

# New strategies to control worms in goat keepers' herds

RIU

## Validated RNRRS Output.

Researchers working in South Africa have produced a range of information that will help producers and extension workers to identify and treat the effects of worm infestation in goats. Currently, heavy worm loads greatly reduce the number of kids that goats produce, as well as the number that live to be weaned. This badly affects the livelihoods of resource-poor farmers. Using simple techniques to identify and treat animals with worm-caused anaemia is one option that has already been shown to work. The project has also produced, tested, and revised a goat keepers' health care manual and booklets to help producers deal with worms in their goats, sheep and cattle.

Project Ref: **AHP06:**

Topic: **2. Better Lives for Livestock Keepers: Improved Livestock & Fodder**

Lead Organisation: **Onderstepoort Veterinary Institute, South Africa**

Source: **Animal Health Programme**

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## Document Contents:

[Description](#), [Validation](#), [Current Situation](#), [Current Promotion](#), [Impacts on Poverty](#), [Environmental Impact](#),

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## Description

**AHP06**

## Research into Use

NR International  
Park House  
Bradbourne Lane  
Aylesford  
Kent  
ME20 6SN  
UK

## Geographical regions included:

[Eastern Africa](#), [South Africa](#), [Southern Africa](#),

## Target Audiences for this content:

[Livestock farmers](#),

**A. Description of the research output(s)****1. Working title of output or cluster of outputs.**

*In addition, you are free to suggest a shorter more imaginative working title/acronym of 20 words or less.*

Control of worms in goats in southern Africa: Development and dissemination of strategies for controlling nematodes in goats

**2. Name of relevant RNRRS Programme(s) commissioning supporting research and also indicate other funding sources, if applicable.**

Animal Health Programme  
Agricultural Research Council, South Africa  
British Council

**3. Provide relevant R numbers (and/or programme development/dissemination reference numbers covering supporting research) along with the institutional partners (with individual contact persons (if appropriate)) involved in the project activities. As with the question above, this is primarily to allow for the legacy of the RNRRS to be acknowledged during the RIUP activities.**

R8151 Onderstepoort Veterinary Institute, South Africa; The University of Edinburgh, UK; Department of Agriculture and Environmental Affairs, KwaZulu-Natal, South Africa; Krecek and Krecek CC, South Africa

**4. Describe the RNRRS output or cluster of outputs being proposed and when was it produced? (max. 400 words). This requires a clear and concise description of the output(s) and the problem the output(s) aimed to address. Please incorporate and highlight (in bold) key words that would/could be used to select your output when held in a database.**

Resource-poor farmers of south-western KwaZulu-Natal Province, South Africa, had complained of **poor reproductive performance** in their **goats**, which suffered from **dry-season** (winter) feed scarcity and **worm** infections. There was a need for general **information on goat health and basic management**. The use of **urea-molasses block supplementation, tactical** and **symptomatic anthelmintic treatment** (by means of the **FAMACHA**® system) on gastrointestinal nematode infection and goat productivity was assessed.

1. The project obtained quantitative data on the effectiveness of urea-molasses block supplementation combined with tactical and/or symptomatic anthelmintic treatment of gastrointestinal nematode infections of goats maintained under different management systems.
2. The project has produced, tested and revised an information package on goat health. This comprises a *Goatkeepers' Animal Health Care Manual* and complementary booklet on *Worms in Your Goats, Sheep and Cattle*.
3. The project has disseminated the results of the project and general information on goat health

widely and improved the knowledge levels and attitudes of the target institutions.

4. The project provided training to researchers, research technicians and extension staff in carrying out on-farm research and technology dissemination.

5. What is the type of output(s) being described here?

Please tick one or more of the following options.

Product	Technology	Service	Process or Methodology	Policy	Other Please specify
X	X				

6. What is the main commodity (ies) upon which the output(s) focussed? Could this output be applied to other commodities, if so, please comment.

