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Agribusiness

Magazine

CATTLE PEN FATTENING FOR PROFIT

- CROP RESIDUES FOR ANIMAL FEED
- THE PIG PRODUCTION CYCLE
- ECONOMICS OF GOAT FARMING
- TIPS ON HOW TO GROW YOUR POULTRY BUSINESS
- STRATEGIES FOR INCREASING SMALLHOLDER FARMER INCOME





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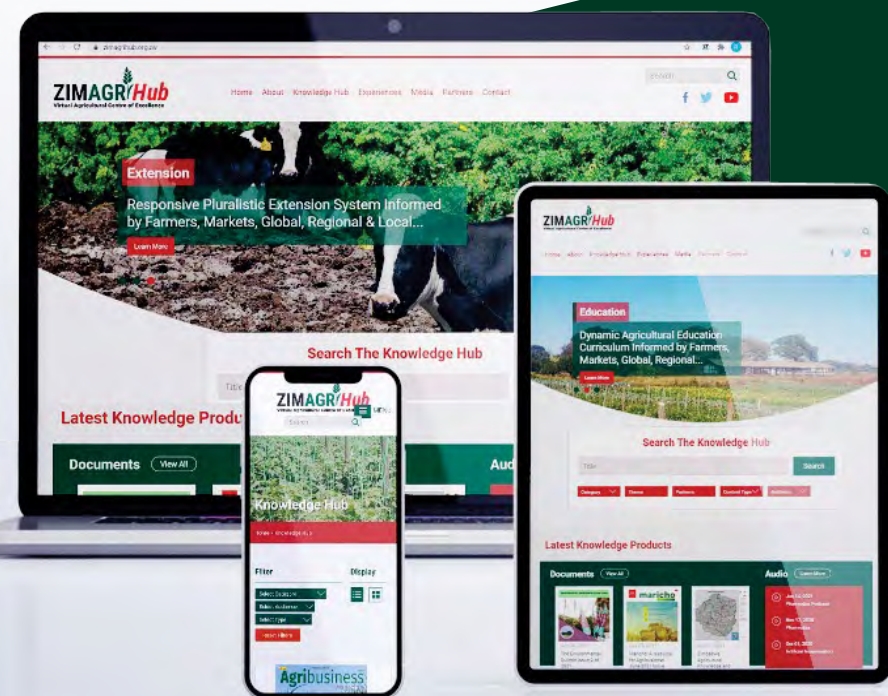
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Cattle pen fattening for profit

By James Kabinda, Animal Production Specialist.

Introduction

During my tenure as an intern, I encountered quite a number of farmers willing to take on beef feedlotting.

My advice to them was to start with a few beasts, gain experience for a while then increase numbers as their business grows. Over 80% of Zimbabwe's cattle is held by the rural community and cattle are sold on need-basis and represent a social security to rural communities. However, cattle production can be a profitable business with improved management.

This article gives insights on beef feedlotting at a small scale level and

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how rural cattle producers can make money from their cattle and conversely improve their livelihoods, through value addition of their beef cattle.

Pen fattening/ feedlotting may be defined as the confining of cattle in a relatively small area (the feed lot) and feeding a controlled high energy diet over a certain period of time. The reasons for pen fattening are generally as follows:

- To take advantage of seasonally high prices.
- To add extra mass to slaughter stock at a younger age, thereby

increasing turnover.

- To increase the degree of fatness of the animal in order to achieve higher grades at a younger age.
- To ensure that young slaughter stock satisfies the standards for export carcasses and thus qualify for the export incentive in areas where this is applicable.

Preparing for Pen Fattening

Prepare the holding pens with the feed and water troughs. Adequate pen space must be provided individually, but two or even more similar animals can be mixed e.g. by age and sex. Large animals tend to

bully smaller animals and keep them away from feed troughs. Pen construction can be done using convectional kraal material such as logs, wire etc. Site for pens should be elevated on well-draining soils.

When constructing these pens, the feed trough should be as far away from the water trough

as possible. With the feeding trough in one corner of the pen, the water trough should be in the corner diagonally across. This is to force cattle to walk the longest possible distance a few times daily to reduce incidences of laminitis, as well as reduce fouling of feed. Drinking water will stay clean for longer periods of time.

Take precaution to make sure that a shortage of water does not occur during the feeding period. Clean fresh water must be available at all times, allow for at least 50 litres per head per day. Use of a 5000L water tank can suffice for a 25 cattle unit. Rural cattle producers can save money as a group and purchase a water pump



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and generator (if in area with no electricity). Pump water direct to the waterers or to tank.

Farmers can use half drums as waterers raised at least 60 cm from the ground.

Determine the feed requirement and make sure that enough feed has been bought in or prepared to last for the duration of the feeding period.

It is essential that sufficient roughage is available to last the whole fattening period. To allow for wastage a minimum of one tonne of stover per animal fattened should be available. Problem of shy feeders can arise as the animals have probably never consumed concentrates. Farmers can organize themselves into groups of 5 to start beef feedlotting. This reduces the capital investment per individual farmer. Each farmer can contribute 4 to 5 beasts for the fattening program depending on their herd size and other resources are also contributed equally.

Farmers should identify site for feedlotting with help of livestock experts. Identify and number the animals for record keeping purposes.

Other Factors To Consider:

- Quality of cattle
- Setting realistic performance targets in relation to the above
- Avoid waste
- Avoid over-crowding. At least 10-14 m² of pen per head.
- Feeding space : 40-50 cm of feed trough space per head
- Water space : 1 metre of water trough frontage per 30 cattle
- Prevent heat stress.

Fattening Timing

Prices are generally favourable from October to February in Zimbabwe.

Feeding

- Days in pens 90 - 120
- Average daily gain (kg) per head 1.5
- Average feed intake per head per day (kg) 10
- Average FCE (kg feed : kg live mass) 8:1

Selecting Animals For Fattening

Before selecting animals for feeding, you have to be able to answer the following questions:

- What is your targeted sale mass?



- What is your targeted period of sale?
- What have you targeted as your sale condition or carcass classification?

Age & Size

Young stock have better feed conversion efficiency than older stock and tends to finish better and will have high degree of marbling in the meat. Cull cows and old oxen have a relatively inefficient feed conversion efficiency, which is defined as the quantity of feed (kg) required to put on one kilograms of carcass mass. To improve the animal's adaptation to the diet a higher proportion of roughage should be included in the diet, and high roughage diets are more economic when fattening this stock. Size at which an animal can be finished is determined by the targeted

finishing mass.

Sex

Heifers respond well enough to finishing but they tend to finish quicker because of their reduced growing potential as compared to steers. Heifers eat less feed per day than steers of the same age hence the reduced growing potential. They deposit more fat than steers during the same feeding period. Male animals grow faster and deposit less fat than steers, and they have better feed conversion efficiency. These animals have to be slaughtered at milk tooth age. There if intensive feeding system and management permits the finishing of animals before 15-18 months of age, use intact animals.

