



# Zero-grazing of improved cattle breeds using drought-tolerant fodder in Uganda

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<b>Country of first practice</b>	Uganda
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<b>Sustainable Development Goals</b>	No poverty, zero hunger, decent work and economic growth and life on the land

## Summary

This technology describes how improved cattle breeds can benefit from an alternative grazing system, namely zero-grazing. In a zero-grazing system, the cattle are usually kept in the farm and the fodder is brought to them. Improved breeds are more productive and resistant to diseases which make them more efficient for the zero-grazing system, and in Uganda, breeds are fed with drought tolerant fodder to ensure cattle feed is also available in dry seasons.

This good practice contributes to increase productivity and enhance the resilience of cattle raising to dry regions and diseases in Uganda.

## Description

Zero grazing is a system where the cattle are usually kept in the farm and farmers bring the feed and water to the animals. Due to reduced communal grazing land, zero-grazing has become a common livestock management practice in most areas of south-western Uganda.

The aim of a zero-grazing system is to maximize the efficiency and sustainability of livestock production by improving animal productivity while reducing the number

of animals. For this reason, zero-grazing is usually practiced only with high-yielding improved breeds. With good planning, many dairy animals can be kept on a relatively small piece of land, making this system suitable in areas where a farmer owns a limited amount of land for grazing. Under zero-grazing, individual attention in terms of feeding is possible as the cattle do not spend energy searching for food. Zero-grazing also makes disease and vector control easier.

Figure 1: Drought tolerant forage



## 1. Benefits of Zero-grazing systems

Zero-grazing Zero-grazing is considered as an adaptation option because of the following:



# Climate Change Adaptation and Disaster Risk Reduction

- The availability of pasture could become limited due to climate change, leading to a shortage of food for animals during droughts. Zero grazing could address this risk as farmers can save natural fodder resources and store fodder.
- Zero-grazing helps in reducing animal pressure on the land such as overgrazing eventually leading to desertification.
- Zero-grazing limits the spread of disease among animals because they are less clustered around watering points.
- Easier manure collection from the farm or enclosures where the cattle are kept, which can be used for crops and lower the costs and labour needed in applying manure.

Figure 2: Cow enclosure collecting urine to make liquid manure



## 2. Constituent parts of a zero-grazing system

The unit of zero-grazing has three major parts:

- the feeding and rest area;
- the exercise area; and
- the manure collection area.

## 2.1 Elements for an effective zero-grazing system

To have an effective zero-grazing unit, the following elements should be taken into account.

### 2.1.1 Safety

A good dairy animal is a costly investment which should be secured. This can be ensured by an appropriate selection of the unit location.

Locating the unit close to farm houses will contribute to security. When choosing the location also take into account the wind direction to make sure that the wind can carry away the dung smell.

### 2.1.2 Ventilation

Good ventilation is recommended for a healthy animal respiratory system and adds to the comfort, which is crucial for maximal milk production.

Ventilation is also important to regulate the temperature and avoid stress to animals caused by high temperatures.

### 2.1.3 Isolation

Different animals are kept separated into different units to avoid injuries resulting from fights and mounting, to control breeding and avoid spread of diseases.

### 2.1.4 Maintenance

Regular maintenance of the floor and the roof ensures that the floor does not develop holes that can injure the livestock and the roof does not leak when it rains.

With good management a cow will typically eat between 75 and 100 kg of fresh grass per day which equates to 14-16 kg of dry matter per cow per day.

For a 100 cow herd this would mean that approximately 0.75 ha (1.9 acres) would



need to be harvested each day to ensure a dry matter intake of 15 kg per head per day.

### 3. Success Story

In one community, a farmer had four improved breed cows for which he built enclosures such as the one presented in Figure 2. Building such an enclosure costs around UGX 700 000 to UGX 800 000.

The enclosure allowed the farmer to collect cow urine and make his own liquid manure. The farmer received support and training to implement his production system.

