

DROUGHT MANAGEMENT IN NAMIBIA:

Part I: Introduction

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1.1. What is a drought?

Drought is a period of several months or even years of abnormal dryness due to below-average rainfall that causes a pronounced decrease in forage yield relative to what is expected in an average year. Associated with the below-normal forage production are crop failures, livestock losses and severe socio-economic disruptions to humans.

Drought is a regular occurrence in the Namibian environment. Some droughts are limited to certain areas of the country, e.g. the south only. These "local" droughts are mainly due to deviations in the local weather pattern. They can occur as frequently as every two years but are of relatively short duration (part of a rainy season). Accordingly, they have a comparatively small impact on our national agriculture.

In contrast, droughts of a regional nature affect large parts of the southern African subcontinent and are mainly due to changes in global weather patterns. Not only are regional droughts more severe than local droughts, usually with a devastating effect on the agricultural sector and the Namibian economy, but they also last longer. However, they are less frequent, occurring cyclically every two to seven years. The major cause of regional droughts is the "El Niño" weather pattern that develops sporadically over the western Pacific Ocean. The importance of this phenomenon was realized only a few years ago.

Whatever the nature of a drought, it follows a certain pattern to which drought management must adapt if the farmer wants to successfully negotiate the dry spell. The central issue is to plan for reducing the risks, or minimize the damage, associated with a drought. Contingency drought planning should be a major obligation of every Namibian livestock farmer.

1.2. Aids in drought management

Firstly, early warning services are available. In the early days of weather forecasting, fortune telling was probably a more accurate predictor of drought than meteorology. But lately, due to the severe economic implications of abnormal weather around the globe, weather scientists are able to predict abnormal weather patterns quite accurately. These days, the farmer who ignores a medium- to long-term weather forecast does so at his peril. He should use the period of grace caused by early warning to prepare for a drought. If the drought should not materialize, the farm's mechanics will not be disrupted significantly. If however the drought does indeed occur, a prepared farmer will be in a much better position to survive the drought (financially speaking) than a farmer who ignored the early warnings and did not prepare for drought accordingly.

Advance management in anticipation of a drought will be discussed in the next part of this series of four.

During the dry spell, certain management practices will reduce the pressure on the natural grazing lands and on the most valuable livestock. In this phase, the aim is to aid the survival of plants and animals as far as possible. Crisis management will be discussed in the third part of this series.

The phase of acute crisis management is followed by a post-drought recovery phase for veld and livestock. The degree of recovery allowed the natural veld after a drought determines its future productivity. If veld is not allowed to recover sufficiently from the effects of drought, its condition and yield will decline quite significantly. It will be further weakened by the next drought which is sure to follow within a decade, eventually leading to irreversible veld deterioration. Similarly, livestock recovers after a drought by increasing in number, i.e. herd rebuilding, but this can only happen in synchronization with veld recovery. This will be discussed in the last article.

The indigenous people of Namibia and its early commercial farmers knew that Namibia was a dry land and adjusted their farming practices accordingly. Livestock production at the beginning of this century was practised with long-term survival as leading motive. As Namibia became more developed and westernized, this long-term mindset was exchanged for the short-term aim of profit-making, at the expense of sustainability. It is ironic that our forefathers knew how to survive in this arid land while the modern generation, in their haste to reap a profit from the land and make "progress", increasingly fall prey to the age-old cycle of droughts in Namibia, degrade the natural range and endanger our survival.

DROUGHT MANAGEMENT IN NAMIBIA:

Part II: Anticipatory management

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2.1. Strategic advance management in anticipation of a drought

A drought that strikes a prepared farmer is a drought that will bring less loss and fear than expected. In order to prepare himself properly for an anticipated drought, the farmer has to be strategically prepared for it. The best way to prepare for a severe, long drought is to practice survival during a shorter, less serious drought.

Advance management to reduce the negative impact of a drought includes flexible herd composition which allows rapid emergency sales of less valuable livestock (destocking), building a cash reserve to pay for crisis drought management, long-term conservative stocking of natural rangelands and establishing a fodder bank in good years in anticipation of the bad years.