Breed

Breeds differ in voluntary feed intake per day. Some animals will not adapt to intensive feeding conditions. Such animals, referred to as non-feeders, either effuse high-energy diet or react unfavorably to it. Non-feeders of the exotic breeds cannot be identified until the pre-pen fattening period.

Marketing tips

Currently, the market for beef in Zimbabwe is deregulated and is there-

fore highly informal and middlemen dominate transactions. Sales are predominantly at farm gate level. There is lack of market information. There following are the major market options available to beef cattle producers.

Individual traders

This market comprises individual buyers who buy livestock cattle for resell in high value urban markets.

Private sector companies (abattoirs, butcheries and others)

These normally require huge volumes of beef cattle to serve both the local market and the export market. This market emphasizes on quality, consistency and timely supply.

There is high transport costs involved when accessing this market. Examples include; koala and surrey abattoirs. Once a feedlotting program has been initiated it will be pivotal for the farmer group to have consistent supply to their market. This is to strengthen the long-term interest of the market. Program should be sited close to the market to reduce transport costs. Coming together of beef cattle producers as an association or group will also help to reduce transport costs as they

can negotiate with transporters on fair prices.

Conclusion

Rural cattle producers have opportunities for income if they fully exploit the production potential of their cattle through value addition activities such as feedlotting. In other words, they should change their systems of production from convectional veld based to semi-intensive or intensive feeding systems.

About the writer:

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For further information (e.g. Budgets and business plans) pertaining cattle fattening consult the above mentioned author.

Also follow posts on KB livestock solutions Facebook page. For a comprehensive guideline on feedlotting get our production manual by contacting the above author.

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Cattle Artificial insemination techniques

M Shahzeb

The technique of inseminating a cow is a skill requiring adequate knowledge, experience and patience. Improper AI techniques can negate all other efforts to obtain conception. Semen must be deposited within the tract of the cow at the best location and at the best time to obtain acceptable conception rates. Early methods of AI involved deposition of the semen in the vagina, as would occur in natural mating.

Those methods are not satisfactory. Fertility is low and greater num-

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bers of sperm are required. Another method which gained popularity was the “speculum” method. This method is easily learned, but proper cleaning and sterilizing of the equipment is necessary, making it more impractical to inseminate than with the rectovaginal technique which is the most widely used AI method today.

In the recto-vaginal technique a sterile, disposable catheter containing the thawed

semen is inserted into the vagina and then guided into the cervix by means of a gloved hand in the rectum.

The inseminating catheter is passed through the spiral folds of the cow’s cervix into the uterus.

Part of the semen is deposited just inside the uterus and the remainder in the cervix as the catheter is withdrawn. Expulsion of the semen should be accomplished slowly and deliberately to avoid excessive sperm losses in the catheter.

The body of the uterus is short; therefore, care should be taken not to penetrate too deeply which might cause physical injury. In animals previously inseminated, the catheter should not be forced through the cervix since pregnancy is a possibility. Since research data show little variation in conception rates when semen is placed in the cervix, uterine body or uterine horns, some people recommend incomplete penetration of the cervical canal and deposition of semen in the cervix.

The recto-vaginal technique is more difficult to learn and practice is essential for acceptable proficiency but the advantages make this method of insemination more desirable than other known methods. With practice, the skillful technician soon learns to thread the cervix over the catheter with ease. If disposable catheters are used and proper sanitation measures are followed, there is little chance of infection being carried from one cow to another.

Timing of Insemination for Maximum Conception:

A frequent question concerning AI is: What time during estrus should cows be bred for greatest

chance of conception? Since estrus may last from 10 to 25 hours there is considerable latitude in possible time of insemination. Much research work has been conducted on this subject.

Controlled investigations were conducted by Trim Berger and Davis at Nebraska in 1943. These and other studies show that conception rate is lower when cows are bred prior to mid estrus or later than 6 hours after cessation of estrus (standing heat in this case). Maximal conception is obtained when cows are inseminated between mid estrus and the end of standing estrus, with good results up to 6 hours after estrus.

Success in insemination timing is dependent upon a good heat detection program. In large herds, this means assigning individual responsibility for heat detection and a continued education program for labor. A successful heat detection program and subsequent proper timing of insemination will pay dividends in increasing reproductive efficiency.

A practical recommendation for timing of insemination:

The best time for artificial insemination occurs in the last part of heat. It is therefore recommended

that cows observed to be on heat in the morning are inseminated in the afternoon and cows detected on heat in the afternoon be inseminated on the morning of the following day.





Crop Residues for Animal Feed

The human population explosion is a source of worry throughout the world. Food shortages and famine are becoming endemic in many places. The population explosion is associated with a reduction in arable land and there are indications that food production is reaching the upper limits possible with present technology, available finances and water. To address these problems, scientists are investigating alternative food sources and evaluating present land use and utilization of food.

Thus, feeding grains

to ruminants is questioned because man, a monogastric, can utilize grains directly. On the other hand, ruminants are characterized by their ability to convert low quality roughage to meat, milk, natural fibres, leather and manure, products that are useful to man. Therefore, ruminants should ideally:

- Graze non-arable areas
- Utilize crop residues.

When crops are harvested, residues become available. For example, when harvesting cabbages, discarded leaves

comprise up to 6 tons of edible dry matter per ha. Often markets collapse (e.g. potatoes) and it is too expensive to send produce to market and this “waste” (crop residue) becomes available for animal feeding.

Carrots damaged at harvesting or discarded due to poor quality, comprise a good ruminant feed when fed with carrot tops.

After harvesting, a farmer decides whether the residues must be left in the land, i.e. ploughed in, or utilized in some other way. This decision depends on a number of factors, including:

- The type and quality of the residues
- The price of animal products in relation to the prices of animal feeds
- The relationship between prices of bought feeds and the cost of feeding crop residues
- Availability of livestock to utilize the residues
- Type and species of livestock available to utilize the residues
- The price of livestock.

Careful evaluation of all these factors, especially a comparison of prices to determine that option with the greatest potential to make a profit, must be undertaken on each occasion when crop residues become available. People tend to do their sums with care when experiencing financial difficulties, but all too often, when things are going well, profits are lost through neglect.

Crops and crop residues

Although almost any crop residue can be fed to livestock, the residues of maize, sugar cane, grain sorghum, soybean, wheat and vegetables are usually involved in animal feeding.

The first essential step when deciding to use any product as feed, is to prevent losses resulting from the presence of toxins and poisons. Poisoning can range from acute cases where animals die when ingesting the poison, to very low levels of poisoning where the consequence of ingesting a deleterious substance can only be measured as a negative effect on performance.

Poor growth or a reduced ability to fatten can be the sole indicators that there is a problem, but, unfortunately, these symptoms are not specific to poisoning.

