

ZIMPAPERS

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ISSUE No. 1

# AGRICULTURE JOURNAL



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## DRY SPELL OCCURRENCE AND IMPLICATIONS FOR FARMING

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Benjamin M. Kwenda

# DRY SPELLS AND IMPLICATIONS FOR FARMING

THE 2021/22 rainfall season has been characterised by both dry and wet spells being experienced at various points during the season.

This is despite the fact that the El Niño Southern Oscillation (ENSO) has been in the La Niña phase. It is important to note that there is always a different rainfall pattern that is observed every season irrespective of the fact that we may be experiencing La Niña, El Niño or neutral conditions.

This phenomenon is commonly referred to as climate variability. Current scientific techniques cannot accurately predict the timing of occurrence of dry spells on a timescale of beyond 14 days before it occurs.

Zimbabwe is investing in new weather reading technologies that will be helpful in specific weather data that will allow for improved weather prediction and climate data analysis to inform regional and national planning.

Accurate reading of weather and climatic patterns is critical for farmers to monitor crop development, pest and diseases as well the ability to predict and manage moisture stress for their crops.

The occurrence of intra-seasonal dry-spells are always a cause for serious concern for a farmer.

This is especially worse if the dry-spell coincide with critical stages in crop development. Different crops have different tolerance to dry-spells with some crops such as traditional grains possessing the ability to withstand significantly longer periods of dry spells as compared to other crops such as maize and beans. These dry periods have different implications depending on which month they occur.

The stages of crop development can be basically into three namely, vegetative, reproductive and ripening. The duration for each stage is variable with most crops having a longer period of vegetative development.

The demand for water also varies across the stages with some stages requiring less incidents of moisture stress for optimum productivity as compared to others. These differences result in the effect of a dry spell coinciding with each stage.

The reproductive stage typically need not coincide with longer periods of moisture stress as the yield output will then be significantly affected resulting in low yields.

In early December 2021, the country saw a significant period of dry and hot conditions being experienced mostly in the traditional maize growing regions of the country.

This resulted in a delay in planting across most of these areas. In some areas, the early planted crop had to be replanted after the early crop had reached permanent wilting.

The downward movement of one of the main rain-bearing systems over the Zimbabwe, the Inter Tropical Convergence Zone (ITCZ), was delayed until towards the end of the month of December. As a result, a shortened season was then expected given that the rains had delayed.

In late December 2021, the cropped areas showed improved moisture content that allowed for planting and effective development of the planted areas during the period.

Zimbabwe experiences Tropical cyclones that originate within the South West Indian Ocean that normally cover most of the country depending on their position, orientation and trajectory.

The cyclone progression paths are usually associated with high wind speed with rainfall over much elongated areas. When the cyclones make landfall they bring rains over the country.

In Zimbabwe, the eastern and southern paths are usually the most affected by these intense cyclones due to their proximity to the Indian Ocean, although the rainfall surge can spread over much of the country and thus provides rainfall to crop growing areas.

The negative side occurs when the trajectory of these tropical systems is such that they draw moisture from inland. This then results in an upward movement of the ITCZ meaning that the country gets an extended dry period.

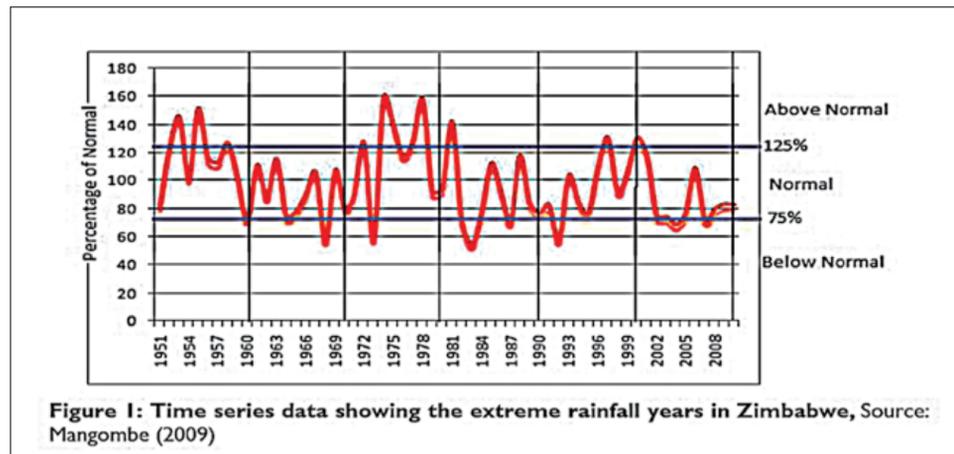
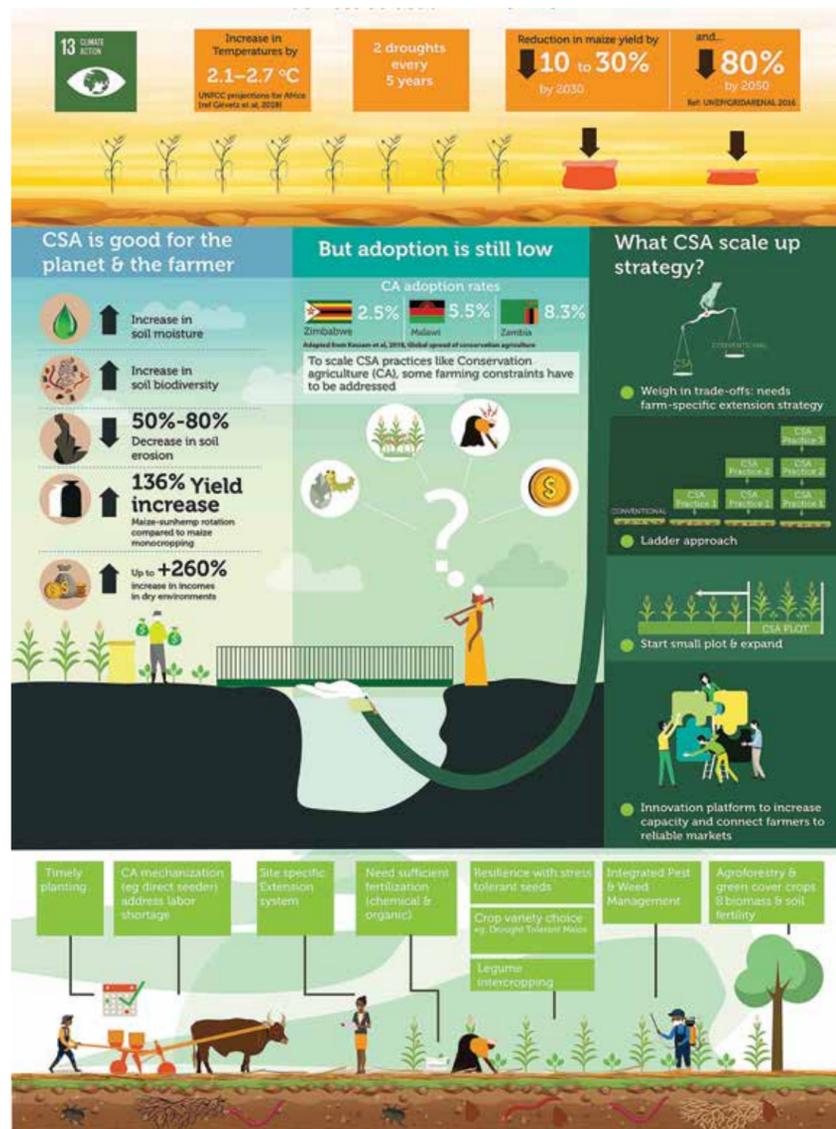
Recent examples of when such phenomena was witnessed are the dry spell that preceded the March 2019 Tropical Cyclone Idai, the early termination of the 2020/21 rainfall season after Tropical Cyclone Guambe towards the end of February 2021.

During the current rainfall season, four (4) tropical systems have gone past Madagascar into the Mozambique Channel. Tropical Storm Anna made landfall in Mozambique and dumped significant above normal rains over Zimbabwe resulting in a significant wet period in January.

The wet spell continued even after the Tropical storm was dissipating because its motion did not affect the ITCZ. Tropical Cyclones Batsirayi and Emmati all went southwards once they reached the Mozambique Channel.

However, in their trajectory, they sucked moisture from over Zimbabwe resulting in an extended period of dry and hot conditions.

In between the two tropical cyclones, another Tropical system named Dumako made landfall over Mozambique with a trajectory into



Climate change and vulnerability has resulted in less predictable rainfall pattern as well as more frequent climate extremes.

Malawi and Zambia. This tropical system pushed the ITCZ upwards resulting in reduced rainfall activity over most parts of the country. In the month of January 2022, the country experienced incessant rainfall over much of the country, which resulted in water-logging in the early planted crops. Farmers had to ensure enough top dressing for maize with basal blends. However, due to increased demand and the shortage of the product on the market, farmers were encouraged to use Urea to address nitrogen deficiency in the planted fields. Good soil and nutrient management

is always encouraged as it helps in ensuring the crops are not nutrient stressed. It is important to note that the dam levels within the country have been significantly high. However, irrigation development is receiving attention from the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development, as a long term strategy to ensure that the significant water that flows into the dams is utilised for irrigation purposes. Climate change and vulnerability has resulted in less predictable rainfall pattern as well as more frequent climate extremes. Government is promoting conservation agriculture practices such as Pfumvudza/Intwasa to address the spikes in rainfall and dry patterns within season. Supplementary irrigation, increased agricultural mechanisation as well as good agronomic practices can improve increased crop yields and productivity. A key strategy is to reduce the number of variables that farmers cannot control such as weather and reduced that can be associated with prolonged dry spells within the farming season. Rainfall is the most important variable in the farming matrix and yet an inconsistent variable due to climate change. The ability to keep producing crops consistently in future will be determined by the ability to harness rainfall which is a highly varying variable on its own.

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## African armyworm alert

AFRICAN armyworm (*Spodoptera exempta*) is considered one of the serious pests of crops in the Graminae family such as maize (the staple crop), drought tolerant small grain crops such as sorghum, pearl millet, finger millet and pastures together with Fall armyworm (*Spodoptera frugiperda*).

