonium nitrate. Early ploughing while the soil is still moist also allows for adequate soil moisture conservation and subsequently less water is used at planting.

Another benefit of early ploughing is that a uniform good tilth is more easily obtained and soil moisture conditions are favourable thereby minimising ploughing and discing costs. Consequently, implements wear and tear is reduced. For small-scale growers who use draft power, early ploughing soon after the rains also ensures that cattle for draught are in good condition to pull the plough unlike later in the season when they may have inadequate strength to pull the plough.

However, late ploughing may be recommended for fast growing regions (areas like Chinhoyi, Banket, Mvurwi and Karoi) or heavy textured, fertile soils as temperatures and the rate of nitrogen mineralisation are usually high during this period (from July onwards). This means that plant residues in the soil are able to fully decompose and mineralise before the planting season commences.

## Conclusion

It is highly recommended that growers practise early ploughing and ensure soil testing is done timeously. It is this attention to detail that enables growers to derive maximum economic value from tobacco production by reducing production costs and yet attaining increased tobacco yields and quality.



Figure 7: A good land preparation leads to a bumper harvest. Image taken at the 2023 Official opening ceremony for the Tobacco Marketing Season.

For more information, contact Kutsaga Research Station's Crop Production and Molecular Technologies Division on telephone # 0868 800 2604 or email: tobres@kutsaga.co.zw or visit Kutsaga Research Station on Airport Ring Road, Harare.

# Harvesting and Post-Harvest Handling of Grain 2023

By Wendy Madzura, Agronomist

It is crucial to minimise losses and maintain the quality and quantity of the harvest for as long as possible. Post-harvest losses of grain in storage can be between 20-30% and in the field, transportation and processing losses of 10 -20% can occur if farmers fail to observe strict measures to minimise losses. Harvesting is an important process in crop production hence farmers can be guided by the following steps.

## Harvesting and Harvesting Preparations

It is important to plan ahead and prepare for the harvest. One should;

- i. Prepare equipment, set/calibrate machinery,
- ii. Prepare packaging/bagging materials,
- iii. Check the condition of grain storage facilities,
- iv. Put in place drying facilities if need be.

## PHYSIOLOGICAL MATURITY

At the time of maturity, the grain has specific moisture content and special physical characteristics. Physiological maturity is observed by the senescence/ ageing of the plant where the leaves turn yellow and brown and by the end of dry weight accumulation; grain filling stops. Different field crops have different signs that can be noted, for example;

**In maize** there is a formation of black layer at the tip of the kernel.

**In soyabean** the pods on the main stem reaches its mature pod colour.

**In sorghum** there is a black layer formation when the grain has 25-35% moisture content.

**In millet** there is a black layer formation and the leaves turn yellow presenting a drying appearance.

## GRAIN MOISTURE CONTENT and HARVESTING

Crops have different moisture content suitable for storage; maize -12.5%, soyabeans -11 %, sorghum -12.5%, millets -12.5% and groundnuts -7%. If the grain is too dry it will be subject to damage during handling and is more susceptible to shrinking insects and moulds during storage. If the grain is too wet there will be high risk of rapid deterioration, spoilage, fungal and insect problems, respiration and germination. High moisture content above 12% promotes diseases in storage, at 13, 5% -> 15 % moisture levels fungal spores start growing.



A Digital Moisture Metre



State of the art grain storage facilities at Ansellia Farm, Mazowe

## HARVESTING METHODS

### 1. Hand Harvesting – Maize

Bang Board trailer - Cobs are loaded by throwing directly into a tractor drawn trailer. It is recommended that 6 rows be harvested on each side of the trailer at a time. The cobs in the 2 rows straddled by the tractor wheels are harvested first and heaped on the sides

Drums/Sacks and a trailer -Used when large harvest gangs are available. The crop with husks is shelled using a tractor driven Sheller

Using empty bags/sacks -Harvesting into empty bags or sacks

### 2. Hand Harvesting Soya Beans and Small Grains

The grain can be collected by cutting of stems with a sickle for soya beans and cutting of heads of small grain crops

### 3. Mechanical Harvesting

Combine harvesters mostly used commercially can perform many tasks concurrently: Cutting stalks, picking, shelling; de-husking, winnowing; cleaning the grain, loading bins/trailers; measuring grain moisture, test density, etc.

## GRAIN DRYING METHODS

Drying is necessary to maintain grain quality as well as to clear the field for next crop. Sorghum, pearl millet, and finger millet can reach physiological maturity when the grain still contains high moisture. In this case the harvested heads should be dried before storage.