Toxicity can arise when nutrients, although present and often required in the normal diet, fed in excess or in imbalance with other nutrients, result in poisoning of an animal's normal production systems. Poisons in feeds also include substances produced by

the crop itself, poisons applied to the crop (e.g. insecticides or herbicides) and toxins produced by moulds and fungi. Steps to prevent problems are:

- When a farmer is unfamiliar with the feeding qualities of the relevant crop residues, enquiries concerning the suitability of the residues as animal feed can be directed to an



agricultural advisor or the literature could be consulted

- An effort must be made to find out if the residues were exposed to moisture for any length of time and if so, the residues must be examined for signs of fungal growth or, even better, the crop residue can be tested for fungal toxins
- Farmers must always be aware of the potential danger lurking where man-made poisons are sprayed onto crops, and directions for the safe use of these products must be followed
- Poor animal performance must always be investigated to find out possible causes. Problems experienced when feeding crop residues include:
 - Bloat, although uncommon
 - Many crops are prone to regrowth and the young shoots cause prussic acid poisoning. Sorghum is known for this problem when late rains and high temperatures stimulate plant growth
 - The brassicas (cabbage, cauliflower,

brussel sprouts) all produce substances that block the uptake of iodine and when animals graze these crops or the residues for a long, uninterrupted period, iodine deficiency symptoms occur (e.g. abortions and death of young animals)

- Some crops produce toxins, which include the trypsin inhibitors of soybeans (not a problem for ruminants) and solanin, which is present in the leaves of many plants, especially potatoes
- Livestock can choke on tubers, maize cobs and other large pieces of food
- Blockage of the oesophagus in ruminants, which

happens when animals only succeed in partly swallowing solid pieces of food such as tubers of potatoes, carrots or radishes, results in severe bloat and death.

Prussic acid (hydrocyanic acid) poisoning can be prevented by feeding a sulphur-containing lick to the animals, or better, lace the drinking water with "hypo" (sodium thiosulphate).

Poisoning with prussic acid can be avoided by preventing livestock from grazing sorghum that was frosted or the young regrowth of the crop. Where potato leaves are fed as a small proportion of the diet, animals do not ingest enough solanin to cause major upsets, although



production can be suppressed. Feeding of potato leaves should therefore only be undertaken in times of major food shortages. It is noteworthy that potatoes (which is a high energy feed for ruminants and monogastrics) that have been exposed to light and are greening, also produce toxic levels of solanin. It is good practice to chop up tubers of any crop (e.g. potatoes, carrots, radish) before feeding to prevent choking or blockage of the oesophagus.

Yield and quality

The quantity of available crop residues is affected by all the factors that normally affect the yield of a crop. Another important factor affecting the quantity of residue available for feeding, is that animals graze selectively, usually utilizing only certain parts of a plant or specific fractions of crop residues. When grazing residues, trampling contributes to the loss of edible material. Collecting the residues and processing it (e.g. milling) increases the amount of residue ingested by the animal, but is associated with reduced animal performance because animals are forced to eat lower quality material. Intake and quality can be im-

proved by additives e.g. spraying residues with molasses or feeding a rumen stimulating lick such as one containing urea.

A number of factors affect the quality of residues, including:

- Weathering occurs when left for a time before grazing commences, leaching of nutrients and damage by rain can severely reduce the nutritional value of crop residues
- Mode of harvesting has been shown to affect quality of residues significantly, especially the amount of wastage of grain (more grain left on the land results in a higher quality residue) that takes place at harvesting as well as the extent to which the harvesting process shatters coarse plant parts such as stems
- Cultivar plays a role
- Plant density and crop yield has an effect
- With grain crops, where grain formation is limited by factors such as drought, the residues often are of higher quality because nutrients are not translocated from the stem and leaf to the grain.

Because animals selectively graze crop residues, an analysis of the residues is a poor reflection of the nutritional value of the residues. Where residues are collected and milled, a chemical analysis will provide only an approximation of feeding value because this analysis reflects the composition of the whole plant, whereas the fraction animals select is usually of a higher nutritional value. Should a farmer, through chemical analysis of residues or poor performance of livestock eating the residues, become aware of deficiencies in feeding value, then the alternative of returning the plant nutrients to the soil by ploughing in the residues, must be considered. Composting the residues is another alternative. The decision to plough residues into the soil or composting it is usually affected by the need for roughage e.g. in times of drought and feed shortages, low nutritional value is less important than availability and relatively higher costs of feeds could make crop residues a viable proposition.

Supplementation

The feeding of the usual licks to animals on crop residues is recommend-

ed and for certain cases, especially low quality feeds, supplementation is essential.

Maize crop residues

Maize crop residues have been used for feeding livestock, both cattle and sheep, for many generations and remains one of the cheapest and best ways for winter feeding in sourveld areas and as an additional source of income in maize producing areas. Because of the cost involved in collecting the residues or baling it, the usual practice is to graze the residues in situ. An important consideration is that removal of residues from a field removes plant nutrients, which must be replenished by fertilization, whereas grazing assists breakdown of residues and the return of nutrients to the soil.

On the other hand, trampling by livestock has been held responsible for soil compaction.

Maize crop residue yield

As a rule of thumb, it is often assumed that the amount of crop residues left on the land after harvesting is equal to the grain yield of the relevant season. Research findings at Dundee indicate that residue yield is higher than grain yield. The rule of thumb for estimating residue yield

should be used when a yield determination of the residues is not undertaken. However, to ensure optimal use of the crop residues, a yield determination should be made by collecting and weighing the residues on at least 5 randomly selected sites, each comprising 20m², on the land. From this data the yield per ha can be calculated.

Maize crop utilization

When grazing maize crop residues, grazing can only commence after the grain has been harvested, which, especially during a wet season when it takes a long time for the grain to dry to the required moisture content (17% or less), could delay the start of grazing deep into the winter, causing a gap in the fodder supply to a herd. At the end of the winter, grazing is terminated by the need to start land preparation for the next season's maize planting. The result is that, in KwaZulu-Natal's maize producing areas, grazing of residues usually only starts in mid June and must be terminated by the end of September. At most, 100 grazing days are therefore possible.

In many trials in South Africa and elsewhere, in-

cluding the United States of America, animals utilize approximately 40% of maize crop residues. The fractions utilized by cattle grazing maize crop residues at Dundee shows that the grain and leaves are utilized the most.

Animal performance

In trials at the Dundee Research Station in South Africa, pregnant beef cows and different ratios of cattle (heifers) and sheep (wethers) were grazed on maize crop residues. The results of the latter trial showed that cattle alone and cattle with sheep provide a higher live mass gain per ha than grazing maize crop residues with sheep alone.

When comparing the performance of pregnant beef cows when strip- or continuous grazing maize crop residues at Dundee, the cows tended to gain live mass and body condition initially, retained this live mass and condition for up to 6 weeks (although condition score did tend to decline gradually between week 4 and week 7 of grazing), and then tended to lose weight and condition relatively rapidly at about 7 to 8 weeks of being on the residues.