Heavy infestations of African armyworms can cause 100 percent crop losses within a short period of time especially when young crops are attacked forcing farmers to replant their fields. Such huge losses have negative impact on both household and national food security and nutrition, especially for many who have come to rely on agriculture for their livelihoods.

The African armyworm occurs during the rainy season and disappears towards end of March to April. The pest migrates as adult moths from Tanzania, into Zimbabwe, aided by winds that bring about rains. The sudden appearance of the pest with extensive damage being caused has resulted in the pest being classified as a notifiable pest.

This compels every farmer to report then pest once seen. African armyworm female moths lay eggs on grasses and the newly hatched larvae or caterpillars are colourless or whitish with black heads becoming green as they feed on green plant tissue.

These caterpillars will turn velvety black when they aggregate into large groups, as in a typical outbreak, or remain in various shades of green or brown when isolated. The caterpillars are characteristically velvety black on top with pale lines on each side and a greenish-yellow underside.

The Department of Research and Specialist Services under Ministry of Lands, Agriculture, Fisheries, Water and Rural Development; Research Services Department; Plant protection Research Institute (PPRI) is mandated, amongst its many roles to establish Early Warning Systems (EWS) and the management of African Armyworm.

An established EWS for African armyworm is currently operational in Mashonaland Provinces of Central, East and West, Manicaland, Midlands, Matabeleland North and South through a network of pheromone traps that attract male moths of African armyworms. The data is collected every Fridays and sent to PPRI for interpretation and forecasting of potential African armyworm outbreaks in risky areas. In turn, PPRI mobilises and distributes chemicals to areas at risks of outbreaks based on the forecast results.

Currently, the institute has delivered 12.4 kg of Carbaryl 85% WP to Mushumbi and Muzarabani in Mashonaland Central in January alone this year following high trap catches reported. Farmers are encouraged therefore to collect samples of the pest for confirmation as they report to their nearest Agritex officers, Plant Protection Research and Plant Quarantine Services Institute staff in their areas for assistance.

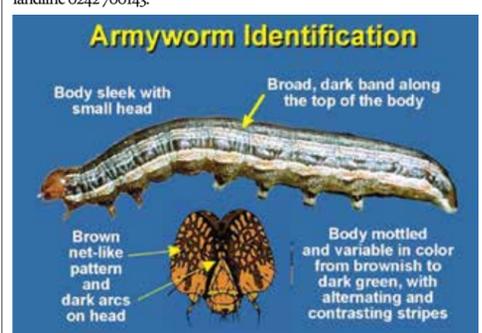
The chemicals are provided for free to farmers for the control of African armyworm and human safety should be considered during spraying as farmers should ensure they put on suitable Personnel Protective Clothing.

Farmers in areas around Muzarabani like Machaya, Utete and Dambakurima should frequently scout for the pest and once they see the pest, collect chemical at Plant Protection Research Institute office at Muzarabani growth point.

Some African armyworm moths have been caught in traps from areas like Chegutu, Murombedzi, Shamva, Magunje and Henderson, and farmers are encouraged to scout their fields. The current heavy rains being experienced have a control effect on the African armyworms as they can be drowned and killed since they feed while exposed.

Early detection of the pests through EWS will help in effective management, leading to reduction in crop losses and increased crop productivity. This will go a long way in achieving the 2 million tonnes for self-sufficiency.

Since the pests also attack pastures, this may impact livestock production. Farmers are however encouraged NOT to spray carbaryl in pastures as milk from livestock may be tainted with pesticide residues. PPRI will continue to advise farmers on any impending pests risks and can be contacted on landline 0242 700143.



# AGRICULTURE JOURNAL

## Minister's Foreword

I AM delighted to announce the launch of Zimpapers Agriculture Journal, which will essentially serve different key audiences in agriculture that include crop farmers, livestock producers, the produce supply chain and agro-retailers and contains agriculture content, data and business insights.

It is exciting to note that the journal has come at a time when the country direly needs reliable hubs for the dissemination of agricultural information critical for catalysing agricultural innovation, modernisation and the general production process.

Our agriculture is going through a commercialisation revolution, thanks to the various initiatives by Government, the private sector, NGOs and other key stakeholders that are introducing various support programmes.

It is in the same vein that I need to congratulate Zimpapers for introducing this journal that will be important in effective information dissemination, which provides an excellent opportunity for policy makers, agribusiness, farmers and other stakeholders to convey and share information precisely and timeously.

The Government is currently seized with rolling out of various agriculture transformation strategies meant to breathe life into the sector and ultimately feed into Vision 2030 that seeks to transform the country into an upper middle income economy by 2030.

It is not a secret that agriculture is one of the key drivers of our economy, hence the need to ensure that information, which helps boost agricultural productivity circulates freely.

Allow me therefore to use this opportunity to wish all stakeholders in the agriculture industry and the country at large, a prosperous 2021/22 cropping season that is already showing signs that we may be headed for another bumper harvest.



Dr Anxious Masuka  
Lands, Agriculture, Fisheries,  
Water and Rural Development  
Minister

## Editor's Note

THIS edition of Zimpapers Agriculture Journal comes at a time when farming communities are almost drowning in a sea of anxiety, thanks to the current prolonged dry spell that threatens to nullify all the efforts they have invested in the 2021/22 season.

Indeed, it is very disappointing to see all the resources that were painstakingly mobilised going to waste given that the majority of farmers survive on rain fed agriculture and either depend on support programmes or have to go the extra mile to secure resources and get their season running.

Of course, those with access to irrigation facilities have nothing to worry about with most water sources either full or almost there, courtesy of the heavy rains fell came at the beginning of the year. In fact, the bulk of water sources still had lots of the precious liquid from last season's lavish downpours. It is this group of farmers that now needs to hold fort and make sure they score good harvests and also plant a lot of winter crops to make sure there is something for the strategic grain reserves.

Those who still have surplus produce from last season, please make sure you resist the temptation to sell all and make sure your households remain food secure. Anyway, not all seems lost. There are signs of rains plotting a comeback and if they do, there is still that little greenery in your fields that needs the rains. Good luck!



Obert Chifamba

# AGRICULTURE JOURNAL

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# WAYS OF HARVESTING RAIN WATER

- Clearing siltation from storm drains, contours and closing the ends so that no water will escape.
- Harnessing the water and trapping it in the drains to encourage filtration into the soil, which benefits crops.
- Creating trenches between rows measuring around 1 000cm long by 60cm wide and about 60cm deep and establish several of these in the field.
- Tying the ridges on crops planted on ridges. Ties are short soil walls created to join two ridges and can be 1 500cm long. They should be staggered in the field as a way of spreading the water evenly in the field. Both trenches and tie ridges will help in harnessing rain and encouraging it to seep into the soil benefiting the crops in the process.
- Cutting available grass and spreading it in the field as mulch, which will help in trapping the moisture in the soil thus saving crops from the dry conditions. This mulch will also help in harnessing very small amounts of rain and storing moisture well in the soil while reducing the speed of run-off water too. Mulch promotes more penetration of water into the soil, which reduces soil erosion and siltation of drains, rivers and dams.

# Prevailing dry spell: What are the 'take-home' lessons?



Ivan Craig

While the crops are advancing, it is important to look at the next season. At the moment, winter cropping is silhouetted against the horizon, which means farmers planning to do winter farming should already be looking at the cropping options.

IT'S almost three weeks since the rains went on a hiatus in most parts of the country. Once again, crops are going through a long dry spell that is coming in direct contrast to the predictions of normal to above normal rains, which the nation received ahead of the season.

This means that crops are currently battling to withstand the harsh conditions that come most such long dry spells while the farmers can only hope for a sudden change of fortunes and get some showers.

In fact, farmers have to think around this situation and try to harness as much rain as possible and fully utilise it when it finally returns.

The use of machinery or ox-drawn implements can benefit crops in four ways: mitigating the dry spell and encouraging penetration of water as it rains as well as improving moisture retention and controlling weeds through suppressing them.

Farmers also need to make use of this time by cleaning the perimeters of their fields and construct fireguards. But as they look forward to harvesting, farmers have to make sure the fields are free from weeds that interfere with the crops' growth. If not removed, weeds will slacken the harvesting process among people will frustrating the effectiveness of the combine harvester as well.

Where workers were supposed to take three days to harvest a field clean of crops, they can take up to seven because of weeds resulting in more expenditure through food purchases, more wage charges, exposing the produce to weather damage, wild animals, domestic animals, theft, over drying and even pests. As the crops mature, it is crucial to keep watching the moisture content to avoid over drying and pest damage. Farmers need to do a lot of harvesting preparations as the crops move towards maturity. They need to make sure they prepare the storage area, that must be clean, free from cracks, whitewashed, dry, roofed properly, well aerated, cool, well secured, must not be general storage space, have no old produce of any kind, no oils, no fuels, no fertilisers, no chemicals, no animals, no rodents and more. If the farmer is storing the produce in bags, the bags must be new. However, if the farmer is using used bags, he needs to make sure they are cleaned inside out, mended for any torn areas and are fumigated. He must use the right bags for the correct crop. If he is using manual labour, he must make sure he has the people on standby as well as the trailers or scotch carts to carry the produce from the field. If the farmer is using a

combine harvester, the combine must be repaired or serviced for effective use. If hiring the combine harvester, the farmer must start making arrangements to that effect as early as now so that he can get it at the right time he needs it. It is always a problem waiting to do so at the last minute. Being organised also helps reduce the time spent with the combine harvester on the farm. The farmer should also plan in advance on the facilities in which to empty the combine bin once it's full.

While the crops are advancing, it is important to look at the next season. At the moment, winter cropping is silhouetted against the horizon, which means farmers planning to do winter farming should already be looking at the cropping options and the markets they intend to supply and at what possible prices. This is also the time to try and establish the specifics of what those markets want and where the farmer does not have adequate knowledge on how to grow the crops of choice, they should outsource expertise.