**Natural drying which requires sunny and dry weather** – The cobs are left on the maize stalk and only harvested once dry, or the cobs can be reaped and put on cribs for drying; drying

them in shallow layers that allow free circulation of air.

**Artificial drying by forcing heat through grains** – The heated air forces moisture to evaporate. The rate of drying depends on velocity of air and uniformity of distribution. Maximum temperature depends on type of crop, intended use of grain, and method of artificial drying. It is important to avoid over-drying, air short-circuiting, and drying dirty (muddy) crops.

## STORING AND PROTECTING THE HARVEST

Stored grain may deteriorate if the grain temperature is too high, grain moisture is too high (only store dry grain and keep it that way), the grain is diseased, insects multiply or rodents gain access to it, and is stored untreated for a long time. The three basic steps to grain protection are;

- 1) **Storage facility** - Spray surfaces with Malathion or Kontakill. If one cannot afford chemicals use cultural methods which include pasting cattle or goat manure on surfaces of storage rooms
- 2) **Chemical treatment of grain** - Appropriate application of grain protectants is important. Mix grain with pirimiphos/ permethrin.
- 3) **Inspection of grain and regular checks** - the grain structure must allow loading and off-loading of the grain applying the First In - First Out method. Structure must be weather proof, must allow inspection, fumigation, and cleaning. Constantly check on temperature and relative humidity levels.



A mobile continual flow grain dryer called the Mobidry by Fangveiv – see ZiMunda Issue 6.



Soyabean harvesting using a combine harvester

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# Farming's Place in International Trade

**Dr. Biandri Joubert (UiO/NWU), Specialist in sanitary and phytosanitary measures - non-tariff barriers in international trade**

Farming's place in trade cannot be over emphasised. Without farming, there will be considerably less goods to trade with. It also has an impact on international food security. The principles, rights and obligation of international trade law find their way into practical application at different levels of law. The international essentially informs the regional and domestic law and within this network private standards and self-regulation also exist.

Agriculture related international trade law in this space includes veterinary law, food safety, the control of invasive pests etc. What law (and which one of the World Trade Organisation (WTO) agreements principles/guidelines) applies and when depends on things such as:

- what you farm with;
- how you farm with it;
- what purpose you farm it for;
- what country you farm in;
- what market your products are intended for;
- what inputs you use, and;
- where your inputs come from.

There are many ways in which Agriculture related international trade law touches the daily activity of a farmer, without that farmer necessarily being aware of it. There is a lot to be gained from being aware of the details and developments in, even distantly related, legislation. Being on top of what applies and when is empowering. Farming's place in international trade is right at the center of it. A large number of international agreements apply to different aspects of farming and the availability and quality of food available is largely dependent on successful interaction between these international laws and the farmers on the ground growing the food. The WTO's notification and other requirements provide a considerable amount of important data to industries and the negotiation forums and committees are powerful.



**Blueberries and sugar snap –good examples of export fruit and vegetables in Zimbabwe**

## The World Trade Organisation (WTO)

The WTO is an international organisation that deals with the rules of trade between different nations. At WTO level a Country or Nation is a Member of the WTO. The Member is there as a representative of its own countries interests and therefore a representative of individuals in the country. The WTO has 164 members and represents an estimated 98% of world trade. Zimbabwe became a Member on 5 March 1995. There are many agreements that fall within the scope of the WTO and are referred to as 'multilateral agreements'. The WTO is therefore a forum for negotiation at what is called a multi-lateral level, where rules are agreed upon between Members and disputes between Members are settled through applying remedies as agreed upon in the agreements, through consultations and raising concerns at specific meetings or in some instances by the composition of a panel and decision by the dispute settlement body of the WTO.



**WORLD TRADE ORGANIZATION**

The WTO has gone through a number of "rounds" of negotiation over the years. The umbrella agreement is the Agreement Establishing the World Trade Organisation. Annexed are a number of agreements applicable to the trade in goods. Some of these agreements are more important to agriculture than others and in upcoming articles I provide more industry specific context. Agreements that are of particular importance to farmers and explored in this series of articles are The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS), The Technical Barriers to Trade (TBT) Agreement and The Agreement on Rules of Origin (ROO).