2.2. Heeding early warnings by meteorologists

Weather can be predicted, however unreliably, by meteorologists. It is a fast-developing science and as the scientists begin understanding local and global weather patterns better, so the accuracy of weather forecasting improves. Phenomena like El Niño, which causes most of the "large" droughts in southern Africa, are by now understood fairly well. Its area of occurrence, the western Pacific Ocean, is monitored continuously to detect the beginning of a cycle and the reach, extent and severity of the phenomenon can be forecast with great accuracy from oceanic and atmospheric pressure and temperature gradients.

For example, meteorologists forecast one of the most severe and longest droughts in human memory for southern Africa, starting early in 1998, based on the extremely severe gradients measured in this year's El Niño. The Namibian farmers would do well to heed this forecast and prepare for a drought. If this drought does not occur as predicted, the farmer will nevertheless be prepared for the next one, which is sure to come.

According to climate impact predictions of Prof. Mark Jury of the University of Zululand, RSA, this year's El Niño will result in a normal to wet early rainy season with northern Namibia receiving up to 27% more rainfall than average. However, the late rainy season, which usually brings more than three-quarters of our total rainfall, will be considerably drier than normal. It will be accompanied by very hot temperatures which will escalate the effects of drought on natural range.

This is exactly the danger of drought: a wet "small" rainy season will make many farmers feel safe and prepare for a bumper season. When the real drought strikes in the "big" rainy season, these farmers will be devastated. That is what makes forecast interpretation a very personal affair.

2.3. Increasing the flexibility of herd composition

The first thing farmers should do in anticipation of a drought is to reduce the number of livestock on their farm so as to reduce grazing pressure on the veld and use the already-produced feed on their veld sparingly. This would stretch the available feed supply and give the farmer a period of grace in which to prepare other drought-management measures. But which animals to get rid of first?

In general, farmers are reluctant to reduce the number of breeding stock in their herd because breeding stock produce offspring which are converted into money. Also, breeding stock is selected stock and is probably genetically superior to other stock. In other words, breeding stock is normally the most valuable type of livestock on a farm and is usually reduced at a very late stage of a drought, if at all.

The least valuable type of livestock are "fillers", e.g. young stock still growing out, animals close to marketable condition, castrated animals, old and sickly animals, etc. However, in an average herd, the number of fillers is generally too small to have a significant veld-sparing effect when they are culled. In an average herd, filler stock makes up 10 - 15% of the total carrying capacity. Their number is flexible and the farmer is normally not opposed to get rid of them quickly.

No research has been done on the ideally flexible herd. It is estimated that if grazing pressure on the natural veld could be reduced by one-third before or at the onset of a drought, this would have the greatest veld- and feed-sparing effect with the least negative impact on the reproductive potential of the herd. The important principle here is that, **in drought-prone Namibia, it is more important to be flexible and survive the drought rather than to maximize short-term profit by farming with a very inflexible herd** consisting predominantly of breeding stock.

Due to the frequent occurrence of droughts in Namibia, it is therefore recommended that **Namibian farmers adjust their herd composition so that at most two-thirds of the carrying capacity of the farm is associated with the breeding herd, whilst the remaining one-third of carrying capacity is utilized by filler animals that can rapidly be disposed of in the event of a drought.** For optimum drought preparedness, Namibian farmers have to actively and aggressively increase the proportion of filler livestock of their herd.

This is a radical departure from modern livestock husbandry practice. To increase profit, most livestock farmers maximize the proportion of breeding stock in their herd, but to increase the chances of surviving a drought financially, a farmer should optimize rather than maximize the number of breeding stock. This would increase his destocking ability in an emergency. For example, if the total carrying capacity of a farm is 750 LSU, the ideal herd should consist of 500 breeding LSU and 250 filler LSU.

Filler stock consists of all livestock not used for breeding, e.g. weaned offspring from the breeding herd and castrates. Their number is supplemented until it reaches the required proportion (one-third of carrying capacity) by purchasing young animals (weaners) that still have to grow out on veld until they are marketable, i.e. they are acquired by speculation. When a drought strikes before the fillers have reached a marketable stage, they must nevertheless be sold immediately to reduce grazing pressure on the veld. Emergency sale of filler stock should realise a profit for the farmer as the animals sold are young and in prime condition. Every farmer should

have about one-third of his herd consist of speculative slaughter stock, whose numbers are adjusted annually according to the condition and productivity of his natural veld.