The pattern for steers on the residues was similar.

The finding that body condition declined rapidly after 56 grazing days on maize crop residues has important implications for the commercial farmer. If the objective is to overwinter animals irrespective of performance, maize crop residues can be grazed for a longer period.

However, if the farmer wishes to retain cattle in good condition, then grazing should be terminated before body condition crashes, which is apt to happen when the residues are depleted.

Live mass changes of pregnant beef cows subjected to continuous and strip grazing maize crop residues for 9 weeks. Condition score changes in pregnant beef cows grazing maize crops residues for 9 weeks.

Stocking rate

From the research at Dundee, it was concluded that a practical method to calculate the correct stocking rate for cattle on maize crop residues is as follows:

1. Establish how much residue is left on the land. If a residue yield determination is not undertaken, assume that amount of residue is equal to amount of grain harvested.

2. Establish number of grazing days based on when the grain is harvested up to the time when land preparation will commence. Although 100 grazing days is theoretically possible, animal performance in the Dundee trials indicated that it would be better to assume 80 days as the upper limit for number of grazing days for wintering only and 60 days if body condition is to be retained.
3. Allow 60% wastage.
4. Calculate daily animal dry matter intake, which in the case of a cow (mature livestock equivalent i.e. a mature animal weighing 450 kg, which is more or less equal to 6 wethers weighing 45 kg each) would be 10 kg/day.
5. Calculate stocking rate.

Example:

1. 4 tons of maize grain harvested = 4 tons of residues.
2. Grazing will commence 30 June and will end 15 September = 78 grazing days (farmer wishes to overwinter only, therefore there is no

adjustment because days < 80).

3. 40% of 4 tons = 1600kg
4. Daily dry matter intake = 10 kg
5. 2.08 cows / ha (or 12.5 wethers/ha) can graze these residues for 78 days.

Cow days is first calculated by dividing the amount of dry matter by the daily intake. The stocking rate (cows/ha) is then the cow days divided by the number of grazing days.

Conclusion

Crop residues are a valuable source of animal feed and utilizing the residues by grazing is very effective in returning plant nutrients to the soil. In the USA, pigs are often used with cattle to utilize crop residues, whereas in South Africa, beef cattle alone or cattle with sheep are more commonly used. It is important to bear in mind that crop residues are low quality feeds and should therefore not be used for high producing animals like lactating cows or animals being finished for slaughter. Strategies worthy of consideration include:

- Crop residues are retained for wintering beef cows or sheep (non-lactating)

- Crops can be under-sown with companion crops to enhance nutritional value of the residues
- Supplements can be used to enhance nutritional value of the residues
- Cattle or sheep can

graze residues in addition to grazing quality pastures for a fixed period each day.

Excluding the first-mentioned strategy, little or no data is available on the best procedures to follow and for the time being, farmers will have to test

some of these possibilities for their own situations. Balancing a ration with the relevant residues as one of the ingredients, can assist in providing a starting point for such investigations.

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Economics of Goat Farming

by Milton Zhakata

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1. Economics of Goat Farming. The prize of certain goats is a subject of constant bickering on local goat market. Unconvinced, some immediately quit the idea of Goat Farming & thrilled some plunge with no due consideration whatsoever. BUT, Where is the Money.

- To start, you simply need to define the objective of your goat enterprise. This will inform the breeding systems to be deployed, hence the costs of the animals to be introduced and later the value of the products that you will sale.
- Making the above fundamental decision is

crucial. It is a different ball game altogether when you produce pure breeds (goat seed production) Vs Cross breeding to produce mainly commercial goats for meat/milk production.

2. Today, I focus on one aspect, commercial/meat Goat Farming and how to overcome the fundamental & underlying problems in the Goat Value Chain (GVC) that often prevents you from earning as much, & in the process demonstrate profitability in goat farming
3. To illustrate goat farming profitability, I will build on a simple goat COMMERCIALIZATION

process anchored on an proven #valuechain business model, which if properly executed, to a greater extent guarantees real income getting down to you as a farmer.

4. Assuming you buy and start 50 local females goats (Does) & 1 local buck. These animals will cost $[(\$40 \times 50) + (1 \times \$100) = \$2,100]$. Under normal circumstances, additional costs will be there, but minimum and manageable. Now assume all other things constant.
 - Naturally 50 Does, breeding with the local Buck and assuming a kidding rate of 1.5/ Doe/annum would produce 75 kids. These will take as much long as 2.5 -3 years to reach

maturity and a Cold Dressed Mass (CDM) of approx 20kg/goat.

If you were to do business this way, the 75 goats produced at the farm, you will either sale as live goats earning @ max $\$40 \times 75 = \$3,000$ (#AFTER 2.5 yrs min). Or add value, slaughter, resale and earn slightly more: $\$3 \times 75 \times 20 = \$4,500$. (Assuming a retail prize of $\$3/\text{kg}$).

The above scenario would seem perfect, BUT unfortunately there is a proliferation of speculative and predatory middlemen who will buy the 75 goats at ridiculously low prices ($\$15-\20) & resale themselves @ higher prices ($\$40$). The goat farmer is literally exploited.

To succeed in goat farming you must UPGRADE the 50- local goat unit in both QUALITY and QUANTITY.

This is achievable through Crossing Breeding the 50 Does with a Pure Buck to make use of "hybrid vigour"- getting kids which perform better than their parents.

- Upgrading Quality: Cross breeding 50 Does will still give you 75 kids. However these will likely have superior



growth qualities such as birth weight (approx 3kg), fast growth rate and high meat yield above 50%. This will translate to economic value.

The 75 kids will grow fast, reaching approx 15kg within (12-15 weeks) and 70-90kg in 9-12 months. For these improved goats slaughter yield of 60% is possible. Based on same assumptions, you will thus sale 75 goats with an ave. CDM of 54kg @ $\$3/\text{kg} = \$12,150$.

Upgrading QUALITY of goats, with same 50 local female goats, you are able to significantly INCREASE your income from $\$3,000$ to $\$12,000$ per production cycle & more importantly REDUCE by 50% the time you earn the income (from 2/3 years to 9-12

months).

- Upgrading QUANTITY: Upgrade your production in a way that you are able to consistently supply the required quantities at specified time intervals (e.g 25 slaughter goats/week). This is key as it helps towards building longstanding and mutually beneficial relationships.

To attain the QUANTITY aspects of the commercialization process, you must increase the breeding goat population in order to sustain harvesting of slaughter stock or at least keep it at a minimum commercialization threshold.

To achieve you either (1) buy additional Does or you (2) retain females from the 75. With kidding rate of 1.5 kids/

Doe/annum & assuming half the kids to be females, you will have approximately 87 Does on the next breeding cycle although at the expense of foregone income.