The time to secure inputs and seek reliable funding for the programme is now. The organised farmer always comes up with a budget to support the production while also making sure there is enough clean water for irrigation against working pumps and pipes that are well-sealed to stand a sustained distribution of water. With all said and done, farmers must learn never to put all their eggs in one basket – diversification is highly recommended.

This should come as part of the lessons from the current season, whose onset was very confusing to say the least. The nature of the unpredictable pattern of the rains has left farmers a confused lot especially after the forecast for a normal to above normal season.

# 8 facts you need to know before starting your own dairy farm

WHATEVER your background and experience, there are some things you need to know before you start milking cows.

## Develop a Business Plan and SWOT Analysis

It is important to remember that a dairy farm is a business. Development of detailed business plan and a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) of your plan and the resources you have available will be critical to the success of your business.

How many cows will you milk? Where will you market your milk? Will you hire employees? How much money do you need to live on after the dairy bills are all paid? Your business plan should include a cash flow plan that will help you set reasonable expectations for your expenses and cost of production.

## Consult the Experts

Even if you grew up on a dairy and learned how to feed and milk cows from your parents and grandparents it is important to consult experts in the dairy industry as you develop your business plan and design your management system. Other dairy producers are great resources.

Attend field days and open houses on dairy farms in your area and other parts of the state or country.

In addition to veterinarians, nutritionists, agronomists, bankers, extension educators, and others that can provide different perspectives on management of your dairy.

## Create a Cropping and Feeding Programme

Whether you are going to feed a TMR (total mixed ration), graze your cattle, or some combination of both; dairy cattle require a certain set of nutrients to support themselves, produce milk, and grow a calf.

Work with a nutritionist to develop rations for your lactating cows and dry cows and heifers if these animals are to be raised on the farm.

Raising all your own feed takes land and time, not to mention equipment for planting and harvesting the crops. Double cropping systems, with small grain crops following corn silage, are used successfully on many farms.

## Create a Waste Management Plan

Dairy cattle produce a lot of manure. While this manure is often referred to as waste, if managed and used properly it can be a great resource on the farm. Manure management will be tied closely to your cropping and feeding programme.

Every farm will need a manure management plan, but depending on the size of your farm a nutrient management plan may also be required. Check with your local extension office for more information.

## Build Your Equity Over Time

Dairy farming requires a large capital investment. Land, buildings, equipment, and cows are expensive and few new dairy farmers will have the capital required to purchase everything when they get started in business. Many beginning farmers begin by purchasing their cows first and renting the farm and land. These initial animals are your farms equity.

## Dairy Farming is a Biological System

The dairy farm is dependent on the cow's ability to live a healthy life, produce milk, and have calves that can become the next generation of the farm. Dairy farming requires detailed programs for herd health, reproduction and calf care in addition to the nutrition and financial aspects on the farm. Working with your veterinarian, genetics representatives and extension agents can help you develop comprehensive farm plans to create a positive future.

## One Size Does Not Fit All

All dairy farms are different based on the producer's wishes, resource requirements, market needs and more. Multiple systems exist and can be profitable. Some producers contract out their replacements to a custom heifer raiser while others diversify by selling crops, raising steers or creating a home-bottling plant. How your farm will depend on your desires, resources, and drive.

## You are a Manager First

All these previous items are just pieces of the puzzle. In order to succeed you will need to combine each aspect of management into a whole farm plan. However, you don't need to do it all. Work with trusted consultants to help you build a plan, and stick with your strengths. If you love milking cows but hate planting corn, find someone to work with who does, or contract that work out to a third party. Consider creating a farm management team or profit team that engages your consultants to be active participants in the farm's progress.

Author: Mathew M. Haan  
Former Extension Educator,  
Dairy Pennsylvania State University

# MANAGING TO GET MORE MILK AND PROFIT FROM PASTURE

GRAZED pasture represents the cheapest source of nutrients for dairy cows, but managing a pasture system is challenging.

Grazing management is the foundation of a successful and profitable pasture based system.

For dairy producers who adopt a grazing system, proper management of low cost pasture is critical. In order to maintain or improve profitability, emphasis needs to be on reducing costs and/or improving efficiency at the farm level.

Increased reliance on grazed forages offers considerable opportunity to reduce costs. In the USA, the estimated cost of pasture is about one-half the cost of ensiled legume or grass forages on a dry matter basis.

The intake by the dairy cow and the efficiency with which low cost pasture is utilized is the single most important factor determining profitability. In grazing, it is about intake.

## Potential Pasture Intake and Milk Output

Research from several counties has demonstrated that with well-managed grazing systems, pasture intakes of 35 to 40 lb. of dry matter (DM)/cow/day can be achieved by Holsteins with pasture as the only feedstuff. This is about 3% of the bodyweight for Holstein cows.

In a study at Penn State University, we obtained a daily pasture intake of 45 lb/DM/cow with high genetic Holstein cows fed grass pasture as the only feedstuff. This intake can provide adequate energy to theoretically support up to 50 to 60 lb. of milk/day with Holsteins.

However, most cows may still lose substantial body condition to achieve this production since energy outgo exceeds energy intake. Pasture intake and milk yields of this magnitude may only be achieved in the spring or early summer when pasture growth and quality are high.

With the generally favorable price of milk in relation to grain supplement in the USA, it is most economical for most graziers to feed supplemental concentrates and feedstuffs rather than feed only pasture.

## Factors Influencing Pasture Intake and Milk Output

In confinement operations, DMI is determined by feeding management, the amount fed, frequency of feeding, and other factors. Pasture intake by the grazing dairy cow is largely determined by how effective the cow harvests the pasture in the field.

How full is the pasture feedbunk? This depends primarily on the grazing time and the rate of intake during that grazing period.

The amount of pasture consumed is characterized by the amount of time spent grazing (grazing time, GT); the rate at which pasture is taken into the mouth (biting rate, BR), and the amount of pasture DM eaten with each bite (intake per bite mass or bite size).

This can be written more simply as pasture intake = grazing time x biting rate x bite size. Grazing time and biting rate are primarily animal factors, which means that dairy producers have little control of these factors.

High yielding cows have a stronger hunger drive than low yielding cows, and consequently graze for longer times (500 to 700 minutes/day) and have high biting rates (up to 65 bites/minute).

However, the major factor influencing pasture intake is the amount of herbage intake per bite, or bite mass. Bite mass can be controlled by management. Small increases in the intake/bite can have a major effect on daily pasture intake and animal performance.

Bite size is primarily influenced by sward factors such as grass height and density of pasture, and the proportion of green leaf in the sward.

If intake per bite declines, as it inevitably does on short swards, the behavioral constraints on biting rate and grazing time mean a reduction in daily forage intake.

The amount of time spent grazing increases as the amount of pasture decreases, which is why high producing cows need to be provided a dense sward with at least 6 to 8 inches pasture height depending on the type of grass.

We conducted a study at Penn State where we compared concentrate supplementation when high yielding Holstein cows grazed at two pasture allowances (55 vs. 90 lb. of pasture DM/cow/day). Cows were equipped with electronic recorders to monitor eating and chewing behavior (see Table 1).

Cows fed only pasture grazed about 617 minutes/day (10 hr), and averaged 56 bites/minute. This resulted in about 35,000 bites/day. This suggests that grazing cows may need stronger jaws and mouths than cows fed in confinement!

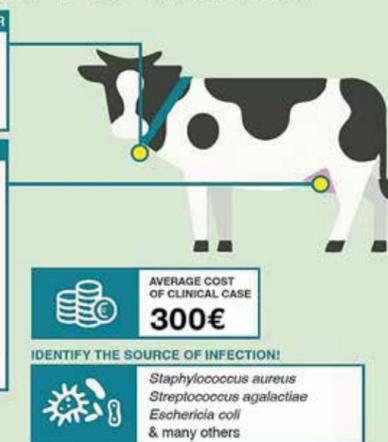
To be continued...

Author: Lawrence D. Muller  
Professor Emeritus, Penn State

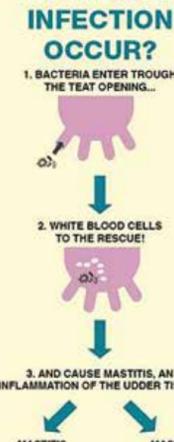
## HOW CAN I DETECT MASTITIS?

CHANGES IN BEHAVIOUR  
PARAMETER  
ACTIVITY  
RUMINATION  
LYING TIMES

CHANGES IN MILK  
PARAMETER  
ELECTRICAL CONDUCTIVITY  
SOMATIC CELL COUNT  
TEMPERATURE  
LACTATE-DEHYDROGENASE  
LACTOSE  
PRODUCTION  
COLOR



## HOW DOES INFECTION OCCUR?



In this article we will discuss:- 1. Meaning of mechanisation of agriculture 2. Benefits of mechanisation of agriculture 3. Case against mechanisation 4. Scope in Zimbabwe 5. Progress.

#### Meaning of Mechanisation of Agriculture:

In G. D. Aggarwal's words, "Farm mechanization is a term used in a very broad sense. It not only includes the use of machines, whether mobile or immobile, small or large, run by power and used for tillage operations, harvesting and threshing but also includes power lifts for irrigation, trucks for haulage of farm produce, processing machines, dairy appliances for cream separating, butter making, oil pressing, cotton ginning, rice hulling, and even various electrical home appliances like radios, irons, washing machines, vacuum cleaners and hot plates."

According to Dr. Bhattacharjee, "Mechanization of agriculture and farming process connotes application of machine power to work on land, usually performed by bullocks, horses and other draught animals or by human labour."

According to Dr. C. B. Memoria, "It (mechanization) chiefly consists in either replacing, or assisting or doing away with both the animal and human labour in farming by mechanical power wherever possible."

"Mechanization may be either partial or complete. It is partial when only a part of the farm work is done by machine. When animal or human labour is completely dispensed with by power supplying machines, it is termed as complete."

"Broadly speaking mechanization of agriculture has two forms mobile mechanization and the stationary types of mechanization. The former attempts to replace animal power on which agriculture has been based for very many centuries; while the latter aims at reducing the drudgery of certain operations which have to be performed either by human labour or by a combined effort of human beings and animals."

