



Karoo Predator Project

10/26/2018

Karoo Predator Project Management Survey

Industry Sector: Cattle And Small Stock

Research Focus Area: Predation Management

Research Institute: University Of Cape Town

Researcher: Beatrice Conradie

The Research Team

Title	Initials	Surname	Highest Qualification
Robertson	N	Nattrass	D Phil
Prof	J	Piesse	PhD

Year Of Completion : 2018

Aims Of The Project

- Conduct an extra wave of the panel survey
- Study the productivity of the sheep performance system
- Analyse the effectiveness of predator control
- Work towards integrating the science and the management data

Executive Summary

The Karoo Predator Project was established in November 2011. Farm management data were collected in four waves (Nov 2012, Sept 2014, Oct 2015, Oct 2016). Analysis of this rich dataset is question-driven and is designed to learn as much as possible about the performance of the farming system. This work has been supported by two RMRDSA contracts (signed 12 November 2014 and 30 June 2016, Pretoria). This report covers all work conducted between January 2016 and July 2018. My main collaborators in this period were profs Nicoli Nattrass on human-wildlife conflict and Jenifer Piesse on farm productivity and farmer attitudes. Students and other colleagues were involved in specific papers.

Survey design and analytical approach

Wave 4 of the Karoo Management Survey was collected in November 2016 on the 2015 production season. This wave of the survey produced 55 useable responses which increased the number of observations in the panel dataset to 255. The three-wave dataset consisting of n = 200 observations was released for analysis in early 2016, and has been used since then to:

- calculate a new estimate for predation losses for the Karoo
- model culling effectiveness

- estimate a stochastic frontier with inefficiency model which identifies opportunities for commercialisation
- investigate the effect of grazing conditions on farm performance
- model the structure of farmers' risk perceptions
- investigate the effect of information searching behaviour on farm performance

This list adds two outcomes to the original list of three analytical aims. Paper 3 is still under review at the *South African Journal of Agricultural Extension*, but was enthusiastically welcomed at the South African Society for Agricultural Extension's June conference in East London and has since been shared with various producer and government stakeholder groups. Paper 4 is in the final review stage for special edition on the Karoo of the *African Journal of Range and Forage Science*.

The four-wave panel, released at the beginning of 2018, is currently being analysed by two honours students who are studying:

- the stability of Karoo farmers' risk perceptions, and
- the effect of the 2016 drought on farm productivity

All papers in this series broadly share the same analytical strategy namely the quantitative analysis of questionnaire survey data. Methods depend on the question at hand and include descriptive statistics, principal component analysis, k-means clustering, OLS modelling, data envelopment analysis, and error components and technical efficiency effects stochastic frontier analysis.

A new estimate of predation losses for the Karoo

This analysis updates Van Niekerk's estimate for the Karoo, which for the purpose of the study was defined as the Central Karoo, Cacadu, Pixley Ka Seme and Namakwa district municipalities.

According to Van Niekerk (2010) small stock farmers in the Karoo loses 13 thousand adult sheep, 393 thousand weaners and 517 thousand newborn lambs to predators every year. Since the latter figure is largely an impression, this category of potential losses was not considered in the Karoo Management Survey. Its estimates for predation losses in the Karoo is therefore much lower at 6700 adult sheep and 278 thousand weaner lambs. These figures represent a cost of approximately R278 thousand per year in current prices. When the same calculation is applied to both datasets, the predation figures for the Central Karoo converge on 5% (4.85% in 2008 and 4.7% for the period 2012-2014). This suggests that farmers were providing consistent estimates irrespective of the interview period or the timing of the survey.

A model of culling effectiveness

Models were specified to investigate the effect on livestock losses of culling predators. Farmers cull predators in response to livestock losses, and those who depend more on farming tend to cull more. Predator control however is probably counterproductive as culling is associated with greater subsequent livestock losses. This finding is robust to the inclusion of a set of socio-economic variables and farm characteristics. It is also consistent with ecological models which hypothesises that culling can create vacancies for dispersing juveniles to move into resulting in greater livestock losses later. The results of paired t-tests conducted across waves 1 and 3 of the panel revealed a great degree of churn in the use and perceived effectiveness of lethal and non-lethal methods which means that nobody has come up with a lasting solution yet. Given jackals' ability to adapt to new control methods, a lasting solution probably does not exist even in principle. Much higher rates of poison use were reported in Wave 3, which is a concern because poison use is illegal, although it might simply reflect higher levels of disclosure rather than a change in practices. A model of the likelihood of using poison shows that poison is used by younger farmers and by people who experience large losses. Lambing in pens close to the homestead did not matter. Another specification showed that farmers who believe that minor carnivores such as African wildcats, black eagles and crows were a problem too, were more likely to resort to poison, than farmers who were willing to accommodate this wildlife. This variable however lost statistical significance when socioeconomic controls were added to the model.