The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) is one which is concerned with the application of measures (rules, regulations, laws, standards etc.) that protect human, animal and plant life and health from risks associated with trade. The



agreement affects many aspects of farming ranging from inputs (such as pesticides and accepted residue levels), primary production and pests (such as FMD and false codling moth) to production and shipment procedures. In principle the agreement requires that measures are justified or based on science and there are three international standard setting bodies which provide guidelines to Members regarding these standards. These are the World Organisation for Animal Health (OIE), the Codex Alimentarius Commission and the International Plant Protection Convention (IPPC). The agreement effectively covers measures related to food safety, animal health and plant health. Members may not use these measures as disguised restrictions on trade or non-tariff barriers with protectionist intent. This will be of interest to you if you export or import fruit and vegetables or live animals or their products. Its application and effect is relevant even if you farm with these products but do not necessarily import or export directly. Members are required to report changes to these measures to other Members through the WTO and notify other members of proposed new ones. The Technical Barriers to Trade (TBT) Agreement applies to technical regulations or technical barriers. The same notification requirement exists and often there is an overlap between products to which SPS and TBT measures apply. Agricultural products are specifically included in the scope of this agreement. If you are involved in formally selling agricultural products, this agreement and its principles is of importance to you.

The Agreement on Rules of Origin has a number of important implications for farmers. The rules of origin are basically the rules that determine, when and how you can say something is of a specific country's origin. For example, a tractor imported may be wholly, or partially manufactured in a specific country. Its origin determines duty payable upon import. This is a useful agreement to understand when purchasing new agricultural equipment for example.

## WTO Level Dispute Resolution

Membership of the WTO is negotiated and enforced on a member-to-member basis. This means that any disputes that arise from a right being infringed on or an obligation not being fulfilled, are only settled or negotiated at government-to-government level (at the WTO). An individual does not have legal standing on their own at the WTO which means that if a trading partner contravenes one of these agreements in your industry your Government has to represent you at WTO level. You cannot go to the WTO dispute resolution body with a case on your own. Going "to court" at a WTO level is known to be a timely and costly process and requires considerable co-operation between local industries and their representative Government departments. Other dispute resolution forums do exist and will be addressed in a separate article.

## Trade Remedies

Within international trade there are trade remedies (actions taken by your Government) to protect domestic industries by responding to situations such as, for example imports from countries benefitting from subsidies (countervailing duties), sales of imported goods at less than fair value (antidumping) and import surges (safeguards). These situations can all affect farmers in their own country if not addressed and how to do so falls within the scope of the WTO. Trade remedies are typically applied to specific imports by a Government (the extent and interpretation of which is guided by national legislation and the WTO) after a process of calculations and adjudication done by a national trade commission or comparable body or government department.

**For more insights on trade contact Biandri on +27 83 465 1513 (whatsapp) or email [biandrijoubert@gmail.com](mailto:biandrijoubert@gmail.com).**

# Drones and the Future of Farming

Sponsored by DripTech featuring Precision Aerial Group



Farmers enjoying the talk by Tawanda.

DripTech Irrigation provides an end-to-end solution by advising on design and installation of irrigation and pump systems, supplying all the required equipment, and offering spares and technical back-up. It believes in building long-term relationships and creating lifetime partnerships and support for clients. The company is a family business that started in 1995 as a micro-irrigation company. It later expanded to providing for urban water requirements in the form of borehole pumps, storage tanks, pressure tanks, booster pumps and related fittings and controllers. In recent years, the company has grown its outlet network within the capital city and regionally, whilst expanding its line of products considerably to become a one stop irrigation and urban water provider. The product lines now cover drip irrigation, centre pivot irrigation, overhead and micro-jet irrigation. In addition to this the range of pumps has grown to include submersible, booster, de-watering, mining and firefighting pumps. A wide range of filters and fittings is also offered, along with borehole equipment and generators.

### DripTech Agriwise Talks

DripTech has since introduced periodic Agriwise Talks where discussion groups consist of local farmers who meet to network and learn about technologies and practices that may be applied on their own farms.

In March 2023, the first talk of the year was titled Drones and the Future of Farming and the keynote speaker was Tawanda Chihambakwe the Managing Director and Chief Drone Pilot of Precision Aerial Group. During his talk Tawanda started off by giving a brief history of the company and his expertise.