Disclaimer:

My Goat Economics is theoretical and one sided highlighting Where the Money Comes From BUT not addressing how you may loose it. You still need to do a detailed.

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The Pig production cycle

The life cycle begins with the piglets, which normally weigh 1.5-2 kg. In each birth event (farrowing), 8 to 12 piglets are born, although sows can produce litters of more than 20. Large litters have many small piglets, most of which may not survive; those that do may grow very slowly.

The piglets remain with their mother for 21 to 42 days, depending on the pig management practice of the farm. Piglets are weaned by removing the sow from the pen. Thereafter, they are fed formulated feed. After a few days of adjustment, the weaned pigs are kept in weaner pens for an additional 30 to 60 days until their weight reaches 20 kg. They are then moved into porker pens where they remain until they

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reach their market weight of 75-100 kg. The life span of a porker is anywhere from 150 to 230 days from birth to the abattoir. When slaughtered, the dress weight of the porkers is approximately 70% of live weight.

The main inputs in pig production are: breeding stock (gilts, sows, and boars); water for drinking and cleaning; feed (grains, protein supplements, minerals, and vitamins); preventive medicines and therapeutic drugs; housing and materials handling; management and husbandry; and sanitation, disinfection, and waste removal. Waste removal must be integrated with proper disposal in the environment, which

means pollution control, resource recovery, and recycling. The pig production cycle can be divided into three phases: breeding, weaning, and growing/finishing.

Breeding

Breeding involves the mating of a sow or gilt (a female pig 5-7 months old that has not been bred before) with a boar, or artificial insemination. After conception, there is a gestation period averaging 114 days, during which the pregnant sows are housed in individual gestation pens.

A week before the sow is scheduled to deliver, she is moved into an individual farrowing pen. During the farrowing period, the animal re-

....continued on page 24

In Pictures Haven Construction



....continued from page 14

quires special care and attention. The period from birth to weaning is called the lactation period. After the piglets are weaned, some of the best female weaners are kept as replacements for the sows. These animals constitute the herd of gilts.

Mating Period

The mating period lasts from the date of weaning the previous litter until the day of conception. During this time, the sow must be kept in a pen or a stall close to boars to stimulate estrus. Estrus is the cyclic period of sexual activity in female mammals. It is commonly called "heat" and is characterized by secretions, ovulation, and acceptance of the male.

The timing of the sow's first estrus after weaning varies from 5 to 40 days. The conception rate for first service is normally about 80%. The estrus cycle of the sow is 21 days. In commercial pig production, it is desirable to reduce the number of days between farrowing and conception to produce more litters per sow per year. A high proportion of the sows that are in good physical condition

will begin to come into heat 3-7 days post-weaning. Adequate boar power is essential for effective synchronization of post-weaning heat.



If a sow fails to conceive within 28 days post-weaning, the farmer will cull her. This is enough time for her to have been bred twice. With each 21-day delay, the sow must produce two extra pigs just to pay for the time and feed she has consumed. Similarly, if gilts do not conceive after being bred three times, they are culled.

Gestation Period

The gestation period ranges from 110 to 120 days; 114 days is the average. During this period, the sow should be individually confined to prevent fighting with other sows and to restrict her activity and feed consumption. Individual stalls, rather than pens, are recommended to reduce embryo loss as a result of fighting. These gestation stalls may be the same ones occupied by the sow during breeding, or they

may be located in another part of the barn. If there are separate facilities for breeding and gestating sows, then extra movement of animals is required. The choice of combined or separate breeding and gestation areas should be made by the manager when the farm is being designed.

Lactation Period

The lactation or suckling period of the sow begins when she farrows (i.e., gives birth to her litter of piglets); it ranges from 3 to 5 weeks. A long suckling period is not practiced in commercial production for economic and productivity reasons. Farrowing pens are the most expensive units to construct and, as such, need to be reused as often as possible. The nursing of large piglets weakens the sows, and thus affects their productivity and re-breeding.

Gilt Replacements

Immediately following the lactation period, old and unproductive sows are culled. These sows are replaced by young gilts. The number of gilts kept for breeding must be sufficient to replace those culled.

Because the first estrus cycle of gilts is variable, it is recommended that one gilt be kept for every three or four litters farrowed. A gilt is considered a “replacement” gilt from the time her litter mates are sold for slaughter until she is bred at about 8 months of age. Replacement gilts may be housed in group pens or in stalls in the breeding barn. In either case, they are placed near boar pens to stimulate sexual development.

Most gilts reach puberty at 5-6 months. From this period on, the gilts will periodically show signs of “heat” (i. e., will stand to be mated to a boar). The estrus cycle will stop temporarily when the gilt is pregnant and start again after the sow has been weaned from her piglets. It is best not to mate the gilt in her first two heats. During these two heats, only a small

number of eggs (ova) are produced; therefore mating would result in only a small litter. Moreover, at this stage, the gilt is still small and growing. Pregnancy might overly stress the animal, interrupt her growth, and result in difficulties in rearing the litter.

Weaning

When the suckling period is ended by removing the sow from the farrow pen, the piglets are called weaners. The demarcation between the weaner period and the grower/finisher period depends on the day of change in ration. Generally, piglets are called weaners until they reach 20 kg live weight at about 8 weeks of age.

It is customary to wean pigs from 3 to 5 weeks of age. If pigs are weaned at 3 weeks or younger they should weigh a minimum of 5 kg. Some reasons for seeking early weaning are to produce more than two litters per year from each sow; to take advantage of the high feed-conversion efficiency in young piglets; to produce heavier and more uniform grower

pigs; to save on feed



for sows because of the short lactation period; and to improve the welfare of the sow, which is neither overly stressed nor loses weight excessively during the short lactation periods. A survey in 1986 of the 10 largest commercial farms in Singapore showed that the mean weaning age was 27 days and the range was 20/30 days.

The period after weaning is the most stressful on the young piglets as they are taken away from the sow and forced to change from a milk diet to dry feed. Often, they are also moved to a new pen. The stress of feed change is lessened by starting the baby pigs on a prestarter dry

feed while they are still nursing and by continuing them on the same diet for at least 1 week before changing to the starter ration.

Most managers move the piglets from the farrowing stall to weaner pens on the day of weaning. Some producers arrange the production schedule so the piglets can remain in the farrowing stall 3-7 days after weaning to further reduce stress. If this practice is to be used, then it must be considered in the planning phase of farm development because more farrowing stalls will be required. The disadvantage of this scheme is the additional cost for farrowing stalls and the extra space they require.

Feed for weaner pigs is normally a dry mash. Weaner pigs consume a daily maximum of 0.7 kg dry feed. On large farms, mechanical conveyors can be used to move the feed to pen self-feeders.

The weaner pigs are 8-10 weeks old when they are moved to the grower pen. After the pigs are moved out, the weaner pen should be

thoroughly cleaned and left to rest for 3 or 4 days before a new batch is moved in.