Live goats (meat). The aim was to improve reproductive performance (which means more kids born, suckled and weaned) and prevent mortalities (which is effectively protecting livestock assets). Alleviation of dry season feed scarcity is a problem in all grazing animals in communal areas of southern Africa, including goats, sheep, cattle, horses and donkeys. The effects of using urea-molasses supplementation in the studies conducted as part of R8151 under on-farm conditions were equivocal. However, tactical and symptomatic anthelmintic treatments of the goats were shown to be beneficial in terms of improving the numbers of kids suckled per doe. Such treatment strategies could also be applied to sheep in these areas. Symptomatic treatment of the animals was further evaluated and was done by means of the FAMACHA<sup>©</sup> system which is a method of comparing the colour of the mucous membranes of the eye of the sheep and goat with the colours on a card. Animals scored in the pale categories are treated for anaemia caused by the nematode *Haemonchus contortus* (wireworm). This symptomatic treatment may also be used in milk goats. Work is ongoing in Kenya to assess the use of the chart in sheep in areas where two other groups of anaemia-causing parasites, trypanosomes and liver flukes (*Fasciola* spp.), occur together with wireworm. There have been initial studies on the evaluation of the card as a potential test for anaemia in cattle suffering from trypanosomosis. The packaging of general information on animal health in a format that is easily understood and applied by farmers is a process that should be carried out for other species.

7. What production system(s) does/could the output(s) focus upon?

Please tick one or more of the following options. Leave blank if not applicable

Semi-Arid	High potential	Hillsides	Forest-Agriculture	Peri-urban	Land water	Tropical moist forest	Cross-cutting
X							

8. What farming system(s) does the output(s) focus upon?

Please tick one or more of the following options (see Annex B for definitions).

Leave blank if not applicable

<b>Smallholder rainfed humid</b>	<b>Irrigated</b>	<b>Wetland rice based</b>	<b>Smallholder rainfed highland</b>	<b>Smallholder rainfed dry/cold</b>	<b>Dualistic</b>	<b>Coastal artisanal fishing</b>
				X	X	

9. How could value be added to the output or additional constraints faced by poor people addressed by clustering this output with research outputs from other sources (RNRRS and non RNRRS)? (**max. 300 words**).

Please specify what other outputs your output(s) could be clustered. At this point you should make reference to the circulated list of RNRRS outputs for which proformas are currently being prepared.

Validated outputs of Project R8151 on the use of strategies to control worms in goats are complementary to work done on the use of tannins in small ruminants as anthelmintics (Project R7424) as well as work done on Project R7351 to improve the productivity of goats through the feeding of tree pods. A joint proforma is being prepared for these two projects. Two publications developed as part of Project ZC0304 are also relevant in this context: *Technical Manual for Worm Management in Small Ruminants* and *Management of Anthelmintic Resistance in Gastrointestinal Nematodes of Small Ruminants*.

The aims followed in packaging the information into the *Goatkeepers' Animal Health Care Manual* are complementary to those for the development of the *Livestock Guru* (Project ZC0262) and the series of booklets about *Wambui* (Project R7425). The goatkeepers' manual serves as an easy reference for the individual goat-keeping household and its neighbours for answers about goat diseases and management problems; the kiosks developed as part of the *Livestock Guru* serve a community role when based at a central location in a village and allow a wide range of questions to be posed; while the *Wambui* books are particularly suited to school children who are learning about agricultural production. The information developed is also complementary to the information on the *Smallstock toolbox* (ZC0243).

The project could also be clustered with project R7597 – *A decision support tool for bovine diseases in Africa*. Work done on this project to develop low-cost decision support tools for the diagnosis of endemic bovine infectious disease could be used as a template for the development of similar support tools for goat diseases. This would be complementary to the FAMACHA<sup>®</sup> card already in use. Also, a manual that comprises information about the most important cattle diseases and effectively tested with farmers would be useful for further reading and in conjunction with the decision support tools. In southern Africa, farmers often keep goats and cattle, or may aspire to keep cattle if only keeping goats at present.

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## Validation

**B. Validation of the research output(s)****10. How** were the output(s) validated and **who** validated them?

Please provide brief description of method(s) used and consider application, replication, adaptation and/or adoption in the context of any partner organisation and user groups involved. In addressing the "who" component detail which group(s) did the validation e.g. end users, intermediary organisation, government department, aid organisation, private company etc... This section should also be used to detail, if applicable, to which social group, gender, income category the validation was applied and any increases in productivity observed during validation (**max. 500 words**).

The outputs were validated on-station and on-farm by means of experimental research. The on-farm work was participative with nine farmers making their goat herds available for the on-farm experiment, which was carried out over a period of two years. There were 4 female and 5 male moderately poor farmers. Researchers and technical staff from Onderstepoort Veterinary Institute and KwaZulu-Natal Department of Agriculture and Environmental Affairs visited the farmers at 4-weekly visits to collect samples from the animals and to provide information to the farmers. Information for the *Goatkeepers' Animal Health Care Manual* was tested with the broader farming community in a number of information sessions. There were indications that there was an increase in the number of kids suckled per doe as a result of the interventions.

