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37 Victoria Drive,
Newlands,
Harare

0242 782 720
0772 447 630
0782 117 840

editor@zimunda.co.zw
support@zimunda.co.zw
sales@zimunda.co.zw

ZiMUNDA FARMING

Contents

Bindu Media

OUR TEAM

PUBLISHER
Mike Garden
mikeg@softrite.co.zw
Cell: +263 772 209 162

EDITOR
Vimbai Ruvengo
editor@zimunda.co.zw
Tel: 024 278 2720
Cell: +263 782 117 840

ADVERTISING & MARKETING
Rudo Nhamoinesu
pr@softrite.co.zw
Tel: +263 772 639 304

Rutendo Nhamoinesu
rutendo@zimunda.co.zw
Tel: 024 278 2720
Cell: +263 774 923 137

DESIGN & LAYOUT
Wilbroad Ishe Bryce Mbofana
design@bindu.co.zw
Cell: +263 779 540 202

PRINTER
Paragon Printing and Packaging
17035 Cedora Road, Graniteside,
Harare
Tel: 024-2773021/7
Email: mark@entpress.co.zw

BINDU MEDIA OFFICES
37 Victoria Drive,
Newlands,Harare

Cover image – Healthy Nkone calves – image provided by George Hulme.

Are You Really Making Money?

By Rutendo Yolanda Chibanda

Farming has a lot of hustle and bustle from sunrise to beyond sunset at times. And when payments come through, it's open season sometimes allowing us to chase the next big thing that is promising huge margins. After all, has been said and done the question is 'Are you really making money?" The ability to understand and utilise Money will enhance your profitability, resilience and ability to attract funding. And before you roll your eyes, walk with me for a bit and meet Cash-flow and Profit. Similar cousins often mistaken for one another.

Ever Heard The Term - Cash Is King?

Cash flow refers to how much cash moves in and out of your operations in a specific period. It is true that cash is king because it enables you to pay for the day to day activities you need to stay in business. One of the things I have seen farmers do is continuously use money from product A to finance product B, money from product B to finance product C and so forth without understanding whether any of the products are actually making money or it's pouring water into a bucket full of holes.

How Do You Calculate Cash-Flow?

If you have multiple product lines on the farm it is best to calculate cash flows for each product. All Cash income/ inflows from that line of business less all its Cash expenses equals Negative or Positive balances. Negative occurs when expenses exceed income and Positive is when the income exceeds the expenses. Certain expenses may not be fully utilised by one line of business for example land lease costs. These will have to be divided among the various lines using things like amount of land used by that line and number of hours worked in that line. Sales Income received, expenses paid after the specific period and non-cash items like depreciation and reserves are not included. When this has been done for each line, a consolidated statement can be prepared with the headings:

Cash from Operating activities (normal business operations, family living expenses, tax paid in that specific period), **Cash from Investing** (Sale and purchase of assets, interest received) and **Cash from Financing** (Loans, Loan repayments, Interest paid, additional capital). **And Profit???**

Profit is how much money is left after you have paid all your expenses. This includes amount due to be received or paid in a specified time period. Again, if you have more than one product line, calculate profitability for each and then consolidate. Non-cash payments such as depreciation and reserves are included in the Profit calculation.

Gross profit refers to all income less the cost of producing the product excluding expenses incurred that cannot be directly linked to the acquisition/production of the product such as rent, administration, advertising etc. which still need to be paid.
Basic Net Profit/Loss is whats left over after all expenses have been deducted.

Which Is More Important

Both are important depending on what stage your operations are. For a startup without reserves cash flow is important, for a growth phase operation looking for investors profitability is a priority. You can be making losses and still operate because cash enables you to pay for daily expenses to keep doors open. It is also possible to run a profitable business that has a negative cash flow. Both positions are only possible in the short run without cash injections into the business through loans, selling shares or extra capital for the business. The best position is having both profitability and cash flow.