Growing and Finishing (Porkers)

In commercial production, the last phase may be divided into the grower (up to 55 kg of animal live weight) and finisher stages (up to market weight). Growers are fed a ration that is high in protein; whereas fibre content is increased in the porker ration. Because growers are smaller than porkers, they require less space per pig and thus, there are economic savings in having two types of pens, but this means moving the pigs twice.

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-NZDL



Tips on How to Grow your Poultry Business

Poultry farming is profitable alright, but a lot of people still fail and incur lots of losses in this business all the same. A lot of investors have blamed themselves for going into the business.

Every business has its 'trade secrets' and a lot of people fail in business because they do not know the trade secrets of their business. Poultry, just like any other business out there has its trade secrets which you have to know to increase your chances at success.

Start Small

Don't start large scale poultry farming if you are inexperienced in the business. Don't read about how people are making millions from poultry farming and then go ahead

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to invest your life savings into the business or go and obtain loans to start a business you are inexperienced at. For a business like poultry farming, you have to start small and then expand gradually as your business grows and demand for your products increases. You should also do a proper feasibility study before you go into the business. If there are too many competitors or if the supply for poultry products exceeds the demand in your area, then look for somewhere else to start your business or look for another business to start. There are several other lucrative businesses in the livestock farming industry that you can consider.

Consider Meat Packaging And Production

A lot of people get their poultry products from grocery stores and supermarkets. Very few people still buy live animals because they feel it is less stressful when you buy already packaged meat which you can use to make your meal in few minutes. Therefore, you should really consider having your own meat production and packaging business to sell the products from your farm.

Once you have your poultry farm, starting a meat packaging company is fairly easy. Just create a space for butchering and cleaning the animals, hire butchers and buy equipment that would make the job mechanized and faster, some refrigerators and then approach food regu-

latory agencies in your area for a license and boom! You are ready to start packaging your own meat.

Have Your Own Sales Outlet

Another way to expand your poultry business is to have your own sales outlet and not rely only on supplying to retailers. You don't have to have too many sales outlets; you can start with just one. You can sell your own branded chickens and chicken parts and fresh eggs to consumers.

Offer Mobile Sales And Delivery Services

Twenty-four hours in a day is just not enough for most

of us because of the kind of busy lives we lead. Now, imagine having to cook, shop for groceries, tend to the kids and do all sort of other house chores and still maintain a 9-5 job. It's really not easy for a lot of working parents and this is why mobile sales and delivery services always work. A lot of people see such services as a life saving one; a service that brings you necessities without dealing with stress and traffic. With a van or two, you are ready to start offering such services within your area and that is also an expansion of your income.

Employ Sales Representatives

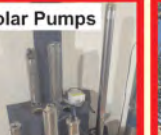
Don't think that your busi-

ness is too small to employ sales reps or that poultry business is not serious enough to have sales representatives. Right here in my office, I have someone who brings me fresh eggs weekly and frozen chicken when I feel like having chicken. She's a sales rep and earns commission for each item she sells. I have also been able to introduce her to my colleague and friends who also buy from her regularly. Now, her employer is a very smart poultry farmer because even when I buy from the grocery store, I only buy their products. Having a sales representative is a good way to increase awareness for your products and increase sales too.

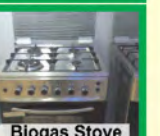


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RENEWABLE ENERGY SOLUTIONS

Have Your Own Hatchery

Instead of purchasing day old chicks, it's more cost effective to have your own hatchery for hatching new chicks. You would be able to reduce the costs of hatching and also increase output compared to outsourcing the service to other people.

Produce Your Own Feed

Another tip for growing your poultry business is to have your own feed mill for producing chicken feed. Chicken feed production is not so hard; if you can learn how to raise chickens, then you can learn how to produce chicken feed and if you are able to reduce the costs of producing feed, you would be able to increase the overall profitability of your business.

Employ Experienced Staff

Another way to grow your poultry business is to employ people who are experienced to handle the operational aspects of the business. If you have a really large poultry farm, you can employ business consultants to suggest ways through which you can expand your poultry business.

Take Stock Regularly

You should also keep an eye on the output from your farm. You should have a store where eggs are stored and have some people who would be in charge of stock keeping and counting the chickens regularly. This would help to prevent theft.

Apply For Government Grants

Agriculture is something that the government is always interested in. And that is why there are a lot of support programs for investors in the agricultural sector. Such support programs come in the form of government backed loans and grants. You should look out for such grants and apply for them.

Source - The E Hub

Notes

- For any crop, always research and secure a market before investing in production. This ensures a sustainable farm business operation that is market driven. Answers to the following questions are important: Who will buy? At what price? Where? Who will provide transport? Are there any hidden costs of selling? Can I add value to my produce? How can I best package and sell my produce?
- Get trained on production and business. The training should cover; land preparation, varieties, fertilizer requirements, management (record keeping, accounting, marketing), pests and diseases, possible problems and solutions, harvesting, storage and transportation.
- Soil quality and water available are key to successful production. Take soils for analysis and ensure you have a reliable water source.
- Visit successful and unsuccessful farms.
- Subscribe to local farmers' magazines and research more on production and business management.
- For large operations, hire an Agribusiness Consultant and an Agronomist to assist you.

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Onion Production Guide 1 Ha

Planting dates	February to April
Days to Harvest	120 to 220 days <i>depending on cultivar</i>
Harvesting duration	- Days
HARVESTING	20 - 60tons depending on variety
Soil requirements	- pH 5.0 to 6.8 - Well drained high organic matter - Soil testing is key
Seed bed	2.5 – 3 kg in a nursery seed bed - Floating seed trays can also be used - Ensure free drainage
Transplanting	8 - 10 weeks after emergence (pencil like size) - Plough, disc and harrow at 30cm depth - Apply lime (at least a month before planting) only if pH is below 5.0
Spacing	In-row: 50 - 75mm Inter-row: 300 - 350mm
Fertilizer requirements	Basal Dressing: Compound S, 1 000kgs/ ha or manure 25 to 50 tons/ha Top Dressing: Ammonium Nitrate 100kg/ha
Weed management	Grasses only / Trifluralin 48EC 1.1 - 6L/ha / Agil 100EC 0.5 - 2L/ Ha
Pests	Cut worm/ Lambda 200mls Caterpillars/ Carbaryl 85WP 400g/ Ha Thrips/ Cartap hydrochloride 400grams/100 litres of water Leaf Hoppers/ Malathion 25WP 400g/ Ha
Diseases	Alternaria/ Dithane M45 400g/ Ha Downy mildew/ Copper Oxychloride 85 WP, and Dithane M45. Purple Blotch/ Tebuconazole 25EC 150mls/100 litres of water. Dont use on spring onions Neck Rot/ Dithane m45 2kgs per hectare White Rot/ Dicloran 400grams/100 litres of water



Free monthly digital magazine discussing the business of farming

E&OE

Crop Planting Calendar (Zimbabwe)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beet Root												
Brinjal (egg plant)												
Broccoli												
Butternut												
Cabbage												
Carrots												
Cauliflower												
Chillies												
Green beans												
Green mealies												
Lettuce												
Marrow (baby)												
Onion												
Peas												
Peppers												
Potato												
Squash												
Squash (germ)												
Squash (marrow)												
Tomato												
Water melon												



Strategies for increasing smallholder farmer income

Farm Income Lab

Small holder farmers own a powerful asset, land. They have remained poor despite owning such an asset. Farmers face a lot of challenges that can be classified as pre-production, production and post production. Whilst there are no easy answers to addressing the challenge of poverty amongst small holders, increasing their incomes is one key element of the solution. A farmer's income is influenced not only by how much agricultural product they can grow, but also by the market dynamics in which they operate and the broader social, economic and political context of where they live.