### 4. Cost-Benefit Analysis of the Practice

The performance of improved cattle breeds raised with zero-grazing and drought tolerant fodder was assessed at farm-level in Uganda.

The net benefits obtained from the good practice were measured through a cost-benefit analysis (CBA), and compared to the net benefits of the local practice which was free ranging local cattle breeds.

#### 4.1 Good practice

Improved cattle breeds in a zero grazing production system with drought resistant fodder.

#### 4.2 Local practice

Free ranging local cattle breeds.

The CBA calculates the cumulative net benefits obtained from an average farm with 10 cattle over a period of 11 years (10 percent discount rate), as well as the benefit-cost ratio (BCR), which is the ratio between total discounted benefits and total discounted costs over the appraisal period.

Figure 5 provides an overview of the outcome of the CBA. In particular, it shows that:

- In farms affected by dry spells and diseases, the cumulative net benefits of improved practice are about one and a half times higher than those of the local practice.
- The BCR of the good practice (2.92) is higher than the BCR of the local practice (2.85), meaning that the good practice brings greater benefits relative to costs, as compared to the local practice.

The assessment was conducted in farms that were affected by dry spell and diseases during the monitoring period (June to September 2016). The additional costs associated with the cultivation of improved fodder (as opposed to free range) as well as the capital costs of building livestock sheds and fodder storage facilities are more than compensated by the increase in

Figure 3: Drought tolerant forage cultivation

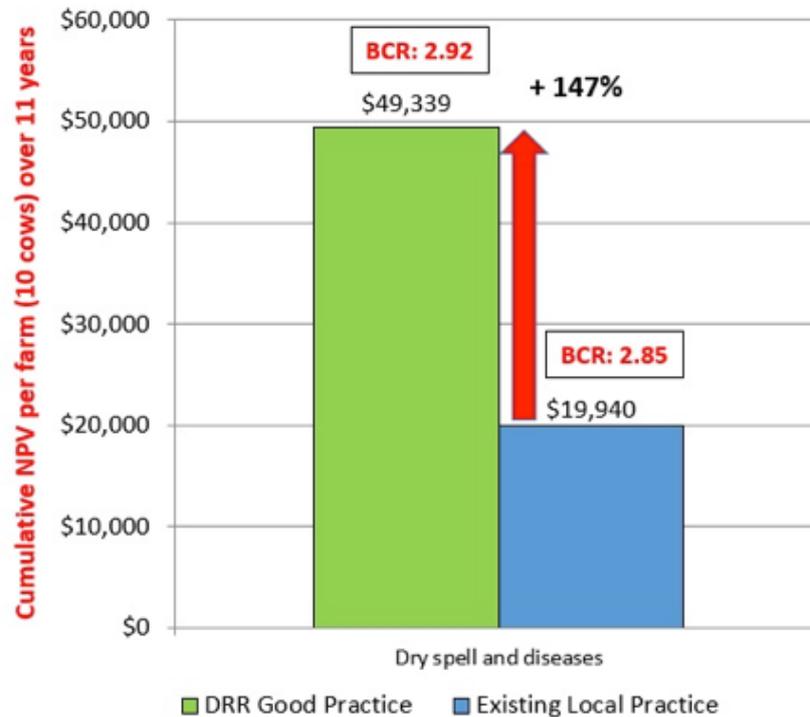


Figure 4: Drought tolerant forage cultivation





Figure 5: Cumulative Net Benefits and Benefit Cost Ratios (BCR) of improved cattle breeds raised with zero-grazing and drought tolerant fodder (USD per farm per season)



Source: FAO/TECA

profits from increased milk production. The benefits of the good practice may be even higher if accounting the potential profits derived from additional land available after the introduction of zero grazing. Indeed, the additional land could be used for other income generating activities, including for crop production.

## 5. Effectiveness and benefits

### 5.1 Climate Change Adaptation related benefits

In a context of climate change, pastures could become less available in the near future, which is why cutting and storing fodder for animals could be a way to adapt to climate change.