Breeding stock consists of all quality female animals as well as their unweaned young, immature females kept for replacement purposes and the male animals needed to mate with the females. Of all farmers, pedigree stock breeders are the least flexible to destock, since their herd consists predominantly of valuable breeding animals not readily sold even in a drought. It will take some effort to convince pedigree breeders to keep speculation slaughter stock, as "speculation" is often still a dirty word in Namibia. However, it is the only profitable way in which a farmer can reduce his herd size in anticipation of a drought.

If all farmers were to follow this advice, where would all the young filler stock come from? Probably from regions not affected or less seriously affected by the current drought. Secondly, weaners can be acquired from the many farmers that specialize in weaner production. A grazier can produce meat cheaper than a feedlot and can therefore compete with large feedlot buyers as far as purchase prices are concerned.

2.4. Accumulating financial reserves

Income obtained from the emergency sale of filler animals in anticipation of a drought should be saved strictly for other drought management measures such as buying emergency feed or the herd re-building phase after the drought. This will require enormous self-discipline by the farmer, who will have to resist the temptation of spending the money now on a new luxury car rather than saving it for other, less glamorous but more vital drought-related expenses.

To increase the flexibility of the herd by increasing the proportion of fillers by speculative purchases requires money. Where else to get this money from the money obtained by selling the previous fillers? The difference between the realised income from the sale of fillers and the expected expense of purchasing new fillers is available for other drought-related expenses such as buying emergency feed etc. Care should be taken to save enough money to cover the cost of re-stocking after the drought.

This, in essence, is the art of speculation: to cover the expected future cost from current income (profit) by anticipating future demand and prices. There is nothing dirty, illegal or immoral about it. In fact, it is probably one of the most important measures that can save a Namibian farmer's skin in the event of a drought. Commercial businesses are built on speculation and farming today is a business.

2.5. Conservative long-term stocking of rangelands

Dry spells and intense grazing pressure work together to cause deteriorating rangeland conditions. This effect can be alleviated by applying conservative grazing pressure to the veld. The carrying capacity of Namibia's savanna varies every year according to climatic conditions and grazing history. A farmer therefore needs to adjust his livestock numbers annually as well, to adapt to changing veld productivity.

The standard commercial farming system in Namibia is inflexible and concentrates livestock on range by fences and watering points. Too often the number of livestock on a farm depends on carrying capacities determined several decades ago. The system aggravates the effect of overstocking (controllable) on the effect of periodic droughts (uncontrollable). It needs to be counteracted by applying lighter-than-possible grazing pressure to the veld and give it a chance to survive under hostile conditions. This approach will not earn the farmer a lot of profit over the short term, but it will keep him and his heirs in business for a long time. It is not as altruistic as might seem, because it ensures the farmer's long-term survival. It will require a paradigm shift from Namibian farmers to adjust to this truism.

2.6. Building a fodder bank

A fodder bank is an accumulation of feed to be used as emergency feed in times of scarcity. The principle is to preserve surplus feed produced in times of plenty; and to purchase emergency feed in times of need, when the unit price is lower than in times of need. The preservation method and the type of feed purchased depends on the purpose and specific intent for which the feed is acquired. The size of the fodder bank must increase with the aridity of the land.

2.6.1. Reserve grazing:

In Namibia, the most convenient and ecologically sensible fodder bank is to leave 15 - 30% of the farm ungrazed for a growing season, resulting in the accumulation of a large amount of readily-available feed. In the arid savannas of Namibia, palatability of this accumulated veld grazing remains high throughout the storage period. The grazing reserve can be utilized as soon as the regular veld grazing starts to run out. It has a significant buffering effect on inter-seasonal variation in carrying capacity.

The size of the grazing reserve varies according to the aridity of the area: the dry southern regions of Namibia need a reserve of 25 - 30% of the farm, while 15 - 20% will do in the more productive northern regions. If the rested parts of a farm are rotated systematically across the farm area, this practice will also contribute to veld recovery.

This system is a simulation of the natural utilization of savannas by wild game animals, which trekked from recently grazed, newly denuded areas to fresh grazing grounds, often following the rain. It also approximates nomadic pastoralism, a system of livestock husbandry superbly suited to harsh and variable African conditions. Many of Africa's indigenous people were originally nomadic pastoralists, living in harmony with nature's cycles and a large number of wild game animals, before accepting modern sedentary lifestyles, which resulted in increasing habitat destruction, wildlife extermination and erosion.