Til' next time.
Rutendo

Rutendo Yolanda Chibanda is an Agribusiness and Leadership Development Facilitator. Transforming Mindsets through inspiring conversations and technical Interventions. Get in touch on +263783187243, email rutendochibanda04@gmail.com. Follow her on LinkedInrutendoyolandachibanda

Non-Conventional Feed Resources in Aquaculture: Potential Uses and Limitations

Tafadzwa Maredza, Lorraine K. Salimu & Milton T Makumbe

The world is being faced by an ever-expanding food demand which is likely to accelerate soon. There are number solid reasons to believe this futuristic bloom in global food demand. According to a report by the United Nations in 2019, the global population will grow to around 8.5 billion in 2030 and 9.7 billion in 2050 from an estimated 7.7 billion people worldwide in 2019. Of the additional 2.0 billion people who may be added to the global population between 2019 and 2050, 1.05 billion (52 per cent) could be added in countries of sub-Saharan Africa. Logically, a corresponding increase in food demand in this region is expected. Since the global human population is growing at a geometric rate vis-à-vis a slower arithmetic improvement in global food productivity, the human race is faced with an ever-growing need to take imperative measures to scale up agricultural productivity with the aim of meeting the ever-expanding global food demand, hence the growing adoption of practices such as aquaculture (fish farming) as a source of valuable fish protein to augment the dwindling fish supplies from the wild (capture fisheries).

In order to intensify fish production through aquaculture, adequate nutrition would be required for attaining high fish yields. However, feed accounts for up to 60% of total production costs in aquaculture. Therefore, it is every farmer's wish to minimize feed costs as much as is sustainably permissible by utilising available feed resources. Let's now have a discerning look at these feed resources useful in providing nutrition to fish.

Main Types Of Fish Feed Resources

Fish feed can be delineated according to two main branches. Conventional and Non-conventional feed (NCFR). Conventional feed resources include a variety of feedstuffs regularly used in the formulation of fish feed. Their usage is standardized and widely acceptable. Examples include fish meal, bone meal, blood meal, soya bean meal, and maize and wheat mill products.

Contrary, NCFR refers to locally available feed stuffs that have not been traditionally used in animal feeding and/or not normally used in commercially produced rations for livestock. They are in most cases not consumed by man. In this sense, the NCFR could really be more appropriately termed "new feeds" and this term is in fact being increasingly used. Examples include feed stuffs such as kitchen waste, insect maggots, agro-industrial by-products like fruit peels and abattoir by-products, single cell proteins and water weeds.

Characteristics of NCFR

- They are the end products of production and consumption that have not been used, recycled or salvaged.
- They are mainly organic and can be in a solid, slurry or liquid form.
- Their economic value is often less than the cost of their collection and transformation for use, and consequently, they are discharged for wastes.
- The feed crops which generate valuable NCFR are excellent sources of fermentable carbohydrates, eg. Cassava and sweet potato.
- Fruit wastes such as banana peels and pineapple pulp by comparison, have sugars which are energetically very beneficial.
- Concerning the feeds of crop origin, the majority are bulky, poor quality cellulosic roughages with a high crude fibre and low nitrogen contents, suitable for feeding to ruminants and to fish at fairly very low inclusion levels or feeding rates.
- Some of the feeds have deleterious effects on fish, and very little is known about the nature of the anti-nutritional factors and corresponding economically justifiable technologies of getting rid of these nutrition vices.

Problems Facing Fish Feed Industry and the Need for NCFR

Most conventional feedstuffs used in formulating fish rations are also consumed by man. These sources, as alluded earlier, include soya bean, ground nut, and our staple crop in Zimbabwe, maize. Since these feedstuffs are required almost exclusively for human consumption there is a great competition for food between human and livestock. With 77% of maize used as food and only 12% destined for livestock feed, there has been a great shortage of conventional feed resources such as maize and soya bean. Hence, conventional feedstuffs are dwindling in supply, and escalating in their cost. In contrast, NCFR are non-competitive in terms of human consumption suggesting their great potential as alternative fish feed sources. Also, the NCFR offer a cheaper and conveniently available alternative fish feed ingredient source. It is therefore necessitous to explore the potential benefits of utilizing non-conventional feedstuffs in aquaculture production in Zimbabwe.

Since fishmeal is expensive as a feed ingredient, the use of non-conventional feedstuffs has been reported with good growth and better cost benefit values. Fish meal has been traditionally used as the main protein source in fish feed industry due to its high protein content and a balanced essential amino acid profile needed to meet the protein requirement of most fish species. Fish meal is produced by processing products of fish such as mackerel, pilchard, capelin and menhaden into a dried and coarsely ground powder. The increased demand for fish meal, coupled with a significant shortage in global fish meal production, has created a sharp competition for its use by the livestock feed industry. As a result, fish meal has become the most expensive protein source in livestock and fish feed industries in the recent years. Hence the pressing need to attempt either partial or total replacement of fish meal with less expensive and locally available non-conventional protein sources such as black soldier fly (BSF) maggots, mealworm and abattoir by-products. In Zimbabwe, conditions are most favourable for the production and scaling-up of the aforementioned feedstuffs not traditionally used in formulating fish feeds.