The following are some of the ways which when

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adopted can be part of this much need intervention.

Access to Finance

Agricultural finance includes a broad range of financial services—e.g., loans, savings accounts, leasing arrangements, and insurance—that can be utilized for activities across the agricultural value chain from purchasing inputs, to renovating farms, to marketing crops. In this article, 'access to finance' refers to loans and savings products available for smallholder farmers.

Agro-Corridors

Agro-corridors bring together value chain actors

(including producers, processors, suppliers, and financiers) in the same geographical area so that they can leverage economies of scale to facilitate cheaper and more effective access to inputs, services, and markets. Locations of agro-corridors are often selected to take advantage of an existing backbone of transport or other physical infrastructure and lower the investment required to make them accessible to market participants.

Certification

Certification is a process in which a third party monitors and validates the compliance of farmers with a set of voluntary standards. Buyers and suppliers then recognize "certified"

....continued on page 36

PIGGERY ARTIFICIAL INSEMINATION



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Semen Prices

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Duroc	\$12
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3. AI Process
4. 2nd Pregnancy Diagnosis
5. Pre and Post Farrowing Advice

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....continued from page 34

farmers as a preferred source of higher quality and/or compliant raw material that meets an agreed-upon specification to receive premium payment. Farmers who participate may also receive technical training and other support to help them meet the certification standards.

Climate Change Adaptation

Climate change adaptation interventions help farmers adapt and build resilience to the negative effects of climate change on productivity—and, where possible, to sustainably increase productivity (i.e., in a way that minimizes further contribution to climate change). This generally involves providing financial and other support (e.g., training) to facilitate the adoption of climate-smart agricultural practices and inputs (e.g., climate-resilient seeds).

Agriculture Insurance

Agriculture insurance is a financial tool used to protect farmers against loss of crops due to natural disasters (e.g., drought, floods, blight) and pests. Farmers pay a regular fee (insurance premium) and can claim compensation in

the event of a covered disaster or incident. This reduces risk and enables farmers to make investments in their farms without worrying that they may lose the entire value of that investment.

Farmer Field Schools

Farmer field schools are a form of agricultural extension that provide smallholder farmers with advanced inputs and hands-on agronomic and technical training aimed at increasing the productivity of their farms, the quality of their produce, and, ultimately, their incomes.

Input Subsidies

Input subsidies are cash transfers to farmers – most commonly provided by governments – to enable them to purchase high-quality inputs and technologies that are unaffordable at market prices—but that could improve the productivity of their farms and the quality of their produce.

Land Tenure Security

Land tenure security programs can take many forms but all support farmers in acquiring or maintaining land through land rights education, legal assistance, and/or land redistribution or titling (that is, private individuals or families receiving formal land

rights)

Market information systems

Market information systems leverage traditional (e.g., radio, telephone) and digital (e.g., web and mobile) communication channels to provide farmers with information (e.g., prices, market sales, weather, and pest risks) so that they can make better decisions about what to plant, where to sell their produce, and what prices they can negotiate.

Outgrower Schemes & Contract Farming

Outgrower schemes (a term often used interchangeably with contract farming) represent an arrangement under which a farmer agrees to produce and sell a certain quantity of a commodity at a future date. This guarantees the farmer access to buyers and the buyer is guaranteed a reliable supply and may guarantee prices between farmers and buyers. Often, the buyer will also provide the farmer with technical (e.g., training on how best to use inputs) and financial support (e.g., loans to support the purchase of inputs).

Post-Harvest Loss Prevention

Post-harvest loss preven-

tion programs promote practices and facilitate access to technologies aimed at reducing the amount of produce lost between harvest and consumption. These range from improved packaging and stacking techniques to new infrastructure for storage and refrigerated transportation.

Poverty Graduation Programs

Poverty graduation programs are a unique bundle of services deployed in a specific sequence that are designed to lift low-income farmers out of poverty. The services typically include some combination of social assistance (e.g., cash transfers, health services), financial services, skills training, seed capital or access to employment and mentoring. Services are offered in sequence, starting with direct support to meet basic needs (e.g., cash transfer, health services, etc.), and then “graduating” to the types of support that prepare households to independently earn a consistent income (e.g., training and finance). The intervention is limited to a fixed number of years (often 2-4).

Pricing Arrangements

Pricing arrangements are aimed at shielding producers from price volatility and/or ensuring that

profit margins are fairly distributed among different actors in a value chain. These arrangements can take a number of forms, but they generally involve a guaranteed minimum price that is either set by the government or negotiated by representatives of producers, as well as premiums for meeting quality and other standards. This intervention refers to public and public-private pricing arrangements. Public interventions refer to cases in which the government sets legally binding price restrictions or requirements. Public-private interventions refer to cases in which marketing boards or other professional organizations comprised of representatives of the private sector (e.g., producers, processors, and exporters) are consulted in setting price levels.

Producer Collectives

Producer collectives are farmer organizations (e.g., farmer producer organizations, cooperatives) that enable farmers to take advantage of economies of scale and increased bargaining power to access inputs and financial services at lower prices, and/or sell to market at higher prices, than they might secure individually. These collectives are generally owned and controlled by producers and often must register with governments

in order to operate within the formal marketplace.

Productivity Enhancement

Productivity enhancement interventions provide farmers with improved agricultural technologies (e.g., improved crop varieties and seed technology) and practices (e.g., crop diversification, planting and pruning techniques and compost and manure application). The aim is to raise crop yield and productivity and/or reduce crop loss caused by pests, diseases, or drought.

Savings-Led Groups

Savings-led groups (which include self-help groups (SHGs) and savings groups) are self-managed, community-based groups that provide their members access to basic financial services. Groups of 15 to 30 self-selected individuals meet regularly, contribute savings to “capitalize” the group and then take turns borrowing for short periods (paying interest on the loans). Groups may or may not be linked to banks. In cases where SHGs are time-bound (i.e., the groups dissolve after a specified amount of time), members divide the profits among themselves at the end of the cycle.