Modern agricultural policy recommends a return to "transhumance" and "tracking pulses in range productivity" instead of nomadic pastoralism. The basic principle is the same: the temporary evacuation of drought-stricken range in favour of reserve grazing somewhere else, before returning to the evacuated range as soon as it has recovered. The Western land tenure system, with its emphasis on fixed property, seems an ill-adapted form of land use in arid rangelands because it does not offer reserve grazing or areas of shelter from droughts. It is ironic that until fairly recently Namibia did have a system of state-owned areas of emergency grazing available to farmers in times of drought, but that this system became "superfluous" with increasing commercialisation of livestock production and the overbearing dominance of the profit motive.

2.6.2. Drought-resistant fodder crops:

A relatively cheap fodder bank is provided by planting drought-resistant fodder crops in convenient places on the farm. Pure stands of xerophytic plants such as Atriplex (saltbush), Opuntia (spineless cactus) and Agave (Mexican aloe) can be established on bare or infertile soil or spread around the farm. Such plantations should be fenced, supplied with watering points and pruned regularly in good years so as not to grow out of reach of grazing livestock. After establishment, these plants do not need any more water than natural rainfall to supply a large quantity of feed of acceptable quality.

In times of drought, livestock can utilize these plantations as a sole source of roughage or preferably in addition to some veld grazing. The plantations can also be harvested mechanically and the feed supplied to penned animals. Some metabolic disturbances occur when these plants serve as only feed to ruminants. Appropriate feeding techniques are known to local farmers. If 10% of a farm is planted to drought-resistant fodder crops, it will significantly add to the farmer's ability to survive the average drought.

2.6.3. Cultivated pastures:

Every farm should have an area of cultivated grass pasture from which to make hay for use in droughts. In the very arid areas of the south, it will probably not pay the farmer to actually cultivate the soil and establish new grasses. It is sufficient to debush a naturally occurring area of high-potential grassland (e.g. vlei or leegteveld), protect it from grazing, apply some fertilizer opportunistically in wet seasons and harvest the grass at the end of summer. Even with just 150 mm of rain/year, such pastures are able to produce about than 3 t/ha of quality grass hay. Obviously, the most suited grasses are indigenous climax grasses such as Antheophora pubescens, Cenchrus ciliaris, Stipagrostis uniplumis, etc. established in mixed stands. About 5% of a farm's area would supply sufficient grass hay to carry the farmer over most droughts.

In more productive savannas of northern Namibia, this system could be intensified by establishing traditional cultivated pastures of indigenous grasses and, if supplementary irrigation is available, even legumes such as lucerne. Depending on circumstances, such pastures could yield up to 10 t/ha. When the fodder bank has exceeded its recommended size, the surplus fodder can be sold to meet cash expenses associated with pasture cultivation and harvesting.

It is also worthwhile to harvest the naturally-occurring grasses in the road reserve. These strips of veld next to each fenced road in Namibia used to serve as wayfeed for trekking animals in the past, when state-owned reserve grazing was still available. Since hardly anyone still treks in modern Namibia, these strips can be cleared of bush, rocks and other obstacles to harvesting and utilized by the farmer not for extra grazing, but for building a hay bank for times of drought. At the same time, well-managed road reserves are effective fire breaks that protect the bordering farmlands during the dry season, when wildfires occur.

All these measures need to be taken well in advance of a drought. In fact, they should not aimed at any particular drought, but rather be an integral part of a flexible Namibian's way of farming in our harsh and variable environment.

DROUGHT MANAGEMENT IN NAMIBIA:

Part III: Drought crisis management

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The reaction of the farmer to the drought should be connected to the intensity of the drought. For example, the first thing a drought-stricken farmer should do is to destock, but the extent depends on the intensity and duration of the drought.

3.1. Destocking grazing livestock

A farmer must progressively reduce the numbers of livestock on his farm during a drought, starting with easy-to-dispense filler animals. This should be done even before the effect of the drought causes deteriorating grazing conditions. Getting rid of filler animals should reduce the farm's stocking rate from 100% utilization to about 65%. The farmer will most probably obtain reasonable prices for his filler animals, as he will be selling at an early stage when the majority of farmers still cling to their livestock in the hope of better climatic conditions.