Climate change is another global challenge facing aquaculture industry. Therefore, as a mitigation measure, locally evaluated and proven NCFR can be developed and multiplied to adapt against drought. Examples of these include pods of indigenous legume plants such as Sickel bush/Mupangara/Ugagu (Dichrostachys cinerea) and Monkey bread/Musekesa/ihababahaba, velvet bean (Mucuna pruriens), pigeon pea (Cajanus cajan), insect maggots, earthworm, snail, tadpoles and a variety of food processing by-products. Developing a multiple range of feedstuffs can potentially mitigate the risk of drought on fish farming in the region. Furthermore, NCFR can include resources otherwise regarded as wastes. Dumped food wastes normally ferment (decompose under anaerobic conditions) leading to an increase in greenhouse gas (GHG) emissions such as methane (CH_4). Therefore, it is beneficially necessary to utilize food processing and consumption by-products as alternative feed sources of fish while providing a means of sustainably managing wastes, thereby reducing GHG emissions.

What is the Way Forward?

The Fisheries and Aquaculture Resources Production Department (FARD) is currently working on a baseline survey to unravel and inventory NCFR locally found in Zimbabwe. BSF larvae has been found to be the leading locally sourced and affordable NCFR where scientific research is being carried out to evaluate the potential and limitations of the feedstuff. Further training at farmer level through FARD is essential on the utilisation of on-farm feed formulations and the uptake of feed production. FARD is therefore key in the prior scientific investigation on farm-feed suitability and offers these services to fish farmers in as a steppingstone to locally sourced, highly productive fish feed.

Climate-Smart Practices To Mitigate Tobacco Yield Losses In a Drought Year

By Dr S. Dimbi and **Dr F. Magama**

The current weather forecasts indicate a transition into an El Niño state in the second half of 2023 and Zimbabwe is among the countries at risk of dry conditions. Considering the significant impact that water stress has on agricultural production, this article is aimed at highlighting cultural practices tobacco growers can implement to mitigate the devasting effects of the anticipated dry weather conditions.

Managing Mild Drought In Tobacco

In a normal season, transplanting of the dryland tobacco crop commences in early October. When adequate water is applied in the planting hole, this allows the crop to survive until the arrival of the rains, four to five weeks later. The plant's major growth period then commences after the rains. However, in a drought year the dry period is prolonged and the start of the major growth period that is normally triggered by good rains, will be delayed. It is important to ensure that the crop survives the extended dry period and cultural practices can markedly affect the quality of the crop. The following areas should be looked out for;

1. Land preparation

It is imperative that land preparation be done well (deep ploughing) and early (soon after the rains where possible) to conserve moisture in the soil. The land should then be kept free of weeds. When using animal drought power, ensure deep ploughing, up to 25 cm while with a tractor drawn plough, aim for a depth of up to 40-45 cm. Land preparation is also important in removing weeds that will deplete soil residual moisture that is needed for good establishment of the transplanted seedlings.

2. Quality Seed

An essential starting point for climate-smart crop production is the careful selection and use of quality seed of well-adapted varieties. Growers must therefore, ensure that they source authentic seed of approved varieties from reputable sources.

3.CULTIVAR SELECTION

3.1Drought tolerant varieties

Tobacco is naturally a hardy crop but the propensity and frequent occurrence of drought periods resulted in the development of novel genetics capable of tolerating severe drought conditions. Two varieties; KRK71 and K RK75 have a remarkable capacity to rebound and give high yields and maintain leaf quality after a debilitating drought growing season compared to others. The varieties KRK71 and K RK75 should be the varieties of choice in drought prone areas and also when drought is forecasted.

3.2 High Leaf Potential Varieties

It is recommended that in a drought year, growers select high leaf potential, slow maturing cultivars, that can withstand drought stress without bolting prematurely (before attaining 18/19 leaves). Cultivars with a low leaf potential such as K RK26R, K RK22 and K RK23 may flower early when exposed to a prolonged period of drought stress. However, when the slow maturing varieties are used, this calls for early planting, with planting hole water, and not wait for the rains as they yield well when given a long season.

3.3 Drought Escape

Alternatively, drought escape can be used as a strategy in a drought year. In the 2023/24 season, Kutsaga placed on limited release new climate proofed tobacco hybrids bred for cultivation in marginal areas. These new varieties (T78, T79, T80, and T81) were bred for a generally short growth duration that allows them to mature early and escape drought especially in situations where the crop is predicted to suffer a late-season drought stress. Early maturity also enables the reduction of total seasonal evapotranspiration because of the crop's short duration in the field.