He noted that the Group consists of four branches namely; Precision Aerial, Precision Drone Training, Zimbabwe Flying Labs and Drones and UAV Conference. The Zimbabwean Flying Labs is a fully integrated technology hub that facilitates the exchange of knowledge, networking, and skills development in the field of drones and robotics. It provides basic "Remote Pilot Licence" (RPL) training and offers a variety of advanced drone training to professionals at all levels. The drone pilot training programs can be industry-specific drone and data application training, inclusive of data acquisition and processing from drone surveys. Flying labs also offers services in agriculture i.e., crop spraying, large-scale mapping, data processing and analysis; and services in climate action, disaster risk reduction, conservation, land management and public health. This season 2022/23 they provided spray services to different kind of crops including tobacco, soyabean maize, sunhemp and sunflower around Zimbabwe

▼ <b>2016</b>	▼ <b>2018</b>	▼ <b>2019</b>	▼ <b>2020</b>	▼ <b>2021</b>
First got involved with drones with a focus on Drone Racing.	Bought our first commercial Drone and became Licensed Drone Pilots.	Registered Precision Aerial and began consulting for local companies who were experimenting with Crop Spraying Drones.	Conducted Proof of concept for Covid-19 Disinfectant Spraying in the inner city markets of Harare.	Purchased our first Crop Spraying Drone to provide crop spraying services for local farmers.

### A brief history of Precision Aerial Group

The Products and Technology There are two main types of drones: Multi-rotor and Fixed Wing aircraft. They each have advantages and disadvantages that make them better suited for some uses over others. Examples of how these two types of drones are used in agriculture is depicted below;





MAPPING & SURVEILLANCE

MULTISPECTRAL

CROP SPRAYER & SEEDER



TYPES OF DRONES FOR AGRICULTURE

During his talk Tawanda spoke of the new and better drone for agriculture that is being introduced to the market- The mighty AGRAS T40. He went on to demonstrate its superiority over the previous version that was on show during the Agriwise Talk.

### Drones and Irrigation

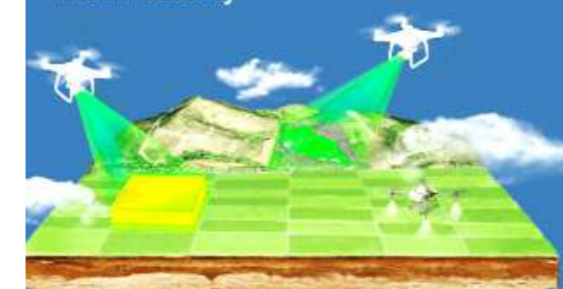
Drones are playing an increasing role in solving issues in agriculture and irrigation management. The use of drones and connected analytics has great potential to support and address some of the most pressing problems faced by agriculture in terms of access to actionable real-time quality data.

Use drone maps, digital surface models, and terrain models for irrigation and drainage management. Multispectral data can also help identify leaky irrigation pipes or areas that need more water.

**Irrigation Planning** - Drones and its data collection and analysis capabilities has great potential to support and address some of the most pressing problems faced by agriculture and water management sector in terms of access quality data in less time and at less cost. Flying labs offers services in mapping and documenting farmland and boundaries to support farmers in creating a base for farmland analysis, like for example analysis of irrigation networks by;

1. Marking the boundaries of the farm using a high resolution drone imagery.
2. Defining the topographic profile of the land using a digital terrain models.
3. Generating contour lines to better orient the direction of water flow for irrigation purposes and installation new irrigation networks.

- 2D + 3D Mapping
- Boundary Mapping
- Irrigation planning
- Farm Topography Maps
- Loss Assessments
- Crop monitoring & Pest identification
- Field analysis
- Plant Health Assessments
- Livestock and plant counting
- Stand Counts
- Farm Security



Overall uses of drones as presented during the Agriwise Talk by Tawanda.

**Irrigation Management** - In order to improve water use efficiency, Drones can be used in water management in order to address crucial issues faced in agriculture and irrigation sector. Drones equipped with Thermal Cameras and Remote Sensing capabilities can help defeat irrigation



Farmers happily mingling at the Driptech Agriwise Talk.



Appetising chicken on the grill for all the participants to chew on while mingling.



Precision Aerial spraying Tobacco at a field in Marondera.

issues, or areas receiving little or too much moisture. The topography of fields from Red, Green and Blue band (RGB) Imagery assists farmers to position and segregate the crops to maximise drainage, follow natural land runoff, and to avoid water-logging. Following are the important benefits of use of drone survey in irrigation management;

- Real Time control on Irrigation Rotation and capturing of evidence.
- Area irrigated outside of command and on backwater can be surveyed and assessed accurately.
- Precise information of area irrigated with accurate crop identification leading to realistic assessment of crop and area.
- Bring transparency and accountability and thereby improving water use efficiency and increase in revenue.
- Requires less manpower and cost effective.