**11. Where and when** have the output(s) been validated?

Please indicate the places(s) and country(ies), any particular social group targeted and also indicate in which production system and farming system, using the options provided in questions 7 and 8 respectively, above (**max 300 words**).

The validation was carried out during 2002-2006 (experimental on-farm animal research: 2004-2005) with moderately poor black Zulu farmers in the Bulwer area (specifically the villages of Nkwezela, Hlafuna and Njobokazi), KwaZulu-Natal, South Africa in a semi-arid smallholder rainfed dry/cold production system. This system is interspersed between large-scale commercial white-owned farming areas.

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**Current Situation****C. Current situation****12. How and by whom** are the outputs currently being used? Please give a brief description (**max. 250 words**).

There is evidence of uptake of the information and FAMACHA<sup>©</sup> technology by the participating farmers who expressed a willingness to train others, by the KwaZulu-Natal Department of

Agriculture and Environmental Affairs who have adopted the FAMACHA<sup>®</sup> technology and are training further extension officers and farmers in the use of this system and by the use of the *Goatkeepers' Animal Health Care Manual* in training programmes of non-governmental organizations.

13. **Where** are the outputs currently being used? As with Question 11 please indicate place(s) and countries where the outputs are being used (**max. 250 words**).

The outputs are mainly being used in KwaZulu-Natal and Eastern Cape Provinces, South Africa, however, numerous requests for the *Goatkeepers' Animal Health Care Manual* and the booklet on *Worms in Your Goats, Sheep and Cattle* have been received from other provinces of South Africa as well as countries in eastern and southern Africa.

14. **What is the scale of current use?** Indicating how quickly use was established and whether usage is still spreading (**max 250 words**).

Figures are not available for the use of the FAMACHA<sup>®</sup> system although anecdotal evidence suggests that its use is spreading steadily. Approximately 1500 *Goatkeepers' Animal Health Care Manuals* have been distributed, while requests for it continue to be received. Use of the manual was very quickly established as it proved very popular with farmers and extension-type personnel who work with farmers.

15. **In your experience what programmes, platforms, policy, institutional structures exist that have assisted with the promotion and/or adoption of the output(s) proposed here and in terms of capacity strengthening what do you see as the key facts of success?** (**max 350 words**).

- An on-farm research approach which is followed by the Farming Systems Research Section, Department of Agriculture and Environmental Affairs, KwaZulu-Natal Province, South Africa.
- Structures within the Department of Agriculture and Environmental Affairs, KwaZulu-Natal Province, South Africa.
- Structures within the Agricultural Research Council, South Africa, and a strong emphasis within the Council to assist resource-poor farmers.
- Yearly workshops (Tanzania 2002, Kenya 2003, Uganda 2004, South Africa 2005) of the DFID Livestock Production Programme Link Project R7998.
- Private and non-governmental organisations such as Scientific Roets (Pty) Ltd and Heifer Project International South Africa and Uganda.
- Media such as *Nufarmer and African Entrepreneur*, a local newspaper aimed especially at the resource-poor farmer.

Keys facts of success: working as a multidisciplinary group comprising of researchers, technicians and farmers dedicated to assisting the resource-poor farmer to improve his/her livelihood. Regular meetings between the parties greatly facilitated the work. The contacts and linked formed between farmers, technicians and researchers greatly contributed to an improvement in service delivery to farmers.

## Current Promotion

### D. Current promotion/uptake pathways

16. **Where** is promotion currently taking place? Please indicate for each country specified detail what promotion is taking place, by whom and indicate the scale of current promotion (**max 200 words**).

Promotion is taking place as part of broader programmes of the KwaZulu-Natal Department of Agriculture and Environmental Affairs, Pietermaritzburg, South Africa and non-governmental organizations such as Heifer Project International South Africa, Durban, South Africa. This specifically involves the training of farmers on an *ad hoc* basis in the use of the FAMACHA<sup>®</sup> system. The *Goatkeepers' Animal Health Care Manuals* and booklets on *Worms in Your Goats, Sheep and Cattle* are being distributed by organisations such as KwaZulu-Natal Department of Agriculture and Environmental Affairs and Heifer Project International South Africa in KwaZulu-Natal Province, and Scientific Roets (Pty) Ltd, the University of Pretoria and the National Wool Growers' Association in the Eastern Cape.

Promotion is also taking place at Onderstepoort Veterinary Institute, Pretoria, South Africa through communication of research results to scientists and technicians at scientific meetings in South Africa and other countries in eastern and southern Africa and in other parts of the world (e.g. USA and Caribbean), and through the distribution of the publications deriving from the project.