The key success factors in Karoo agriculture

To investigate the question of effective commercialisation, production data from commercial operations were used to benchmark farming in extensive grazing areas. The inputs in the technical efficiency effects model were stock sheep, labour, feed and animal remedies and fuel. The functional form was Cobb Douglas and the inefficiency model contained management experience, a dummy variable for a Grootfontein diploma and a dummy variable to indicate fulltime or parttime farming. The farm

characteristics considered were size, grazing conditions, a dummy variable to indicate flexibility and breed type.

The exercise revealed that every fifth commercial farmer in the sample is less than 50% efficient and therefore is as much in need of extension as any smallholder might be. Experience is an important determinant of performance and could be developed in the smallholder sector through appropriate vocational training. A commercial farmer needs at least eleven years of managerial experience to move from the bottom to the middle productivity cohort and a Grootfontein diploma adds eight percentage points to mean efficiency compared to any other configuration of education. Introducing a fiber component (wool, mohair) increases productivity by 13 percentage points. Sheep farming is amenable to smallholder production, because it can be done successfully on a part-time basis. The grazing index was significant but carried the incorrect sign. If all six farm and farmer characteristics identified in the model are set at the optimal levels a farm's predicted level of productivity rises by 50%, which if incorporated in extension programs will substantially enhance the Black Farmers' Commercialisation Programme's chances of success.

The drought

The effect of grazing conditions on productivity was pursued further in stochastic frontier error components model. Results show that during the period 2012-2014, which was a good year followed by two normal seasons, the best farmers were able to maintain productivity at around 93%, while the bottom third producers suffered serious productivity declines. Several bottom-third producers dropped out of wool and mutton production even before the drought started, while many more are expected to have failed since due to the drought.

Risk perceptions

Waves 1 and 4 collected Likert scale data on farmers' risk perceptions. Principal component analysis uncovered the structure of farmers' risk perceptions. In round 1 the top threats were predators and rising input costs and the main components of farmers risk perceptions were institutional, market-related, rural safety and security and the environment. The environmental risk component combined drought and predators. OLS models explained individual risk scores with profitability, share of income from farming and key demographic variables. Profitability and income diversification lowers risk perceptions. More experience and education were generally risk mitigating too. Farm size and the amount of time spent the veld explained environmental risk perceptions.

A second round of risk data, collected during a politically more turbulent and drier period, revealed stable risk perceptions. Four new sources of risk were added in round 2, including weather weirding (a technical term to describe perceived departures from typical conditions), politics, fracking and uranium mining and prospecting. On the longer list, farmers bundled together market risk with regulatory and political risk, which show that risk perceptions are rapidly updated as new threats emerge. Predators were dropped from environmental risk which now focusses on drought / climate change.

Productivity and information searching behaviour

Wave 1 productivity scores (Conradie and Piesse, 2015, *Agrekon*) were correlated to farmers information searching behaviour on the topics of rangeland management, animal husbandry and predator management. For information on rangeland management farmers still turn to the retired FSD extension agent who is a fellow farmer. For animal husbandry information they rely mainly on breeders and buyers and the representatives of input suppliers and for predator management Niel Viljoen in the preferred source. Farmers do not think that the government has any experience in this domain. A preference for private sources of information correspond to higher levels of productivity than the use of public sources.

POPULAR ARTICLE

To follow soon

Please contact the Primary Researcher if you need a copy of the comprehensive report of this project – Beatrice Conradie on beatrice.conradie@uct.ac.za

- ◆ 2018, Conradie, CSS, Online, UCT
- < Dairy ranching for beef and milk
- > Marker detection in beef cattle II

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

< Apr 2021 >						
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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