#### Benefits of Mechanization of Agriculture:

##### (1) It Increases Production:

Mechanization increases the rapidity and speed of work with which farming operations can be performed. According to D. R. Bomford, "The ploughman with his three-horse team controlled three-horse power, when given a medium-sized crawler tractor controlled between 20 to 30 horse power. His output, therefore, went up in the ratio of about 8:1."

According to B. K. S. Jain, "In the U.S.A. a labourer who formerly ploughed one acre of land with a pair of horses is now able to account for 12 acres a day with a gasoline-driven tractor. By this quickening of agricultural practices the human labour required is minimised. Over a period of three decades in U.S.A., a study revealed that one-third increase was due to the use of chemicals; another one-third due to better varieties, and wealthier seeds, while another one-third was due to improved farm machinery."

According to Roy D Laird, "A more recent and more spectacular development in mechanization of agriculture has been brought in the U.S.S.R., where four times the agricultural output became that of 1913 and grain production alone increased by 70 per cent by 1960. By 1965 Socialist Competition, increased electrification and more machinery were supposed to induce a 100% increase in the efficiency of agricultural labour in that country."

##### (2) It Increases Efficiency and Per Man Productivity:

Mechanization raises the efficiency of labour and enhances the farm production per worker. By its nature it reduces the quantum of labour needed to produce a unit of output. In the U.S.A., "the amount of human labour used to produce 100 bushels of wheat dropped from 320 hours in the year 1830 to 108 hours in 1900; by 1940 a new series of improvements has reduced labour requirements to 47 hours." (Bureau of Agricultural Economics).

According to Hecht and Barton, "Before the World War I it took, about 35 man hrs. to grow and harvest an acre of corn; 15.2 hrs. for an acre of wheat and 15.7 hrs. for an acre of oat. In 1945-48, the labour requirements were 23.7, 6.1 and 8.1 man hours respectively. The combined, effect of fewer hours and more bushels per acre has resulted in more than halving labour requirements per unit of production. The number of man-hours required in 1910-14 per 100 bushels of corn was 135, of wheat 106 and of oat 58; in 1945-48, the corresponding figures were 67.34 and 23 respectively."

"It is estimated that productivity per man on farms in U.S.A. is about four and a half times that in the U.S.S.R." (Jusny) "In the U.S.S.R. in collective farms, production has raised labour productivity to a high level compared with the pre-revolutionary days; now labour is three times more productive there." (Anisimov)

##### (3) Mechanization Increases the Yield of Land Per Unit of Area:

S.E. Johnson holds that "of 28 per cent increase in farm output in U.S.A., above the average of 1934-39 only about one-fourth is due to better weather, probably less than 15 per cent has resulted from expansion of crop, land acreage and the rest, about 60 per cent is largely accounted for by the fuller use of the improvements in crops, live stocks and machinery. Increase in the yield of crops, due to mechanization of farms, has been traced from 40 to 50 per cent in the case of maize; 15 to 20 per cent in Bajra and Paddy; 30 to 40 per cent in Jowar, Groundnut and Wheat."

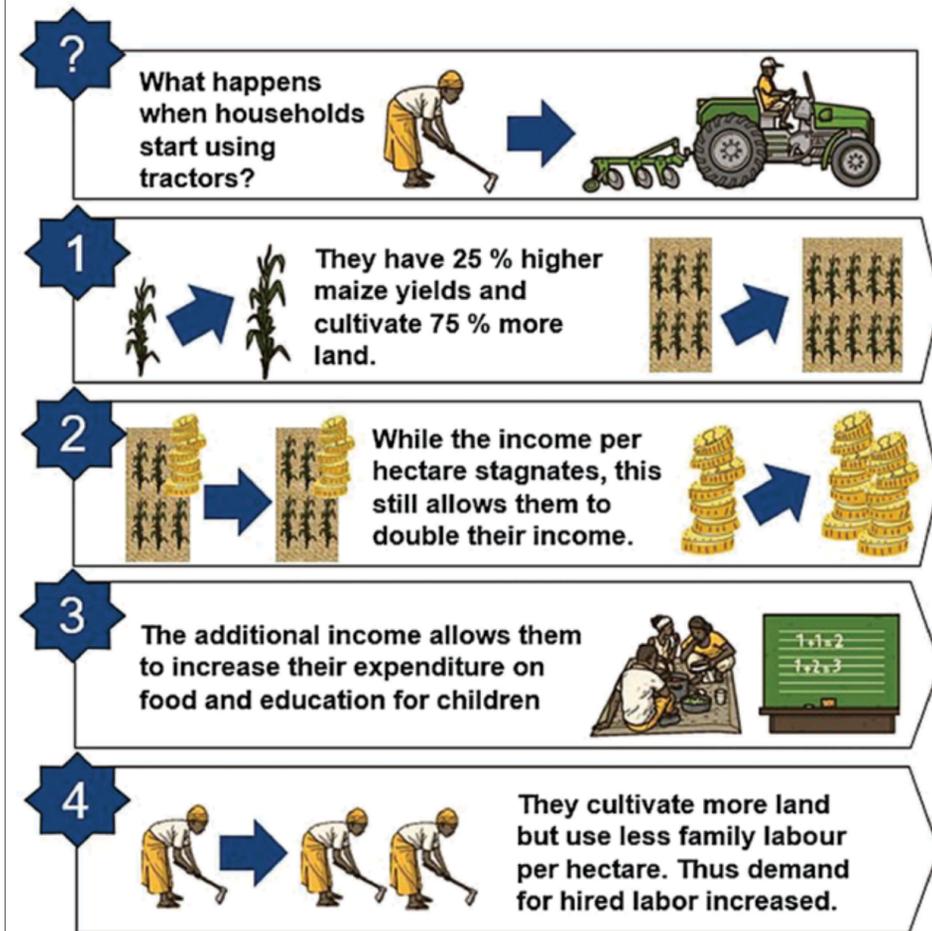
##### (4) Mechanization Results in Lower Cost of Work.

It has been accepted by all that one of the methods of reducing unit costs is to enlarge the size of the farms and go in for more intensive farming. It is found that the cost of production and the yields can be adjusted properly if mechanization is resorted to.

(5) It Contracts the Demand for Work Animals for ploughing water lifting, harvesting, transport etc.

In actual operation, costs amount to little when machines are idle,

# Mechanising agriculture: How do you benefit?



whereas the cost of maintenance of draught animals remains the same during both periods of working and idleness, because animals have to be fed whether they are doing work or not. It is advantageous to use tractors when a great deal of work has to be done in a short time.

##### (6) It Brings in other Improvements in Agricultural Technique:

In its training come improvements in the sphere of irrigation, land reclamation and the prevention of soil erosion. The present-day dependence on the monsoon as the only irrigation of crops in India can be obtained by a more scientific approach.

Besides, ploughing by tractor reclaims more land and thereby extends the cultivated area as the tractor smoothes hillocks, fills in depressions and gullies and eradicate deep-rooted weeds. It also prevents soil erosion. Besides mechanical fertilization, contour bunding and terracing are done by mechanical methods with the help of self-propelled graders and terraces.

##### (7) It Modifies Social Structure in Rural Areas:

It results in a significant modification of the social structure in rural areas. It frees the farmers from much of the laborious, tedious, hard work on the farms. The pressure on land decreases and the status of the farmers improves.

##### (8) It Leads to Commercial Agriculture:

Mechanisation results in a shift from 'subsistence farming' to 'commercial agriculture. This shift occurs mainly due to the need for more land and capital to be associated with farmer in order to reap the full technological benefits.

This in its turn gives rise two tendencies:

(i) Gradual replacement of domestic or family by commercial methods, and

(ii) Search for international markets for agricultural produce.

##### (9) It Solves the Problem of Labour Shortage:

In countries where human labour falls short of requirements in agriculture, use of machines can replace human and animal power.

##### (10) It Releases Manpower for Non-Agricultural Purposes:

Since the mechanisation of agriculture results in the employment of lesser number of persons on farms, surplus manpower may be available for other economic activities.

(11) It Results in Better Use of Land:

Mechanisation also results in better utilization of agricultural land for "the substitution of gasoline tractor for animal power means reduced demand. The use of machine energy, therefore, leads to good agricultural production, to trade many crops or saleable animal products in short, to an exchange economy and a system of land utilization in which cultivator rests on a different and infinitely more complex basis than is found in the local self-sufficient economy."

##### (12) It Increases Farm Income:

With the introduction of mechanisation the farm income as well as the individual income goes up. E. G. Nourse writes, "It accounts for the unparalleled rise of national income and with it the standard of living, it builds cities, it raises an ever loftier superstructure of financial, commercial and other cultural institutions; it turns loose economic agglomerates into social economies to closely knit by a thousand lines of interdependence. It creates much of the capital surplus on which modern economic progress is largely based. It constitutes, the lion's share to the public funds which support education, health and law and order. In short, not only do machine industry, and mechanisation and science render agriculture efficient, they create the very world in which this efficient agriculture can sell its bountiful crops."

##### (13) It Reduces Fodder Area and Enlarges Food Area:

"With the introduction of mechanisation in agriculture the surplus animal power would be reduced so that large areas of land required for producing fodder for it can be utilised for producing food for human consumption. The remaining cattle population would be better attended to and better fed under mechanised agriculture, for new and nourishing varieties of feeding stuff would be grown in cultural (waste lands after reclaiming them for cultivation)." (Dr. Memoria)

#### Case against Mechanisation of Agriculture:

But the case against the use of farm machinery in India is equally strong. Important arguments against mechanisation are:

##### (1) Small Sized Farms:

The existence of a large farm is an essential condition for mechanisation. For proper and best utilisation of agricultural machines, holdings will have to be large and should be (bund together and not scattered in tiny plots

as is the case in India. In U.S.A. the average size of a holding is about 145 acres; in Canada it is 235 acres and in U.S.S.R. it is 1,600 acres.

Mechanisation has no scope in India because of the extremely small size of holdings which are between 3 and 12 acres. Even these small holdings are not found together but scattered over the village in tiny bits. A tractor cannot be used to plough a quarter of an acre plot. This is not a valid criticism because such farm machinery like a pump set can be installed even in a small farm of half an acre.