Zero-grazing helps reduce animal pressure on the land and limit the spread of disease amongst animals, a risk that could increase with climate change. Easier manure

collection because of enclosures could also help reduce soil fertility loss induced by climate change.

### 5.2 Socio-economic and ecological benefits

The free grazing livestock often damage crops also in neighbouring farms, and this is a major cause of conflict. Zero-grazing allows to have less pressure on the crops and on reduce land conflict. In addition, enclosures make it easier to collect manure which can be used for sustaining soil fertility in cropland.

Other goals are to improve household income, reduce expenditure on pests and disease management through livestock isolation from other animals, and to reduce labour by cutting and storing fodder for use over a period instead of grazing in distant pastures daily. Increased manure collection and application increases crop yields.



Advantages of zero-grazing systems are the following:

- Exposure to parasites and diseases vectors is reduced.
- Manure is easily collected and distributed in the farm enhancing soil fertility.
- Better control on breeding and animal health.
- Milk yield in dry season tripled after introducing this good practice, from 100 liters to 300 liters per cow.

## 6. Synergies

Other adaptation options that would create the most synergies with zero-grazing are:

- Fodder banks;
- organic fertilizers; and
- planting of fodder trees s.a. calliandra, albizia, where possible.

## 7. General recommendations

Technical and financial support should be provided to allow farmers to acquire and properly manage zero-grazing cows. Zero-grazing cows should be integrated in the whole production of the farm so that feed can be provided easily at no additional costs.

In terms of minimal requirement to be able to establish such a zero-grazing system:

- Should a farmer have available for fodder production a minimal amount of land? i.e. if he does not have a certain amount of land, the system is not sustainable as he cannot produce the necessary fodder for the animals?
- Should the farm have guaranteed access to a certain amount of water for cows to drink?
- Other elements that are essential for the successful implementation of such zero grazing system?

## 8. Validation of the practice

### 8.1 Hazard context during monitoring period

During the 2016 dry season (June to September), the performance of this good practice package was monitored in 13 farms in Kiboga (4), Mubende (2), Sembabule (2), Nakaseke (4), and Nakasongola (1) districts. All the farms were affected by dry spell during the monitoring period. In particular, rainfall was between 50-100 percent below normal in August, and land surface temperatures were 3 to 7 °C above average, causing a reduction in water availability.

### 8.2 Farmers' perception

Seven of the farmers who were interviewed all reported that they would replicate the good practice (i.e. raising improved cattle breed in confinement and produce drought tolerant fodder to feed the cattle) in the coming seasons since it increases climate resilience, leading to higher profits. Farmers assigned a score of 4.6 out of 5 to the performance of the good practice towards dry spell and disease. Some of the farmers, however, raised concerns regarding the high investment required to start the good practice, such as the costs of clearing land for pasture growing.

## 9. Minimum requirements for the successful implementation of the practice

### 9.1 Major costs are

- One hired worker: 160 000 UGX per month.
- Construction of forage storage facility. Average cost per average farm (10 cows) is UGX 3.5 million.
- Construction of a zero-grazing unit for an average farm (10 cows): UGX 750 000.
- Average price of improved cattle breed: UGX 2.25 million per cow.



- Cost of producing forage: UGX 175 per kg of fresh grass, or about UGX 26 million per average farm (10 cows).
- Price of fresh forage: UGX 400 per kg, or about UGX 60 million per average farm (10 cows) (This cost can be avoided when farmers grow their own fodder on their farms).

### **9.2 Major barriers are**

There were not many farmers adopting zero-grazing in the visited district of Uganda as improved breed are very expensive and less resistant. The main barrier against zero-grazing is the additional cost of not only purchasing a “zero grazer” but also the running costs associated with cutting the grass along with the additional slurry which will have to be spread as a result of housing the herd over the summer.

### **10. Agro-ecological Zone**

Tropics, warm

### **11. Country of first practice**

Uganda

### **12. Objectives fulfilled by this technology**

- Labour-saving technology
- Resource use efficiency
- Pro-poor technology