Sugar cane Production Guide

Agribusiness Talk

Varieties

- Varieties N14, N10 and NC0376.
- Plant more than one variety to minimize losses due to pests and diseases.
- It takes 8-10 months to produce seed cane.

Climatic and Soil Requirements

- Sugar Cane is a long season crop (12 months growing cycle).
- It has a high water requirement of about 1500 mm / yr.
- It thrives well under high temperature conditions (Min.16-21°C and Opt. 27-38°C).
- Hence, bulk cultivation of the crop is in Chiredzi and Triangle.

More Information

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Planting

- Seed cane consists of cuttings with shoots (25-30 cm long) called setts.
- Setts should have at least 2 internodes and at most 3 internodes.
- Use certified seed cane to minimise systematic smut infection.
- Plant August- November.
- March and April are also suitable due to the low weed pressure characteristic of the period.
- Spacing 1.5-1.8 m inter-row and 0.6 intra-row.

- First sprinkle Triadimenol to the setts to protect against termites.
- Plant by laying setts in the furrow, cover the setts with soil.
- Overlap the setts to increasing degree of buds that germinate if there is any doubt about seed cane quality
- Spray the setts and furrow with Dieltrin solution to protect the crop from Heteronychus Beetle.
- 8-10 tonnes of seed cane are required per ha.
- Failure to germinate may be due to:

Mechanical injury of the

....continued on page 39

buds.
Chemical injury.
Poor nutritive status of the setts.
Lack of nitrogen.
Disease.
Low temperatures expose setts to decay.

Fertilizer Requirements

- Conduct soil analysis.
- Apply 200 kg/ha Muriate of Potash (MOP), 200 kg/ha Single Super Phosphate (SSP) and 150 kg/ha AN at planting.
- Put fertilisers in the furrow and cover with soil before putting the cane /setts.
- AN rate is 450 kg/ha including requirements at planting. Remainder of AN applied before the crop is 12 weeks old.
- For ratoon crops the fertiliser is applied in a band shortly after cutting.
- Blends can also be used in sugar cane production and these are a much cheaper option.
- Blend 1 : 430 kg/ha
- 2 : 620 kg/ha
- 3 : 700 kg/ha

Irrigation Requirements

Overhead and furrow irrigation are the common methods of irrigation used in production of sugarcane.

- The average water requirements, from planting to harvesting, is about 16,000m³ litres of water/ha. This requirement necessitates a peak water requirement of about 70mm a week in hot, dry periods and in winter 2-4 weeks with the same application.
- Quota system. Milling done at Triangle and Hippo Valley.
- Commercial production through contracts with millers.

Harvesting/Marketing

Cut after burning.

- Burning done at night to minimise conversion of sucrose into alcohol.
- Harvest before the onset of the rainy season for better returns.
- The time spent between burning of cane and milling should be less than 72 hours in order to minimise the loss of sucrose from the cane.
- If cane is poorly managed and the Plant Protecting Group of ZSA discovers serious pest and disease infestation the crop may be declared useless and will be ploughed out.
- At least 90 days have to be allowed between ploughing out of the cane and introduction of a new

crop.

- For every 50 tonnes of sugarcane delivered, there is automatic sampling and subsequent filtration of the juice which is done by the laboratory department of the milling companies to determine how much sucrose is in the juice.
- Generally, 12% of the cane will be sucrose, i.e. the estimated recoverable crystals will be 12% of the tonnage delivered. The farmer will be paid the remainder after milling and transport costs plus levies that might apply are deducted.
- Prices are based on sucrose content.

Yield levels (cane)

- Range from 90-120 ton/ha.



Female Force of Farming Nomhle Mliswa

- Mhangura, Mashonaland West.
- 345ha land
- PROJECTS: 175 ha Maize, 60 ha seed soya beans, 285 breeding cattle (Angus, Boran, Brahman and Tuli) cattle pen feeding, maize, 75 ha Potatoes, 150 ha wheat, 70 goats
- WHY FARMING: Farming you will never go wrong. It allows us to grow different types of crops to process, creates employment
- SUCCESS: The best thing which happened to me was getting a farm in 2007. 300 employees. Have a school for the ECDs called SummerHill
- CHALLENGES: Climate

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- change has affected us and now have to implement new conservation ways to mitigate this. Access to farming finance.
- AMBITION: Taking my farming to the next level and improve the economy. To be recognized globally and to inspire my community
- TO W.A.U: WAU never to give up. Focus is needed. Keep up the good work and keep on empowering us.
- ADVICE TO WOMEN: I encourage farmers to look at farming as a business, engage in joint venture partnerships so that you are

productive

- FEMALE FORCE OF FARMING

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The Agribusiness Expert Answers



Q

Kindly assist with market tips for fish farmers

A

The informal market

- This market is particularly useful for selling small tilapia of between 150g and 300g. There is a great market for small tilapia in informal townships, where fish are offered for sale as small, medium or large.
- Typically, fish are harvested and then transported immediately to the informal market for sale.
- These fish are whole, and often still alive, and therefore remain fresh. The customers have little access to refrigeration, so the fish are consumed on the same day.

Fish distributors

- These people collect gutted, gilled and possibly scaled fish from the farmer, and distribute them to various retail outlets. While these distributors may be hard to find, they are available countrywide.
- One of the advantages of this market is that processing is limited – packaging is very basic and often requires little more than bulk plastic bags.
- A minimum load of 100kg to 500kg is usually required at a time, and a

regular supply may be expected.

The formal market

- In this market, tilapia are processed into a value-added format that may include fillets, spiced offerings in various configurations, or even whole, cleaned fish in shrink-wrap plastic.
- A supermarket may seem like an attractive option, but its delayed payment terms and need for regular supply may make it unviable for smaller producers.
- Moreover, supermarkets are notorious for their reluctance to pay a fair price for a product
- A better option may be health food outlets or delicatessens that are attracted to the healthy pesticide- and hormone-free nature of locally farmed tilapia as a health food.

- Farmers Weekly

Word Search

S	C	D	P	O	P	U	L	A	T	I	O	N	E
I	M	A	R	K	E	T	T	L	I	M	E	C	H
P	T	H	M	U	I	B	O	Z	I	H	R	I	S
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E	E	P	F	F	I	R	O	S	N	C	S	G	P
C	A	S	H	C	R	O	P	R	S	C	S	A	Z
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POPULATION
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WEED
CASH CROP
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S	C	D	P	O	P	U	L	A	T	I	O	N	E
I	M	A	R	K	E	T	T	L	I	M	E	C	H
P	T	H	M	U	I	B	O	Z	I	H	R	I	S
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S	N	M	G	V	A	R	I	E	T	I	E	S	E

There 5 differences between these pictures. Can you spot them?

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