



# Dairy ranching for beef and milk

10/25/2018

## Small scale Dairy ranching for the resource poor sector in South Africa

Industry Sector: Cattle And Small Stock

Research Focus Area: The Economics Of Red Meat Consumption And Production In South Africa

Research Institute: Agricultural Research Council – Animal Production Institute

Researcher: Dr. Susanna Maria Grobler PhD

### The Research Team

Title	Initials	Surname	Highest Qualification
Prof	MM	Scholtz	DSc
Ms	V	Leesburg	MSc (USDA)

Year Of Completion : 2018

### Aims Of The Project

- To generate results from a dairy ranching system that can be used by existing and new emerging cattle farmers.
- To benchmark the system of dairy ranching for the resource poor sector in comparison with a small scale dairy production and an ordinary beef cattle suckler (weaner calf) system.
- To do on station characterization and benchmarking of different cattle genotypes for suitability to be utilized in systems of dairy ranching.
- To measure the levels of methane emission between the different genotypes

### Executive Summary

Dairy ranching is defined as the practice of keeping cows of relatively low milk yield, who are parted from their calves in the evenings, milked out in the morning, and spend the day with their calves at foot while the cows are usually not milked in the evening.

The objectives of the study was firstly to generate results from a project that imitate Dairy ranching that can be used by existing and new emerging cattle farmers; secondly to benchmark the system of Dairy ranching for the resource poor sector in comparison with small-scale dairy production and an ordinary weaner system; thirdly to do on station characterization and benchmarking of different cattle genotypes for suitability to be utilized in a Dairy ranching system; and fourthly to measure the levels of methane emission between the different genotypes.

The project commenced with five purebred heifers each of the Bonsmara, Brahman, Nguni and Red Poll breed. The small-scale dairy at Roodeplaat, was used to produce milk from Jersey cows grazing natural veld under small-scale conditions with limited resources. The weigh-suckle-weigh technique was used to estimate milk production from all breeds except the Jerseys, which was milked daily.

When comparing the different breeds, the Nguni cows followed by the Brahman cows showed the highest potential income from a weaner production system. In the Dairy ranching system, the dual-purpose Red Poll cows had the highest potential income. The Jersey cows milked in a conventional dairy system potential income reduced by 24% when cows were milked once per day instead of twice per day. The Dairy ranching system produced the highest potential income compared to the weaner production system and conventional dairy milking once per day. The conventional dairy produced the highest potential income when milked twice daily.

With funding from rural development, another ARC-API project “Dairy value chain”, established small-scale milk production units in rural areas in Limpopo, KwaZulu-Natal and Eastern Cape by making use of the Dairy ranching project’s principles after the Dairy ranching project’s promising preliminary results. These small-scale farmers are producing milk now successfully for the past three years.

Understanding the differences in enteric methane production from cattle in different production systems is important for the productivity in the different sectors and for developing mitigation strategies in respect of the contribution of agricultural activities to methane emissions.

In the first study methane production was measured from, Bonsmara, Nguni and Jersey heifers, grazing natural sour veld, forage sorghum under irrigation, oats pasture under irrigation and a total mixed ration (TMR) were significant differences were found between breeds and feed sources. It was also found that individual animals emitted higher or lower quantities of methane irrespective of the feed source. The second study evaluated methane production from pregnant Bonsmara-, Brahman-, Jersey-, Nguni- and Red Poll heifers grazing natural veld and forage Sorghum under irrigation. Bonsmara heifers produced the highest amount of methane and the Jerseys produced the lowest amount of methane on both the natural veld and forage Sorghum.

## POPULAR ARTICLE

The smallholder milk producers in South Africa have their own constraints ranging from poor access to support services, lower productivity, limited access to market outlets and low capital reserves. These farmers have the opportunity to make use of a dairy ranching system with lowered liabilities in relation to intensive milk production systems. This includes less infrastructure, lower production costs and relative resilience to rising feed prices.

Methane is one of the major anthropogenic greenhouse gasses, second only to carbon dioxide in its impact on climate change. Understanding the differences in enteric methane production from cattle in different production systems is not only important for the productivity in the different sectors, but also for developing mitigation strategies in respect of the contribution of agricultural activities to methane emissions.

Dairy Ranching can be defined as the practice of keeping cows of relatively low milk yield, who are parted from their calves in the evenings, milked out in the morning, and spend the day with their calves at foot while the cows are usually not milked in the evening. Beef cattle can be a viable option for small-scale farmers to complement other farm enterprises, such as milk production. In tropical countries, making use of the calf to stimulate milking is a popular practice and it was reported that this system is adopted by 95% of 289 farms surveyed in the State of Minas Gerais, Brazil. Advantage of this restricted suckling system include a reduction in milk let-down problems and improved milk production under good nutritional regimes, reduce stress in both cows and calves and the efficiency of milk utilization is higher in calves that are suckled than when they take the same amount of milk from a bucket. Other benefits of suckling calves in relation to bucket fed calves are a reduced incidence of diarrhoea and the elimination of naval suckling. Udder health and the incidence of mastitis also decrease with suckling due to small-scale farmers not being able to milk the cows from time to time due to labour and other personal constraints. When compared to a conventional dairy system, Dairy Ranching has lower input costs, labour requirements and limited infrastructure is needed. It is also the perfect opportunity to add value to small-scale beef production enterprises. Dairy Ranching development in the rural-based, small farmer-oriented cattle industry can therefore increase productivity, raise income, promote self-reliance, reduce malnutrition and therefore improve standard of living.