17. **What are the current barriers preventing or slowing the adoption of the output(s)?** Cover here institutional issues, those relating to policy, marketing, infrastructure, social exclusion etc. (**max 200 words**).

Adoption of outputs could be greatly improved through further hands-on training of trainers in the FAMACHA<sup>®</sup> system and in basic knowledge of goat diseases and management. Important here is that the trainers need to be empowered so that they have sufficient confidence to address farmers; otherwise they are inclined not to do so for fear of the questions they might receive. Trainers need to have sufficient self-assurance that they can say to farmers that they do not have all the answers but that they will be able to contact an expert and report back. Of course, there must be an expert with sufficient sensitivity to resource-poor farmers' situations that the trainer can in fact contact!

Dissemination of research outputs is dependent upon the availability of scarce resources (personnel, transport, time, additional funding for printing of dissemination materials) and to an extent requests from government and non-governmental personnel who are able to make such resources available. Often the areas in which the dissemination of information is carried out are far apart from each other geographically, meaning that impact in a region is difficult to achieve within

a short period of time.

In a complementary study in KwaZulu-Natal, farmers continuously complained about the high input costs. High costs could have a negative impact on the adoption of technology developed in resource-poor areas. In this regard, the availability of remedies in sufficiently small packaging at a reasonable price may be an impediment to their use. This is a problem in many resource-poor areas where access to the remedies is not easy and the nearest shop selling such remedies may be 40km away. In South Africa, this situation may be compounded by the fact that the permission to dispense a medication from a larger and cheaper package into a smaller container for resale is limited to a veterinarian.

There is poor access of farmers to markets to sell livestock and this may be related to a mindset that has not considered the potential commercial aspects of livestock production – a change from subsistence production to a surplus production and on-selling of surplus and cull animals.

In South Africa, crime including the theft of livestock may be a deterrent to some communities keeping livestock while those that do keep livestock may suffer heavy losses as a result of theft. There are also costs involved in preventing theft, e.g. purchase/construction of housing so goats can be locked up at night.

*18. What changes are needed to remove/reduce these barriers to adoption? This section could be used to identify perceived capacity related issues (max 200 words).*

More trainers empowered to train farmers and to impart knowledge on goat production would assist in promoting adoption. Adoption would also be promoted through the training of people from the local community as community-based animal health care workers, to serve people in the area in close co-operation with state and private veterinarians, animal health technicians, animal scientists and extension officers.

A support system to allow farmers to obtain inputs more easily is needed for households in communities. Research into ways to supply and provide better access to medication and supplementary feeds would be of use in promoting strategies that rely on the medication and feed for success. Finding ways to supply more FAMACHA<sup>®</sup> cards to farmers, which supply must be accompanied by training, is necessary.

Infrastructure and organization of farmers into groups or co-operatives to enable them to better market their animals would provide an impetus for farmers to produce more livestock. This would create a greater need to prevent mortalities and improve reproductive and general production of the animals raised in resource-poor systems.

*19. What lessons have you learnt about the best ways to get the outputs used by the largest number of poor people? (max 300 words).*

Project R8151 was participative in that it involved farmers, farmer advisors and researchers at all



phases of the project. By all indications, the project left behind farmers who were empowered to provide their neighbours with information on ways to treat goats for worms. Government and non-governmental personnel were able to advise farmers in areas other than the project location with regard to the project findings and how to make simple improvements in goat management. This participative, two-way-learning, interactive and sometimes 'hand-holding' process proved to be empowering for all concerned including farmers, advisors and researchers.

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## Impacts on Poverty

### *E. Impacts on poverty to date*

*20. Where have impact studies on poverty in relation to this output or cluster of outputs taken place? This should include any formal poverty impact studies (and it is appreciated that these will not be commonplace) and any less formal studies including any poverty mapping-type or monitoring work which allow for some analysis on impact on poverty to be made. Details of any cost-benefit analyses may also be detailed at this point. Please list studies here.*

Within the scope of the project, formal impact studies on poverty were not possible. However, monitoring work took the form of meetings and workshops at various stages during the execution of the work. These were conducted with farmers, extension personnel or both, and at times also non-governmental organisation representatives participated too. Questionnaires of participating farmers and their neighbours provided further information on project impact. Other impact assessment-type work has been conducted in a similar community of KwaZulu-Natal by De Villiers (2005) following the use of the on-farm research and technology dissemination approach in that village and the results of this study may be extrapolated to some extent for the present work.