An ideal seedling

Use disease and pest free seedlings that are uniform and healthy. For seedlings produced using the conventional system, an ideal seedling should have a stem 15-17 cm long and 6-10 mm thick. It must be well-hardened, have 8-10 leaves and must have a strong, vigorous root system. Float seedlings are generally smaller with a stem length of 10-12 cm and about 6-8 mm diameter; however, these survive better in the field because they have an intact root system that minimises transplant shock. To get the ideal seedling, plan to sow your seedbeds 90 days before the intended planting date. A well hardened seedling is paler and must pass the finger rolling test. If seedlings are not ready the best option is to delay planting until the seedlings are well hardened as the use of poor-quality seedlings in very hot, dry conditions is a recipe for disaster.

5. Beds Rather Than Ridges

Beds have the advantage that the total surface area exposed to evaporation is less that when single ridges are used. Tie-ridging or potholing should be carried out to enable any rain or added water to be retained and not lost through run-off. Avoid re-ridging during the drought period as this causes moisture to be lost from the soil.

Canopy closure of tobacco grown on beds

6. Adequate Planting Water

It is important to ensure that sufficient water is applied at planting to link up with residual moisture that had been conserved by early ploughing.

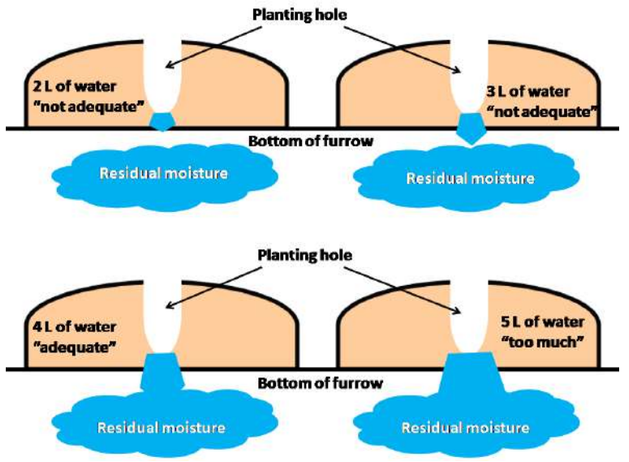


Illustration on determining the amount of water required per planting hole

6. Adequate Planting Water

It is important to ensure that sufficient water is applied at planting to link up with residual moisture that had been conserved by early ploughing.

In a season when the rains have been delayed, establishment and survival can be improved by the application of additional water in potholes made between plants on the bed or ridge, after planting. It is also recommended that this be done within two weeks of planting. This is because less water is applied after pre-watering as the soil in the planting hole is already at field capacity. Research at Kutsaga has shown that once the seedlings have taken off and have adequate moisture, they will survive for up to six weeks of dry weather without significant yield losses.

7. Proper Planting Techniques

Well planted seedlings

Ensure that seedlings are planted in the centre of the planting hole, straight down and not layered in the soil. This will ensure that the roots are placed in a zone of soil that will not dry out completely, even when rain is delayed for seven to eight weeks.

8.Delay the nitrogen top dressing

In a period when the dry conditions have been prolonged, growers must think very carefully before applying a top-dressing fertiliser to their crop. No Nitrogen either applied (through the basal) or residual will have been lost through leaching and will thus still be in the soil. It is therefore unlikely that the crop will benefit from topdressing and in most cases it will be harmful. When the rains eventually fall, the plants will make maximum use of soil nitrogen. In fact, the hotter and drier the conditions before the start of the rains, the greater the release of mineralised nitrogen The uptake of this Nitrogen will be enhanced by the fact that during the dry period, roots would have continued to grow downwards into subsoil moisture, and good root systems would have developed. However, soil mineralised nitrogen availability is higher in early ploughed lands.

Manual weeding

9. Good Weed Control

It is essential to remove weeds early and keep crops weed-free during their period of major growth in order to reduce evapotranspiration. Weeds can be managed by herbicide use or manually. If manual weeding is to be done, this must be through light scraping using a swan-neck hoe rather than by deep cultivation with a 'badza' as this exposes moist soil to the atmosphere and cause loss of soil moisture.

10.Early topping and good sucker control

Suckercide application after topping.