##### (2) Surplus Agricultural Workers:

The basic defect of mechanisation is that it will result in too many agricultural workers becoming surplus. Millions of farmers will be thrown out of land and will have to be provided alternative sources of employment.

It is impossible to provide alternative employment for millions of persons. In U.S.A. and Canada, the real problem is shortage of labour and to overcome this difficulty, machines were invented and used, as labour saving devices.

But India has abundant labour and there is the necessity to use this labour and not keep it idle. What is, therefore, useful and necessary for the Western countries, need not be so for India too. Use of farm machinery may create unemployment only in the short period. In the long run, there will be more employment opportunities.

##### (3) Surplus Cattle:

The adoption of farm machinery will throw not only men out of employment but it will render the existing cattle population surplus and unnecessary. To cut down the existing cattle population will be a difficult problem. But as is well known, it will indeed be beneficial for India to reduce somehow its cattle population.

##### (4) Poor, Illiterate and Ignorant Farmers:

The Indian farmers are, in general, poor and, therefore, will not be able to buy expensive tractors and other farm machines. Besides, the farmers are uneducated. They will not be able to understand the use as well as the working of expensive farm machinery. This criticism can be easily answered. Farmers can always join together and purchase expensive farm machinery. Or the village co-operative society can purchase it and hire it out to farmers.

##### (5) Imports:

India may not be in a position to produce farm machinery on a large scale. Necessarily, therefore, she will have to depend upon foreign countries. This is only a short period problem.

##### (6) No Increase in Productivity of Land:

Mechanisation may not increase productivity of land. In India, the crucial problem is to increase the productivity of land, because land is a scarce resource of the country.

The increase in the productivity of land is much more important than the increase in the productivity of labour in a country like Japan, where mechanisation of farming is not adopted, productivity per hectare has been maximised because of intensive cultivation.

(7) Lack of Spare Parts and Service Facilities and Shortage of Power: There is also lack of spare parts and service facilities in the rural areas,

and an acute shortage of kerosene, petroleum and diesel oil. These need to be imported from abroad at a high cost and this might lead to a heavy drain on foreign exchange reserve.

#### Scope of Mechanisation of Agriculture:

The prospects for wholesale mechanisation of agriculture are not very bright in India for more than one reasons:

(1) We have seen above that we have surplus farm labourers who seasonally unemployed and underemployed. Mechanisation would further result in greater unemployment.

(2) The holdings are very small, while machines can be used on large farms economically and effectively.

(3) As yet our production of tractors has not been sufficient to meet the requirements. Also we are short of power tillers and tyres and tubes.

(4) Indian cultivators are largely ignorant and illiterate and have not yet developed the sense of receptivity for the same.

(5) There is also lack of facility for standardised spare parts and servicing of machines.

"However the following fields of agricultural activity are the logical domain of mechanisation in India, where manual methods would be insufficient and expensive:

1. Reclamation of lands infested with deep-rooted weeds and grasses like Kams, hariali, and doob by deep ploughing with the help of tractor driven implements.

2. Land improvements by land leveling and grading with the help of bulldozers and other heavy machines;

3. Construction of dams and reservoirs, soil and water conservation works such as contouring, terracing, bunding to check the menace of soil erosion;

4. Jungle clearance and opening up virgin lands for cultivation;

5. Deep ploughing, chiselling, more draining, and other operations like lifting water from great depths in the wells;

6. Making roads on the farms, hauling farm produce, for processing of farm produce such as rice hulling, oil extraction, sugar cane crushing and decorticating of the groundnuts, plant protection measures like spraying, dusting and fumigation;

7. Large co-operative or collective farms;

8. For ploughing of clayey soils, that are difficult to handle when the time for preparation between crops, or after heavy monsoon rains and before sowing, is too short for effective results by bullock driven implements;

9. Intensive and extensive cultivation in sparsely populated areas; and

10. Big farmer's holding of more than 30 acres of land."

#### Progress of Mechanisation of Agriculture:

M.L. Darling has rightly affirmed that the plough that looks like a half open pen knife over just scratchs the soil, the hand sickle made more for a child than for a man, the old fashioned winnowing tray that wodes the wind to shift the grain from the chaff and the reeds Choffer with its waste of fodder are misplaced from their primitive but immemorial functions."

Thus it has a deep rooted impact on the economy of the region.

Tractor is the basic mechanical input which largely determines the extent of use of allied machinery and equipment. There was rapid progress in the number of tractor in the country.

In 1961 the country had 31000 tractors which increased to 2,52,000 in 1966. This increase is indeed too phenomenal to be overlooked. This fact can be attributed to the incidence of this period with the green revolution. Consequently, the number of tractors increased to 4,55,000 in 1990 and is expected to have further increase to over, 1,90,990 during 2000-01.

The number of tractors increased upto 7,53,286 in 2002-03. The number of tractors have further increased upto 28500453. Similarly the number of tube well operated with electricity increased from 1,06,000 in 1961 to 4,55,600 in 1990 and further expected to be double of during 2000-01. The number of electric tube-wells further increased to 10,85,000 in 2000-01. The number of power tiller was accorded 16018 year ending 2000-01. The number of tiller increased upto 46472 in 2005-06.

#### Some Suggestions:

There are practical difficulties in the way of introduction of the machines on the farms. Some of these can be removed.

(1) The Government should provide credit facilities to those farmers who are willing to purchase the machinery individually.

(2) Joint farming societies may be developed to serve as machinery cooperatives in the different States.

(3) Machine Stations of the type of M.T.S. or U.S.S.R. may be developed in different parts to give the tractors and servicing facilities to the cultivators on subsidized rates.

(4) Cheaper types of small machines suitable for Indian conditions should be evolved. These would help the labourer to perform his task more efficiently rather than displace him. In this connection we would do well to remember what E.A.O. Development Paper has remarked; "Mechanisation should not be introduced in a hurry, or on a too large scale. To be successful it should be gradually expanded and kept within proficiency standards of those who operate it."

Report on India's Food Crisis and Steps to Meet suggests, Special studies should be made of the need for tractor drawn ploughs or other tillage implements, with a view to procurement and use:

(i) Where the soil areas will yield for greater increases in food production than is possible with other tillage implements, and where the cultivators have the ability, willingness, and organisation to make effective use of the implements without significant subsidy beyond loans;

(ii) Where neglected and compacted soils of derelict village commons can be brought into use; and

(iii) Where new land development requires heavy initial ploughing or earth moving. Even scarce foreign exchange should be allocated for such machines where the benefits are very substantial.

"At the outset, it might appear that the scheme of overall mechanisation is not feasible under the present agrarian structure, for agricultural sector may not presently invest huge sums of money; and it would be difficult to create big farms required for mechanised agriculture compulsorily."



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# Safe handling of the golden leaf ahead of delivery

PREPARATIONS for the marketing of the crop have reached fever pitch especially for the irrigated crop ahead of the 2022 tobacco marketing season for which deliveries will start on 31 March following sales bookings slated for Wednesday 16 March. A total of 110 102 hectares of tobacco were planted for the 2021/22 cropping season with 18 510 hectares under irrigation and 91 592 under dryland.

On the one hand, 122 604 tobacco growers registered for the current season while 145 625 registered during the same period last season.

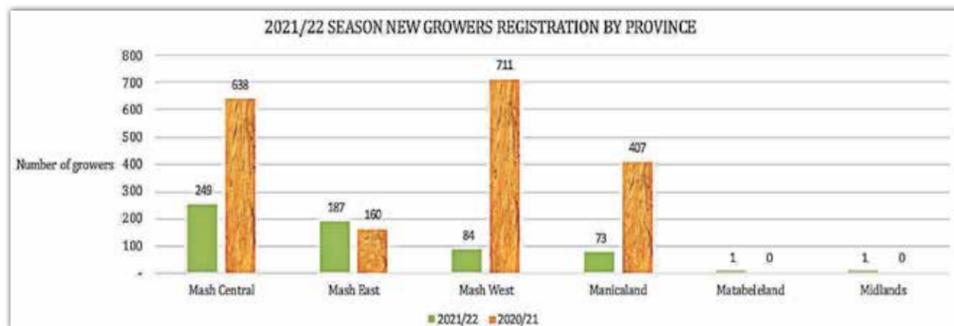
Below are facts on the economic importance of the golden leaf and the expected way of handling it from the harvesting to the marketing point.

Zimbabwean tobacco is regarded as having some of the best smoking and flavour qualities hence it is well sought-after by major tobacco markets thereby making the country the third biggest exporter in the world and the largest producer of tobacco in Africa.

For the country to maintain this position and continue producing good leaf, it is prudent that the delicate crop is treated methodically at each production stage of which the reaping stage is no exception and must not be overlooked, TIMB chief executive officer Mr Meanwell Gudu observed recently.

Harvesting and curing is in progress in all tobacco growing regions hence it is prudent to look at how farmers can avert losses that can occur due to poor handling and harvesting immature or overripe tobacco.

Whilst tobacco may appear well grown on the land, if it is not harvested at the optimum degree of ripeness, an array of challenges arises. When tobacco is overripe when it is reaped, it neither colours well nor yields, as would tobacco harvested and cured at proper maturation, consequently fetching poor prices.



On the other hand, tobacco that is harvested when it is still green and not yet ripe, results in pale, harsh textured leaf with incorrect chemical balance in the cured leaf.

Tobacco leaves reach full maturity a few days before ripening and when the crop is allowed to mature in the field it produces the best quality.

As a result, a farmer needs to know how a leaf that would have reached full maturity looks like in order for it to come out of the curing process with the quality, colour, weight and aroma the merchants are after.