If the drought persists and the remaining livestock's condition deteriorates, it is time to sell animals from the breeding herd. The farmer should see this positively; as an opportunity to get rid of all unproductive or below-average animals from his breeding herd, thereby raising the herd's standard. Sub-standard animals are bound to occur in even the best-managed breeding herd. Obvious candidates for emergency sales are surplus males, old females, females that emerged barren from the last mating opportunity, animals with an undesirable phenotype, etc. Selling enough breeding animals to reduce the stocking rate a further 10% to 55% utilization does not affect the ability of the remaining breeding animals to rebuild the herd in future.

The next breeding animals to be disposed of are weaned or about-to-be weaned young stock, all female replacements and about half the number of breeding males, since less males are now required to mate with the reduced number of females. This should reduce the stocking rate to 40 - 45% of the norm, which is probably the minimum required for herd rebuilding. Further reductions in animal numbers will make the enterprise infeasible.

Livestock should preferably not be supplemented with fodder bank feed while the herd still contains a sizeable proportion of animals due to be sold soon. This is wasteful since the farmer loses the veld grazing consumed by the animals before they are sold, he loses the reserve feed fed to these animals before their sale and eventually he also loses the animals themselves when he sells them. Supplementary feeding of fodder bank feed on the veld should be limited to core animals that will not be sold. Before that stage is reached, veld grazing should be conserved by destocking rather than supplementation.

3.2. Pen-feeding of nucleus herd

Should veld grazing deteriorate further despite destocking, there is no other option than to completely withdraw the remaining animals from the veld. They must be placed on kraal and receive full drought feed, without any grazing. The fodder bank will be used at this stage, probably supplemented with a few essential feedstuffs bought in well ahead of the drought. Pen-feeding must be restricted to the core or nucleus herd, i.e. stock that will not be sold, as it is extremely expensive and unprofitable. No sick, old or unworthy animal should be pen-fed. These must be sold before the remainder, which should be the most valuable and indispensable animals, are fed on kraal.

Pen-feeding should be exactly that: animals fed in a pen. Not in a small camp or some spare piece of veld, because it will be destroyed by the intensive husbandry practised. Special care must be taken to address intestinal parasites and certain contagious diseases which might become a problem in livestock unaccustomed to intensive conditions, after consulting the local veterinarian.

Income realised from the emergency sale of breeding stock will probably be low in comparison to the prices realized from the advance sale of filler animals, because the drought is in an advanced stage and every farmer wants to sell. Furthermore, breeding stock will probably be sold in a poor body condition. It is therefore essential to restrict this income for the purchase of emergency drought feed, as it will be the last income in a long time. For those few fortunate enough to have surplus veld, this is an ideal opportunity to acquire quality animals cheaply.

The pen-fed nucleus herd should not be allowed to reproduce, as their survival is at stake. This is not the time to stress their metabolism by requiring reproduction. Apart from farm-made hay, the most popular home-mixed drought feed that has proven itself in Namibia is so-called "chocolate maize", i.e. alkali-treated grain. It can be fed as an only feed for up to four weeks at a rate of 0,8% of body mass. If sufficient roughage is available, the amount of grain can be halved while hay is supplied at 1 kg/sheep/d or 3 kg/cattle/d. Livestock must be adjusted to this diet gradually to prevent losses from metabolic disorders.

3.3. Utilizing drought-resistant fodder crops

An alternative to pen-feeding the nucleus herd is to utilize the plantations of fodder crops by direct grazing / browsing or feeding-out of harvested material. These plants can be used as only feed for an extended period of time, although certain complications may arise. Succulents such as Opuntia may give rise to scouring, but this does not seem to have any negative residual effect on the animals. Halophytes such as Atriplex should preferably not be fed to pregnant animals while good-quality drinking water should be available at all times. If a farmer can afford it, he can supplement his livestock with "chocolate maize". This would enable the animals to complete their gestation or lactation. Preferably, animals should not be mated as success under these stressful conditions will be low anyway.

A lot has been written on drought-feeding of livestock on kraal and information about this subject is readily available. Namibian farmers know how to get through a drought, but in general their advance planning needs work while drought aftercare is often neglected.