**Am I Legally Flying My Drone?**

With this enticing knowledge on how drones are revolutionising the agriculture space, a lot of farmers present at the talk were left with a question on ‘what one LEGALLY needs to operate a drone for agriculture in Zimbabwe?’ During the question and answer segment they discussed everything needed for agricultural drone operations in Zimbabwe from the regulations to training requirements. The cherry on top was free consultancy offered to all participants who attended the talk.

The Statutory Instrument 271 of 2018 set by the Civil Aviation Authority of Zimbabwe (Regulator) Remotely Piloted Aircraft Regulations in 2018 with the responsible ministry being the Ministry of Transport and Infrastructure Development. SI 271 OF 2018 Part 1V Section 15 states that ‘No remotely Piloted Aircraft Operator shall operate a remotely piloted aircraft in terms of these regulations unless such person is the holder of in the case of commercial, corporate and non-profit operations, a valid remotely piloted aircraft operator certificate (ROC) and the Operations Specifications.’ The Precision Aerial Group offers training for certification drone piloting in Zimbabwe – sign up for a course today!



Tawanda demonstrating the two types of drones.

Drone technology is very useful in irrigation management for identification of crop type and area. This information is used for assessment of irrigation revenue. This technique is advanced, fast, accurate, minimum manpower required, non-human centric, transparent, evidence based and verification enabled. Working together with DripTech and the Precision Aerial Group can give you the results you need.

**For more information, contact;**

DripTech on 0867 700 7000 info@driptech.co.zw  
 Precision Aerial on +263719489139, email: info@dronetraining.co.zw or visit www.dronetraining.co.zw  
 Watch demo videos on https://youtu.be/YDvLL\_gW4Ss



# Global Farmers Connect Introducing Agro-Tech to Schools

By Global Farmers Connect (GFC)

Technology has evolved remarkably across the various sectors and Agriculture is not an exception. Agro-technology is rapidly becoming the foundation of modern farming practices as it has proven to constantly provide efficient solutions to agricultural challenges. For instance, before agro-tech, farmers could only access consumers in their proximity through farmer’s market, farm-gate sales, vending etc. Now they are able to easily market their produce to consumers across the globe thanks to technological innovations such as:

- digital marketing technology - which provides farmers exposure to markets and suppliers;
- mechanisation - which allows more advanced agricultural and farming monitoring systems as well as attainment of high yields in crop production;
- high-tech storage facilities such that produce can be kept fresh for extended periods.

Agriculture is the backbone of Zimbabwe’s economy and for it to thrive, it is paramount for the country to also adopt agro-technology in mainstream education. It is in this regard that GFC is introducing Agro-tech to schools as a supplement to the current curriculum. We will teach the learners the benefits, pros and cons of using technology, especially now in this post Covid era wherein we find that most sectors of the world’s economy have gone digital. This will help to demonstrate to the younger generation how technology has evolved within the 21st century and how we can use it to our advantage as a nation in our farming and agricultural exploits.

The Agrotech practical lessons aim to fully complement the already existing agricultural syllabus being studied within the primary and secondary sectors in Zimbabwe, ultimately invoking, on the part of the learners, an interest in modern day farming through usage of Apps, Robots and Artificial intelligent farming tools. It will show the younger generation how powerful technology can advance the production of food at a large mass. Its seminars will exploit the different types of technologies that are being used in the first world



countries at the moment and that could be introduced into third world countries, and thereby instill a sense of innovation and creativity in the learners. Global Farmers Connect will be looking to spearhead the government of Zimbabwe’s Vision Mandate 2030 aligned with introduction of technology into farming in the country: **“Our system of education is trapped in an unspoken irony: The institution with the greatest potential impact on the future is arguably the one most shaped by taking for granted ideas from the past.”** This means that teaching as a profession and education in general as a system must simply adapt to the new circumstances and changes in role, which is how GFC will take part in doing so to align to Vision 2030.

The way ahead - A dynamic team of young apprentices who have attained agricultural qualifications from reputable institutions have been recruited. Together with experienced professionals, this team will conduct workshops in primary and secondary schools across Zimbabwe to deliver a series of exciting training sessions coupled with live demonstrations for a hands on practical approach to the subject. Schools in 1st world countries benefit from such modules and it has been found that if a child finds a liking into something at a young age, they are more likely to pursue that when they grow up.

The younger generation is the future, and the future is technology

Introducing Agro-Tech to Schools will allow pupils to get an appreciation of new and better methods of farming in turn diminishing the stigma around agriculture.

Over and above, these efforts will raise a generation of well-equipped agro-professionals who will take Zimbabwe’s agricultural productivity to world class level!



For more information on GFC, please visit <https://linktr.ee/globalfarmersconnect>

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