The ARC-API conducted a trial funded by RMRD-SA to firstly generate results from a project that imitate dairy ranching that can be used by existing and new emerging cattle farmers; secondly to benchmark the system of Dairy Ranching for the resource poor sector in comparison with small-scale dairy production and an ordinary beef cattle suckler (weaner calf) system; thirdly to do on station characterization and benchmarking of different cattle genotypes for suitability to be utilized in systems of dairy ranching; and fourthly to measure the levels of methane emission between the different genotypes measured with a Laser Methane Detector. Purebred Bonsmara, Brahman, Nguni and Red Poll heifers were used to represent a weaner production system and dairy ranching system. Jersey cattle was milked from natural veld in a small-scale dairy at the ARC-API Roodeplaat campus, with limited infrastructure and resources to represent a small-scale rural dairy production system. The weigh suckle weigh technique was used to estimate milk production from all breeds except the Jerseys which was milked daily.

When a small-scale farm has the carrying capacity to sustain 25 large stock units (LSU), the amount of animals that can be sustained on the farm will differ between breeds with different frame sizes and different weights. Therefore, results obtained from the project was converted to simulate a farm with the capacity to sustain 25 LSU which included 15 Bonsmara, 16 Brahman, 20 Nguni, 21 Red Poll and 21 Jersey cows.

When comparing these different breeds in different production systems, the Nguni cows followed by the Brahman cows showed the highest potential income from a weaner production system. In the Dairy Ranching system, the dual-purpose Red Poll cows showed the highest potential income. The Jersey cows milked in a conventional dairy system potential income reduced by 24% when cows were milked once per day instead of twice per day. The conventional dairy produced a higher potential income than a weaner production system from 25 large stock units but less than the Dairy Ranching system, even when compared to pure beef breeds being used for milk production.

With funding from the Department of rural development and land reform's REID project, another ARC-API project "Dairy value chain" established small-scale milk production units within the resource poor sector in rural areas in Limpopo, KwaZulu-Natal and Eastern Cape as one of the project's objectives. The uncomplicated, economical small-scale Dairy Ranching unit, showed promising results at Roodeplaat, which inspired the coordinator of the "Dairy value chain" project to implement the principles at the newly established small-scale milk production units in the mentioned three provinces. These small-scale farmers received pregnant heifers in 2013/2014. They are producing milk now successfully for the past two/three years with cows already in their second lactation.

The methane production trial evaluated methane production (g/day) from the pregnant Bonsmara-, Brahman-, Jersey-, Nguni- and Red Poll heifers grazing natural veld and forage Sorghum under irrigation.

The methane production was much higher when grazing natural veld (164.8g/day) than grazing forage Sorghum (130.4g/day). The tannin content in Sorghum may have contributed to lower methane production as tannin content reduce enteric methane production. A significant difference was found between different breeds methane concentration ( $P=0.0692$ ). The large frame Bonsmara and Brahman cows produced the highest amount of methane, 159.6g/day and 170.5g/day respectively. The small frame Red Poll and Jersey cows produced the lowest amount of methane, 139.4g/day and 119.9g/day respectively. Methane production is linked to body weight and from this study, it is clear that small frame animals produce less methane than medium frame animals

From this study, it is clear that Dairy Ranching is a viable strategy to increase income, add value, increase cash flow, competitiveness and long-term survival of rural smallholder cattle farmers.

***Please contact the Primary Researcher if you need a copy of the comprehensive report of this project – Dr Grobler on [mgrobler@arc.agric.za](mailto:mgrobler@arc.agric.za)***

- Cattle and Small Stock, Red Meat Consumption
- ◆ 2018, ARC, ARC-API, CSS, Grobler, Online
- < Evaluation of methane measuring techniques
- > Karoo Predator Project

## DEADLINES for RESEARCHERS 2021

Proposals for 2021: TBC

Progress reports: 28 Jan 21

Final reports: 29 Jan 21 Final includes comprehensive report and popular article

## COMMITTEE MEETINGS for 2021

RMRDSA CSS Planning - TBC

Project Committee - TBC

Pork Planning - TBC



## Calendar

<span style="float: left;">&lt;</span> <span style="float: right;">&gt;</span> <b>Apr 2021</b>						
Sun	Mon	Tue	Wed	Tur	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

## **PORK Priority Areas**

### **Cattle & Small Stock Programmes**

#### **1 Sustainable natural resource utilisation**

#### **2 Improvement of Livestock production and forage**

#### **3 Management of agricultural risk to create a resilient Red Meat sector**

#### **4 Sustainable health and welfare for the Red Meat sector**

#### **5 Enhancement of production and processing of Animal Products**

#### **6 Consumer and market development of the Red Meat sector**

#### **7 Commercialisation of the emerging sector**

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