DROUGHT MANAGEMENT IN NAMIBIA:

Part IV: Drought aftercare

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When the drought is broken by the resumption of the next rainy season, the two most important aims of the farmer are to allow his veld to recover its productivity while gradually increasing his livestock numbers (restocking). These actions will ensure the long-term sustainability of the farming enterprise. If veld recovery does not take place, restocking with grazing livestock is impossible, except at the expense of veld productivity. Veld degradation and, in an arid environment such as Namibia, desertification will occur.

Often, the effect of a drought is really only felt in the year following the drought. A drought following a good rain year (e.g. the predicted 1998 drought following upon a wet 1996/97 season) does not seem to effect range productivity immediately, as the soil is still well supplied with moisture and the grass is dense. However, in the year following the actual drought, any soil moisture reserves will have been depleted and the grazing used up. This delayed effect of drought makes appropriate aftercare even more essential.

A generation ago, Namibian farms were larger than they are now. Subdivision of farms to enable each son to inherit a piece of the family farm are the surest way to get rid of the family farm. A small farm does not offer the flexibility and grazing reserves necessary to survive a drought and to maintain the potential of the veld. The criterion for determining the size of an economic farming unit should not be the income potential of the farm in good years, but whether the farm is big enough to give the owner enough scope to survive an average drought. The measures needed to recover the potential of veld and livestock demand large farms or large tracts of reserve grazing in communal areas.

A drought lasting as long as the one in the 1980's can break anyone's resolve, but it is inconceivable that farmers should depend on Government assistance after merely one or two years of drought. After all, droughts are an integral part of the Namibian farming scene. A farmer who is unable to survive a "small" drought should be allowed to sink rather than be kept afloat by subsidies, probably at the expense of his most precious resource, his natural veld.

4.1. Veld recovery

Allowing natural veld the time to recover is vital to its ability to recover. Natural veld takes a lot of strain during a drought and many plants, especially grasses, may die. Species composition of grasses changes as well, with hardier but less productive grasses taking the place of more productive, but drought-sensitive species. Tufts of perennial grasses become smaller and less viable during a drought. It is essential that the veld receives sufficient rest so that these changes can be reversed.

The duration of the rest depends on many local circumstances, but in general, veld should not be grazed until the grasses have reached seeding stage. The initial stocking rate should be

adapted to the veld's weakened condition and the priority aim of veld recovery. Restocking should happen more gradually than veld recovery, in fact, restocking should follow veld recovery, not vice versa.

Colonization of bare ground by bush seedlings will be a post-drought problem in many Namibian veld types. Browsers may be utilized to control colonization by invasive species while allowing the herbaceous layer to recover its vitality. While browsers like goats should be a part of any livestock enterprise in most Namibian veld types, they do have a specific role in drought aftercare by bridging the gap in income between the end of the drought and restocking with grazing livestock (sheep and cattle).

4.2. Livestock restocking

Apart from the fact that it will take the herd some time to recover to its original size, the veld is in no condition to sustain a greatly increased number of grazing livestock right away. The farmer should use the natural rate of increase of his herd and the judicious purchase of filler livestock to manipulate his stocking rate in such a way that veld recovery is facilitated. If a farmer cut his herd to 40% of its pre-drought size, it will take two to three mating seasons to reach 100% herd size again. Such progressive restocking will probably allow simultaneous recovery of veld condition and productivity.

If the impression gained after reading this series of articles is that natural veld is the primary concern during dry spells, it is absolutely correct. While veld as such does not earn any money, it is the foundation of livestock production in Namibia and the farmer who does not take care of his veld will not stay in animal production long.

Caution must be applied when deliberately expanding livestock numbers in years of abundant rainfall. This is a grave danger, as farmers are more inclined to cling to recently purchased livestock and therefore sacrifice their ability to react quickly to the next drought. If the herd is expanded rapidly, its composition needs to remain flexible so that destocking can occur as rapidly as restocking.

The Namibian livestock farmer must remember that he lives in an environment in which droughts are a natural and frequent occurrence. If he wants to remain in business, he needs to recognize this fact, incorporate it in his planning and be more flexible in his management, especially in terms of livestock numbers and herd composition.