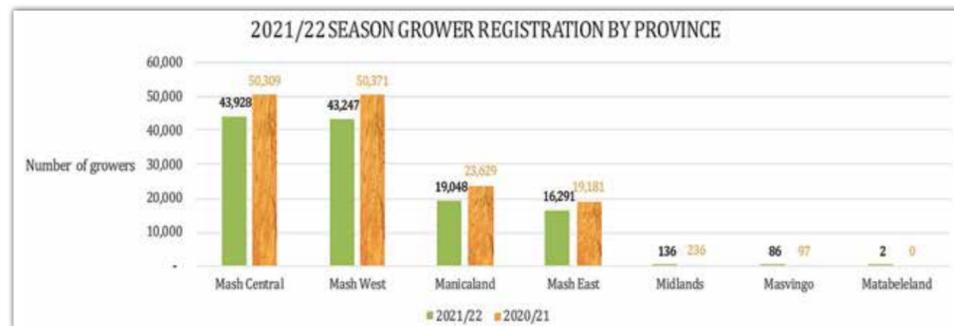
Mature leaf changes in colour from the normal green to yellowish, accumulates gummy substances in them, thickens as more starch accumulates in the leaf as well as becomes more brittle as nitrogen and chlorophyll content decreases in the leaf.

When cured, it is soft to touch and orange to yellow in colour. Mature leaf exhibits a slight yellowing on the stem and edges, has wrinkles or folds between veins and break off the stalk easier than immature leaves.

Noteworthy is that harvesting based only on the aforementioned visible signs may be erroneous as severely leached tobacco often exhibits false ripening and when this leaf is cured it results in spongy and green leaves.

For an indication of relative ripeness when in doubt, reap six or eight extra leaves from a typical plant, tie them in pairs in sequence and hang them in a visible place in the barn.

They represent the next three or four reapings, and their colouring times and final quality will give a good idea of how ripe you are reaping. The rate at which the tobacco crop ripens depends on



the climatic zone in which it is grown and the prevailing weather conditions.

However, as a general rule, the crop will ripen at a rate of about two leaves per week hence tobacco leaves are harvested progressively up the stem and two at a time from a plant.

Nonetheless, prevailing weather conditions or disease can cause the crop to ripen more slowly or more quickly than the average hence farmers need to adjust accordingly.

The tobacco leaf stages for maturity are: premature, mature, ripe, and overripe and as a result, the tobacco farmer should remove from the stalk fully ripe leaves as they cure more easily and optimum quality can be achieved.

During harvesting, reapers must understand the type of leaf they are out to harvest as the uniformity of the leaf in terms of ripeness

and stalk position (primings, cutters, lugs, leaf and tips) is important.

A good crop may be wrecked during the harvesting if the delicate crop is mishandled and the incurred damage may reduce the value of the tobacco crop hence the harvesting operation of the tobacco crop from the field right up to the grading table should be carefully organised to minimise handling as this tends to damage the tobacco leaf.

Clippers are also useful in reducing contact with the leaf thereby minimising bruises to the leaf. The harvested leaf should not be exposed to the sun in the field as this affects the quality.

It is the farmers' role to ensure that the crop attains top grades hence they must follow the correct methods in curing and baling to preserve quality of the leaf and guarantee favourable prices at the auction floors. — [www.timb.co.zw/news/taking-care-reaping-golden-leaf](http://www.timb.co.zw/news/taking-care-reaping-golden-leaf).

## The dos and don'ts of curing tobacco

CURING is a process by which the harvested tobacco leaf is made ready for the market. It is a well standardised process to achieve the desirable qualities in the cured leaf along with the removal of moisture. The process of curing has an intimate bearing on the quality of cured leaf. A good quality leaf from the field can be made poor by improper curing. The curing operations followed in India are dependent on type of tobacco, the mode of consumption, local preference, convenience, market value and production economics.

Depending on the type of the tobacco principal methods of curing can be distinguished as flue-curing, air-curing, fire-curing and sun-curing. Though some of the characters that govern quality in tobacco are genetic, the way of practising and following standard curing methods play a significant role in determining the quality of leaf.

### Harvesting

Uniform, well-matured and ripe leaves should be harvested. Ripe leaves have greenish-yellow colour with velvety feel and less sticky. Matured leaf lie horizontally or bend slightly down with tips slightly dry. As a general rule, the leaves are harvested from the bottom primings slightly on the green side, the middle leaves when they are ripe and the top leaves when they are fully ripe.

On an average, not more than three leaves should be harvested at a time. Harvesting must be done on a clear weather day. Immediately after rains or irrigation the crop should not be harvested and it is to be delayed by 2 - 3 days in such cases. Under normal condition, priming is done once in a week.

The leaves should be plucked against the direction of the sun for better judgment of matured leaf colour. While picking, the midribs should be bent side-ways and a well-matured leaf will snap crisply with a characteristic sound.

### Green-leaf grading

In spite of utmost care, during the harvest some immature leaf and over ripe leaves may be picked, which have to be sorted out before tying. These over ripe and under-ripe leaves must be tied separately so that each stick contains leaves of uniform colour. Over-ripe leaves are usually yellowish white and under ripe leaves are relatively dark green.

### Tying the leaves

The leaves are to be tied to sticks by handling gently in a shaded place avoiding wilting and bruising. A bruised leaf (physically damaged) does not cure well in the barn. About three leaves are tied in a bunch, back-to-back, with a jute twine loop on a stick. About 90-100 such leaves are tied in separate bunches with a series of loops on a stick approximately 130 cm long. The leaves are distributed uniformly all over the length of the stick to avoid overcrowding.

### Loading the barn

For a satisfactory curing, the whole barn should be loaded with the freshly harvested leaves from a single priming. The un-ripe leaves (green) are placed on the top tiers, the over-ripe leaves (yellowish-white) leaves on the bottom tier and well-matured leaves (greenish-yellow) in the bulk of the intermediate tiers.

The sticks are placed on the tiers approximately at a distance of 20-25 cm so that the leaves from the adjacent sticks slightly touch each other without pressing. A five-metre by five-metre barn will usually be loaded with 750 sticks with such spacing. Leaves from the top of the plant may be crowded slightly more by closer spacing without much detriment to grade-return. Loading of the barn should be completed by late afternoon.

### Curing practice

Curing tobacco according to fixed schedule is not possible all the time because of the variability in green leaf due to various factors like weather condition, plant position, leaf maturity, disease prevalence and in such cases slight adjustment in the process is necessary. The schedule will only serve as a broad outline and individual judgement will be necessary in almost every case.

### Curing principle

The early stage of flue-curing should permit continuing biological activity in the leaf permitting destruction of chlorophyll, conversion of starch to simple sugars and leaf proteins to soluble nitrogenous constituents. These cellular reactions take place in fully turgid leaf cells in aqueous medium and for complete enzymatic reactions, thermal inactivation of these enzymes must be prevented. This means maintaining high humidity and low temperature in the barn for these favorable reaction sequences.

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## Protecting stored tobacco from moth and beetle

ALL tobacco growers are reminded that the Tobacco Moth and Tobacco Beetle is a notifiable pest, listed in the first schedule of the Plant Pest and Diseases (Plant and Alternative Hosts) Order 1976.

The Tobacco Marketing and Levy Act (Chapter 18:20 Section 75) empowers the Tobacco Industry and Marketing Board (TIMB) to prevent movement of infested tobacco, to order fumigation at the owner's expense and even to order complete destruction. Fumigation using Gastoxin tablets can be done by the farmer or authorised fumigators.

The objectives of preventative pest control are to make premises inaccessible and unattractive to pest and to stop pests getting at the raw materials and finished products. These objectives are cleaning, good storage practice and building maintenance.

What to do:

All leftover tobacco including waste tobacco material such as tobacco fines and dust, which might accumulate on a daily basis should be removed and disposed of. This may be burnt or buried in a pit.

Leftover tobacco must never be carried over the next season without prior arrangement and authority from TIMB. Application to keep tobacco should be made to TIMB before 15 December each year.

Sweep and remove spider webs, which are a good indicator of insect activity, in the storage and working areas.

Give access to stored tobacco products as well as light and ventilation.

Tobacco or material or finished products must be staked with enough space around them to facilitate fumigation should the need arise.

Storage of tobacco from another farm or tobacco whose pest infestation status is unknown should be avoided.

Good stock rotation is very important and must be practised. The basic rule here is first in first out.

Doors or windows, which may stay open should have wire mesh screens of appropriate gauge to prevent entry of insect.

Source: <https://www.timb.co.zw/news/tobacco-moth-and-tobacco-beetle-awareness>.






THE weather can be unpredictable this time of year and livestock farmers have to deal with a major amount of environmental issues throughout the season

# Ways of keeping livestock safe in severe weather conditions

THE weather can be unpredictable this time of year. Whether it is flooding, cyclones or just increased rainfall, livestock farmers have to deal with a major amount of environmental issues throughout the season.

This has never been more apparent than what has been going

on recently in most parts of the country, which have been getting a great deal of rain over the last several weeks. It has even begun to impact the safety of farms and the livestock raised there.

Over the past few weeks, several areas were pummeled with storms that brought along heavy rains, hail and strong winds. While

heavy rains caused flash flooding in several of the areas, one farm was affected more than the others in the area.

According to sporadic reports, an entire herd of cows was swept away in the flooding that occurred last season, although thankfully none of the animals were harmed or killed. They were found after the storm had passed on a neighbouring property.

In light of this story, here are a few tips that will help you protect your livestock from rainfall and severe weather conditions:

- **Build a sturdy shelter:** The best thing you can do to keep your livestock safe in extreme weather is by making sure that their shelter will keep them protected from the elements. The animals will need something to break the wind, as well as an overhead that will stop rain from falling on them and creating excessive moisture. As long as the barn you build is able to withstand the elements, you will be able to keep the livestock safe.

- **Evaluate the safety of your farm:** You do not want to be caught in a storm only to realise that your farm is not adequately prepared. That is why you will need to take an honest look at everything on your land, from the condition of your home to how sturdy the livestock barn is, to determine whether or not you are ready for a major storm. If you find certain areas to be lacking, be sure to fix them up before the damaging weather comes through.

- **Supply enough food and water:** In addition to the barn being in good shape, there will also need to be enough supplies for the livestock. This is especially important for those moments where you will not be able to provide for them, such as during rainfall or heavy winds.