Plants must be topped as soon as possible, although during drought conditions the topping activity has to be carried out over an extended period as plants come into extended bud unevenly. Each plant must be topped as soon as possible after attaining the required leaf number, and this is called bud-topping. In a situation where the crop begins to grow and then becomes very water-stressed a grower must consider topping a little higher than normal to compensate for the scorched lower leaves. Additionally, good sucker control is recommended as this reduces moisture consumption.

11. Preventative Pest and Disease Management

It is a well-known fact that healthy, actively growing plants have better capacity to withstand pest infestations and disease infections than their stressed counterparts. When it is anticipated that pest and disease pressure will be high (late planting, drought stress conditions) it is important to put in place preventive measures for the management of pests and diseases. Insecticides such as imidacloprid or thiamethoxam applied in the planting hole will ensure that the crop is protected against aphid infestations. These insecticides are also effective against a wide array of soil pests such as white grubs and wire worms that if left uncontrolled will damage plant roots, further weakening the plants.
Other insecticides such as lambda-cyhalothrin and other pyrethroids for cutworm prevention must be applied around the base of each transplant immediately after transplanting, to protect against stand loss.

12. Regular Crop Monitoring

In addition to direct damage (leaf scalding), a significant secondary effect of drought is that it weakens plants and predisposes them to secondary invaders and opportunistic pests. For example, although not usually economically important on tobacco, incidences of red spider mite and scale insect infestations have been widely reported on droughted tobacco crops. It is therefore important for the grower to monitor or scout frequently and systematically for infestation by pests and apply treatments as necessary.

13. Reaping and Curing

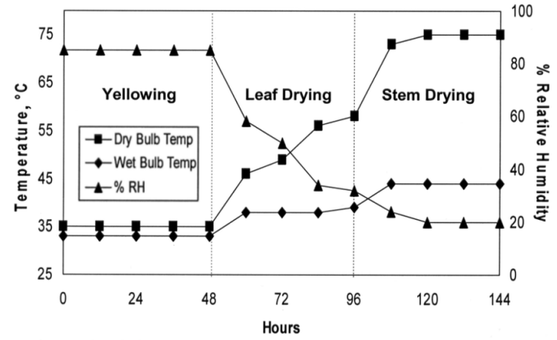
Tobacco crops exposed to severe droughts generally ripen very slowly as the less than ideal climatic conditions slow down growth and cause thickening of the leaves. These crops have high starch concentration in the leaves and relatively slow breakdown of the starch. Slow ripening crops which have been under fertilised at some stage in their growth are more prone to produce off-type tobacco (close-grained, thick, harsh natured often with a grey, slatey appearance) if the leaf from such crops is reaped before it is fully ripe and cured too fast.

13.1 Timely Reaping and Controlled Colouring

To achieve the best possible quality, the maximum possible time for starch breakdown must be allowed. This is achieved by reaping the crop ripe ensuring that reaped tobacco is removed from the field and loaded into the barn as quickly as possible to avoid the leaf from being scalded by the sun. During fire start-up, growers must avoid flash temperatures that can dry the leaf before colouring is completed as this sets an undesirable green color. It is important to keep the temperature at less than 330C for the first two days from the day of starting up the fire. During this period, relative humidity must be kept within 85-90%. This can only be achieved through suppressed ventilation (closed air supply vents) and recirculation of exhaust air in the barn depending on the barn design. It is also important to note that by the end of the colouring process, efficient curing systems must have removed at least 25% of the moisture. Failure to remove sufficient moisture during the colouring process may result in sweating of the tobacco. Therefore, controlled ventilation is supposed to commence once 75% of the leaf has coloured. Growers must make use of the dry and wet bulb thermometers or digital hygrometers to monitor relative humidity.

13.2 Managing Humidity

Humidity control can extend or shorten the coloring time and thus enable the grower to get the most desirable color. The general guide is that the closer the dry bulb temperature reading is to the wet bulb one, the higher the humidity in the barn. If the tobacco is drying too quickly then temperature must be reduced and the vents closed. Opening the vents will speed up leaf drying. If the humidity is lower than required, moisture can be applied through placing wet hessian sacks or pouring water on the barn floor. When the colouring phase is almost complete, the tobacco should have a good yellow color at the leaf tip with slight green-tinged colours running along the main stem and veins to the butt. Once the colouring phase is completed, temperature should be increased moderately at a rate of 30C every four hours. It is important to note that the curing process approach is unique for each harvest and after reaping, measures have to be taken to achieve the best leaf colour and quality based on the leaf moisture content, maturity and thickness.



Curing schedule

Kutsaga Research Kutsaga Research