Official census data is available for 1996 and 2001 for the project area (Ntsime et al., 2003; Jennings, 2004). This would provide a baseline with which to compare any changes in poverty at the rural municipal level when future censuses are conducted. Such changes would not focus on households involved in agriculture, however, and as many rural households appear to rely on state-paid pensions or money returned from family members working in towns, changes in agricultural production and any impact on poverty would need to be conducted separately.

DE VILLIERS, J.F. (2005) A strategy to improve agricultural production in a rural community through on-farm research and technology transfer. PhD thesis, Centre for Rural Development and Systems, University of KwaZulu-Natal, Pietermaritzburg, South Africa.

JENNINGS, R. (2004) Socio-economic baseline of target communities for a goat farming support project in KwaZulu-Natal. Strategy and Tactics, Johannesburg.

NTSIME, M., JENNINGS, R. and DUBE, N. (2003) Poverty profiling and socio-economic impact analysis of a goat farming support project in Hlafuna, Njobokazi and Nkwazela in KwaZulu-Natal.

## Strategy and Tactics, Johannesburg.

21. *Based on the evidence in the studies listed above, for each country detail how the poor have benefited from the application and/or adoption of the output(s) (max. 500 words):*

- *What positive impacts on livelihoods have been recorded and over what time period have these impacts been observed? These impacts should be recorded against the capital assets (human, social, natural, physical and, financial) of the livelihoods framework;*
- *For whom i.e. which type of person (gender, poverty group (see glossary for definitions) has there been a positive impact;*
- *Indicate the number of people who have realised a positive impact on their livelihood;*
- *Using whatever appropriate indicator was used detail what was the average percentage increase recorded*

Indications are that the on-farm research approach followed in the rural communities of Nkwezela, Hlafuna and Njobokazi (Bulwer), KwaZulu-Natal, South Africa, for Project R8151 stimulated a new enthusiasm for goat farming in the community. The project outputs have the potential to improve the numbers of kids suckled per doe which may be raised and sold for cash or exchanged for cattle. The work will have contributed to an appreciation by some farmers of the enormous potential that livestock holds for food security and upliftment. The positive feedback from farmers and extension staff during workshops and meetings strongly indicated that the on-farm research and technology dissemination approach adopted for Project R8151 could fruitfully be used in the rest of the province to address goat management and health problems. The approach is an extremely powerful tool in the sense that 'seeing is believing'. These results are similar to those of a survey in a similar area of KwaZulu-Natal Province where the Department of Agriculture and Environmental Affairs is also active. Here the farming systems approach followed by the Department has also been successful in improving agricultural production and in improving the perceptions of the community towards such production.

Project R8151 was completed in March 2006 but further dissemination and uptake of project results is still ongoing. The Farming Systems Research Section, KwaZulu-Natal Department of Agriculture and Environmental Affairs, and an important stakeholder in the work will be conducting an impact assessment questionnaire towards the end of 2006 or the beginning of 2007 to determine the impact of the on-farm research and technology transfer since 2000. Questions to measure the impact of the goat research have been included in the questionnaire.

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## Environmental Impact

### H. *Environmental impact*

24. *What are the direct and indirect environmental benefits related to the output(s) and their outcome (s)? (max 300 words)*

*This could include direct benefits from the application of the technology or policy action with local governments or multinational agencies to create environmentally sound policies or programmes. Any supporting and appropriate evidence can be provided in the form of an annex.*

Preventing the mortality of goats and improving their production through simple dietary and treatment interventions assist farmers to optimise goat production. Rather than losing an animal as a result of worms, the animal maybe treated and salvaged. Also, controlling worms means that the erosive effects of the worms are minimised and the protein derived from precious grazing resources is better utilised for the growth of the animals rather than lost as a result of damage caused by worms. This is particularly relevant for marginal lands, which are unsuitable for crop production but which lend themselves to livestock farming.

*25. Are there any adverse environmental impacts related to the output(s) and their outcome(s)? (max 100 words)*

A potential increase in the numbers of grazing goats, without adequate access to markets may impact negatively on grazing in communally grazed areas, which may lead to erosion in such areas. This is probably unlikely to happen in areas such as KwaZulu-Natal Province where there is a large demand for goat meat for Halaal slaughter as well as traditional Zulu customary slaughter. This demand is currently being met through the import of live goats from other provinces in South Africa and even probably from Namibia.

*26. Do the outputs increase the capacity of poor people to cope with the effects of climate change, reduce the risks of natural disasters and increase their resilience? (max 200 words)*

Goats are particularly resilient animals which are able to adapt well in drier areas. They are able to utilise both browse and grazing well. Animals often act as a 'safety net' in areas where the risk of crop failure is high due to drought.

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