- **Evaluate the safety of your farm:** You do not want to be caught in a storm only to realise that your farm is not adequately prepared. That is why you will need to take an honest look at everything on your land, from the condition of your home to how sturdy the livestock barn is, to determine whether or not you are ready for a major storm. If you find certain areas to be lacking, be sure to fix them up before the damaging weather comes through.

- **Supply enough food and water:** In addition to the barn being in good shape, there will also need to be enough supplies for the livestock. This is especially important for those moments where you will not be able to provide for them, such as during rainfall or heavy winds. As long as the livestock have enough high-quality food and a steady supply of water in the barn, they will be able to sustain themselves throughout the storm.

- **Warm bedding is essential:** The livestock will need to be comfortable throughout the storm, which is why warm bedding is essential. This is especially important during rainstorms, which can often make the air cold and moist. There should be enough bedding for every animal that will be living in the barn, regardless if it actually ends up being used or not. Check the current bedding you own to see if anything needs to be replaced.

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# Even the sky will not limit Marwa's dairy dream!

Talent Chimutambgi

FOR once, 54-year old Mrs Esther Marwa feels good. No worries, just endless possibilities. Endless possibilities. She is convinced even the sky will not restrict her dream to showcase her talent and determination to participate in the renaissance of the economy through dairy farming.

Mrs Marwa was capped the 2021 Zimbabwe Association of Dairy Farmers (ZADF) Small-scale Dairy Farmer of the Year National Award winner for the dairy sector during a ceremony organised by the Zimbabwe Association of Dairy Farmers (ZADF) and held at Lancashire, Milk and Honey Farm in Chikomba, Mashonaland East.

After the ceremony, the ecstatic Mrs Marwa opened up to chronicle her journey in which it is easier to fail than to succeed if one does not have the passion and zeal.

A holder of Diploma in Business Administration, Mrs Marwa only discovered her potential in entrepreneurship through a feeling that she should not work under someone. And driven by this strange feeling, she gave up her formal job to pursue her passion to start something, which would give her that sense of independence and proprietorship.

"I had a feeling in me that I should be my own boss, I discovered this feeling after failing to cultivate good relations with my supervisors at work. As time passed by, I left the job to pursue my passion driven by a feeling of entrepreneurship inside me," said Mrs Marwa.

She started with a thriving horticulture nursery project, which she also dumped for a dairy farming opportunity thrown her way by ZADF in 2019.

Her dairy project started with five cows, three of which were in-calf heifers. She benefitted from a partnership between We Effect, ZADF, Zimbabwe Farmers Union (ZFU) and Zimbabwe Dairy Farmers Association. This torched a desire inside her to be a dairy producer. Now she has 26 head of cattle among them 16 are milking cows, six heifers and three bulls.

Mrs Marwa praised her husband, Mr Absalom Marwa whom she described as a pillar in this project, for approving the project on their 460-hectare Milk and Honey Farm in Chikomba. And despite the numerous challenges that dairy farmers encounter, Mrs Marwa's project seems to be bearing fruit.

"I produce 140 litres per day. I am happy to be supporting the initiative to rebuild the dairy sector, strengthen and expand the Dairy Revitalization Programme (DRP). The milking cows produce an average of 16 litres each per day," she added.

She sells her milk at Nharira milk collection point at usso, 50 per litre and has easily become the biggest producer in the country in the category of smallholder farmers.

Nharira Milk Collection Centre received assets worth US\$16 000 from ZADF in partnership with We Effect, a European Union branch, which supports dairy farming when it was established.

"One cow produces an average of 16 litres per day and we want to improve the feeding to push it to 25 litres per day. This project is a testimony of hard work as well as the training that we get from ZADF through its extension officers. I have also benefitted a lot, getting a solar borehole to ensure enough water for the cows," she said.

To her, not even the sky will provide a ceiling, as she plans start breeding to make it easy for her community to access good dairy breeds.

For now, she is using artificial insemination, which she says has higher chances of giving her female offspring. The use of bulls will make it difficult to determine the sex of an offspring, she observed, adding that most smallholder dairy farmers in their area had no pure breeds and that was a major factor affecting their production levels.

"I don't use bulls for breeding because they don't allow us to determine the sex of the offspring, but by using artificial insemination, you are quite sure that you are getting female calves that we direly need to improve our daily production.

"We are about 45 farmers at our collection point, 85 percent of whom do not have pure breeds and milk indigenous cows



**Top: A proud Mrs Esther Marwa during the field day held at her farm recently. Above: Mrs Marwa explains to guests, who included Deputy Minister of Lands, Agriculture, Fisheries, Water and Rural Development Vangelis Haritatos, how her milking machine works.**

that only yield five litres of milk or less. They also don't improve pasture; they don't make hay, which limits their daily milk production," said Mrs Marwa.

Mrs Marwa said apart from getting training from extension officers provided by ZADF, she also gathers information through diligent surfing of the internet.

She is currently mentoring her daughter, Tariro to be a dairy farmer like her after noticing traits of passion to pursue dairy farming in her.

"I made efforts to install internet at our farm, which helps me with information especially from other countries like Kenya where dairy activities are thriving on how to run the project.

"Our daughter Tariro who is studying for a Master of Science in Business is also exhibiting a growing desire for the project and I'm coaching her with the help of our four farm workers," said Mrs Marwa.

Mrs Marwa, who likes travelling especially during public holidays, also enjoys swimming.

## WIDE RANGE OF MASSEY FERGUSON TRACTORS & FARM IMPLEMENTS





Dr Reverend Moregood Spargo



## What is Theileriosis?

**TICK-BORNE diseases, chief among them Theileriosis, have claimed 1 478 head of cattle in January, marking the lowest figure in three years**

COMMONLY known as January disease, Theileriosis is a tick-borne disease of cattle caused by the blood parasites, *Theileria parva*, which are transmitted by the brown ear ticks. The parasites affect white blood cells resulting in generalised swelling of the lymph nodes. The disease occurs throughout the year, being more prevalent in the rainy season as this coincides with increased activity of the tick vectors.

The moniker January disease was coined after it was observed the most cases occurred in the month of January when the country normally receives most of its rains during the rainy season.

Two forms of the disease are recognised in Zimbabwe, which are indistinguishable clinically. These are the Corridor disease and January disease.

Corridor disease occurs when cattle and buffaloes share the same grazing pastures, when cattle are moved into or through buffalo areas or when buffaloes stray from national parks or conservancies into farming areas.

Buffaloes do not normally become sick when they have these parasites in their body and cattle are infected when they are bitten by ticks that have fed on infected buffaloes. January disease on the other hand is cattle derived, being spread from one beast to the other by tick vectors.

The latter is the more common form of the disease in the country. The disease outbreaks are currently being reported in seven out of eight rural of the rural provinces of Zimbabwe. Only Matabeleland North has been spared for now.

How is the disease transmitted and spread from one area to the other?

The brown ear ticks are responsible for the transmission of the disease. They were so named because of their colour and also because the adults prefer to attach and feed from the cattle ears. Cattle are infected when they are bitten by ticks that have fed on infected cattle.

A recent tick distribution survey carried out by the department of veterinary services have shown that the brown ear ticks which

were formerly found mainly in the Highveld, now have widespread occurrence in the country. Ticks cannot move long distance by themselves and are mostly transported from one area to the other on the cattle host.

This is why there is legislation (Cattle Cleansing Regulations, 1993), which prescribe that cattle should be dipped before movement, undergo pre-movement inspection and allowed to be translocated if they are tick free. Illegal cattle movements have been responsible for the spread of the disease across the country.

Another way in which the disease can be transmitted from one animal to the other is through the use same needles between infected and uninfected animals hence the need to use different needles per animal or sterilise them in between use.

What signs do you see in an animal affected January disease?

The signs of the disease are normally observed a week after the bite by an infected tick. Cattle develop a fever which manifests as depression, listlessness and standing apart or lagging behind.

The ticks are normally found in the ears and hence the lymph nodes draining the area of the tick bite, especially the one below the ear and the ones in front of the shoulder and the knee.

Within a few days this spreads to the rest of the body with generalised swelling of superficial lymph nodes. There is loss of appetite, watery discharge from eyes and cloudiness of the eyes.

The animal rapidly loses condition, have difficulty breathing with froth exuding from the nose and the mouth. There is also terminal diarrhea, which is often blood stained.

Recumbency and death almost invariably occur within three weeks of infection. The Theileriosis is a notifiable disease by law in Zimbabwe and farmers should report to veterinary services when they suspect the disease.

**To be continued**

Dr Reverend Moregood Spargo is District Veterinary Officer for Zvimba



Dr Josphat Nyika

## More facts on January Disease

effective dipping is carried out every week. Sound dipping infrastructure and effective dip chemical are critical in tick control.

### When the disease occurs

- Infected property is placed under quarantine for 28 days.
- All clinical cases to be treated using buparvaquones (butachem, butalex and butacure) and oxytetracyclines (alamycin, limoxin, and hitet) administered intramuscularly according to the manufacturer's instructions.
- The treatment regime may be repeated after 72 hours if the cases have not fully recovered.

• A 5-5-4-day dipping interval (cattle are dipped three times in 2 weeks) under the supervision of DVS must be enforced coupled with tick grease application in between dipping session.

• After two rounds of applying the 5-5-4-day dipping interval (28 days), the animals are inspected 48-72 hours after last dipping and if found to be free of ticks, quarantine is lifted and the farmer switches to weekly dipping.

### Why do we dip our cattle?

Ticks spread many diseases to livestock. These tick-related diseases cause 75% of cattle deaths in Zimbabwe every year. Ticks are controlled through various dipping methods such as:

- Plunge dip,
- Spray dip and
- Pour-on dip

In the first two methods the animals are completely submerged in the plunge or wet thoroughly using a spraying appliance containing an effective tick-destroying agent at the concentration specified in the manufacturer's instructions.

Pour-on is a concentrated oil based dip chemical containing a spreading agent which when applied topically allows the dip to spread over the skin of the animal.

### What then is tick grease?

It is a tick-destroying agent used as a supplementary spot application tick control method applied by hand dressing to an animal.

### When does one use tick-grease?

In cases of evidence of inadequate tick-control in some or all animals subjected to any of the three methods of dipping, tick grease hand-dressing is used to supplement in the following scenarios:

- ticks in the hidden areas remain alive after dipping because the water did not reach the hidden areas

- there is a certain tick species which could not be killed through the main dipping method
- The animal could not be found on the dipping day so has ticks on it.
- The animal is sick so remained in the kraal on a dipping day
- The animal is in poor condition in drought time so cannot swim across the dip tank
- Temporary shortage of the main dip chemical
- Clustering of ticks in hairless areas causing skin damage and annoyance

Brown ear ticks which transmit the deadly January disease also known as Theileriosis usually clusters in the ears of cattle. Applying tick grease will kill ticks and reduce cattle deaths from this disease.

### How is tick-grease correctly applied?

The owner of the cattle may apply it to certain or all animals as necessary. It can be applied between dipping sessions.

Tick grease sticks better to hairless skin and generally has a fairly long residual period.

Please note: It should not be used as the only method of tick control. Before application:

Restrain the animal, then clip or shave the following areas:

- tail brushes,
- polls and
- ears.

### Then:

Apply thinly (or according to the manufacturer's instructions) and evenly by means of a brush or gloved hand to tick feeding sites such as:

- the inside surface of the ears,
- tail root/under the tail-head,
- udder and
- between and behind the hooves where ticks tend to cluster or to such other areas of the body where there are visible ticks.

### Where to get tick greases

Liaise with your nearest veterinary office to collect tick grease at the GMB depot close to you. Collection is for free for all farmers with stock cards.

Dr Josphat Nyika is the Chief director at the Department of Veterinary Services

# Fall army worm maize attack

## ... a case for diversity from farm to fork

AS Government scales up efforts to control an army worm outbreak that is damaging maize crops across the country, William Chifura wonders if the infestation will encourage a policy shift away from mono-cropping maize.

Maize – Zimbabwe's primary staple crop – is under attack from fall army worms. The fall army worm is a migratory pest that rapidly moves through fields eating young plant stems at lightning speed, leaving devastation in their wake. It is estimated that 10 percent of Zimbabwean farms in six provinces have already been affected.

Maize dominates agricultural production in Zimbabwe and neighbouring countries, in spite of its limited nutritional value. Other staple crops, such as millet, are far more nutritious, drought tolerant and less susceptible to pest outbreaks. Yet more than 90 per cent of smallholders rely on maize for income and food calories.

The current pest invasion could cause farmers in affected areas to lose 30 to 40 per cent of their crops. According to media reports, the army worm – which is native to the Americas – will continue to wipe out tens of thousands of acres of maize fields unless its progress is controlled.

### Catastrophic impact

According to the United Nations Food and Agriculture Organization (FAO), the effects of the army worm invasion could be catastrophic for Zimbabwe.

The Government has declared the outbreak a national disaster and disbursed over us\$3 million for pest control. Military planes have sprayed affected areas in an attempt halt the infestation. However, experts worry that the army worm's capacity to burrow into the centre of maize plants will make it difficult to control the outbreak using pesticides.

Pest invasions come from a combination of ecological and climatic factors, such as weather patterns, mono cropping, the introduction of new species, or pest migration routes. Because the army worm jumps across borders, it is already being reported in neighbouring countries such as Burundi, Malawi and Zambia, increasing the challenge of controlling the infestation.

Interestingly, other crops such as cassava, millet and sorghum have been less affected. While the loss of maize crops to this infestation must be addressed, it is important to consider whether the country's reliance on maize has contributed to the pest attack.

Since 2007, the Zimbabwean Government has spent an average of 80 per cent of its agricultural budget supporting the production of maize. The latest attack on the maize crop by army worms therefore highlights the need for the nation to diversify its crop production.

Greater diversity of foods on the farm and on the plate is something that is also urgently needed to combat hunger and malnutrition nationally.

Moreover, much of the maize grown is rain fed, making it vulnerable to climatic shocks such as drought. Within the last 20 years, prolonged dry spells and shorter rainfall seasons have reduced maize yields to only 40 per cent of the long-term average, a consideration that also makes the case for diversification.

### Dietary decisions

Though Zimbabwe has recently been receiving good rainfall, the gains are likely to be jeopardised by the pest attack. Climatic shifts, the inadequate production of alternative staple crops and poverty are contributing to widespread food insecurity.

Maize mono cropping is diminishing the variety of foods in the fields and in people's diets.

If there is a role that crop diversification can play in halting the advance of future army worm attacks, it is worthy of national debate. Despite being a much loved crop, it is high time to ask whether maize is proving too costly at a production and dietary level.

### Quelea attacks

MOST wheat growing areas where farmers planted maize early have recorded quelea attacks on the crop that has reached the soft dough stage, the Plant Protection and Research Institute (PPRI) has reported.

The PPRI report said attacks were noticed in the bulk of such areas especially in the Midlands province and urged affected farmers to report infestations early to reduce losses.

PPRI head, Mr Shingirai Nyamutukwa challenged farmers to report quelea bird attack early saying the department had more than enough chemicals to spray.

"We have received reports especially from Midlands where the early planted maize is under attack from the birds. Maize at Ngondoma Irrigation Scheme was affected by the birds. We have acquired 7 410 litres of chemicals to deal with the birds. In the past we used to buy 5 000 litres, which would last up to three seasons.



A fall armyworm outbreak, the first emergence of the pest in southern Africa, is causing considerable crop damage in some countries



The vast majority of birds feeding at the crops were the targeted species: farmland birds such as chaffinch, linnet, reed bunting, meadow pipit, goldfinch and starling

"Farmers with large tracts of land should identify the roosting sites of the birds. The birds are getting into their breeding season so farmers should identify those sites and alert authorities for early control," he said.

Mr Nyamutukwa said the fall armyworm population was also building up and farmers should continue scouting so they can make reports before the pest destroys crops.

"So far 17 hectares of maize and sorghum have been destroyed by fall armyworm in Mushumbi, Mashonaland Central. We assisted the farmers with chemicals to control the pest. We encourage farmers to do early scouting so there is early control," he said.

The institute is also assisting vulnerable farmers with chemicals to control the fall armyworm but those who can afford to buy should

do so from reputable retailers, further observed Mr Nyamutukwa. He said teams were on the ground assessing the situation on both the fall armyworm and quelea birds.

Quelea birds have been a threat to summer subsistence small grains and commercial winter cereal cropping in Zimbabwe in recent years.

Each tiny bird can feed on four grammes of wheat per day and experts say a million birds can result in losses exceeding 40 000 tonnes when the quelea birds invade fields in large flocks.

Fall armyworm causes extensive damage to maize if not controlled properly and on time.

The pest has 10 to 12 cycles and can continue recurring after the first spray.

# Land preparation and planting of sunflower



**Kennedy Mabebla**

**S**UNFLOWER has become a very important oil seed crop, due to its drought tolerant properties that enable it to grow under various soil and climatic conditions.

Due to its high value over the years, the crop has become popular across the Southern African region. Sunflowers are a drought resistant crop that can produce high yields on as little as 410 mm of rainfall provided the soil is moist just before and during flowering period.

Sunflowers are suited to regions II and IV and will yield more than maize in these areas. They are mainly planted from mid-December to mid-February. Yield levels average between 1,5 t/ha for November plantings and 0,5 t/ha for end of January to early February plantings.

Sunflower can grow on any type of soil. It also does well on soils with controlled pH range and are saline to some extent. However, sunflowers do best in deep loamy soils with good drainage, especially under irrigation. Sunflower is not highly sensitive to soil pH. The crop is grown commercially on soils ranging in pH from 5,7 to over 8. The optimum growing conditions depend upon other properties of the soil. The 6,0 to 7,2 range may be optimal for many soils.

When considering planting sunflower, farmers should make sure they have adequately prepared their land. Poorly prepared fields may lead to soil erosion, poor germination, weed infestation and harvesting losses. In preparing the seed bed, land must be ploughed, disked and harrowed if necessary to obtain a fine tilth. Care must be taken with virgin land or heavy soils, where large clods may easily suppress seeds thereby reducing the germination percentage. In some instances, it may be necessary to first deep plough the land before coming in with a disk to break the big clods



**SUNFLOWERS can grow quickly and can achieve close to four metres of growth in only 3 months**

and have a fine tilth, which allows for easy emergence of the seed.

This will ensure incorporation of crop residues and weeds that would have been ploughed into the soil. A fine seedbed for planting will be produced.

If some weeds have come up before planting, either disc lightly or plant, then burn off the green weeds with glyphosate mixed with pre-emergent grass and broad leaf herbicides in one tank mix. A light disc or spike harrow may be used to break clods to produce a smooth seedbed just before planting if necessary. On previously cropped fields, the soil should be disked preferably after soaking rain.

Sunflower seeds are sown using the dibbling and furrow methods. Under the dibbling method, one can sow about 5 to 7 kg of sunflower seed per hectare while for the furrow method, it is possible to use about 10 kg of sunflower seed per hectare. In regions, which receive high rainfalls (regions I, II, III) a spacing of 90x 25 cm is recommended whilst in region IV and V a spacing of 90x 30 cm is also recommended.

Planting lines can be made by opening a shallow furrow with a ripper tine. The seed should be planted 4-5 cm deep. When seedlings appear, those deemed excess should be thinned out after two weeks of the germination. Also, a proper seed treatment is recommended for better germination of sunflower seed so, that you can achieve a good plant density.

Planting depth is critical. In sandy or light soils seed can be placed up to four centimetres (cm) deep. In heavy soils (high clay content) a depth of two – three cm is adequate. If planted too deep, sunflower seed will fail to emerge. If it rains soon after planting, a crust may form that will hinder germination. A light spike harrowing across the rows will aid germination.

Dribble basal compound fertiliser into the furrow at 150 – 250 kg/ha. In fertile soils or previously well-manured or fields previously planted to well-fertilised maize crop, use less basal fertiliser. One handful should be dribbled on one metre length to give approximately 150kg per ha.

● Kennedy Mabebla is an Agritex Principal Agronomist



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