Performance testing for the smallholder sector in South Africa

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Introduction

Performance testing is the objective and systematic measurement of individual animal performance. It is widely recognised as the single most effective tool for increasing economic returns or efficiency of livestock production. Essentially, this is achieved in the following ways:

- Facilitation of improvement of the biological and economic efficiency of production through genetic improvement and better herd management.
- Provision of a reliable data bank for research, planning, training and extension.

In addition, performance testing supports animal genetic conservation initiatives by providing the means for breed evaluation and characterisation.

National performance testing schemes in South Africa were started in 1917, 1955, 1959 and 1965, respectively, for dairy cattle, pigs, beef cattle and sheep. Phenomenal improvement in performance has been achieved in the national commercial livestock population, largely due to these schemes. The setting up of a national genetic evaluation programme in the early 1980s and subsequent refinement of the methods used saw increased rates of improvement in average animal performance, a significant proportion of which was attributable to genetic progress. The number of animals participating in performance testing also grew markedly, resulting in enhanced improvement in the national herd performance.

Following the remarkable success of performance testing in the commercial sector, the Agricultural Research Council's Animal Improvement Institute (ARC–AII) initiated a beef cattle performance testing scheme for smallholder farmers in 1996. The scheme, which became known as *Kaonafatsho ya Dikgomo* (Sotho for animal improvement), has been running well in the Northern and North West Provinces and is set to spread gradually to the rest of the country. A dairy cattle performance testing scheme for smallholder farmers was recently launched in Gauteng Province and is in its initial stages of implementation. This case study will only focus on the beef scheme, since it is the one on which significant experience has been gained.

The problem

Agriculture in South Africa operates off a relatively poor base in terms of land and water resources. High quality soils combined with adequate rainfall are relatively scarce. Commercial agriculture has however been remarkably successful in developing production systems that are economically sustainable. Government intervention and support during the greater part of the twentieth century played a major role in the creation of this highly productive commercial sector.

On the other hand, the smallholder sector was marginalised by the policies of

apartheid. Farmers in this sector were denied access to information, support services and appropriate technology. Performance testing, for example, was a preserve for the large-scale commercial sector. Consequently, animal productivity in the smallholder sector is very poor. Off-take of livestock is exceedingly low and farmers hardly get meaningful returns from their animals. The potential role of performance testing in addressing this situation cannot be overemphasised. Approximately 40% of the national cattle population is found in the smallholder sector (National Department of Agriculture 1999). Improvement in animal performance, coupled with commercialisation of this sector, can therefore impact positively and significantly to the country's economy.

Efforts to implement performance testing schemes in the smallholder sector have been made in several developing countries and have met with mixed success. According to Galal (1997), high-input system technology has been employed in most of the attempts to set up smallholder performance recording schemes, leading to high failure rates. Varying levels of success have however been recorded in countries such as India (Trivedi 1997), Egypt (Mansour 1997), Senegal (Fall and Diop 1998), Morocco (Ilham 1997) and Zimbabwe (Banga 1997).

The South African experience

The implementation of performance testing in the smallholder sector of South Africa is done in phases, so as to allow the gradual progression of knowledge and skills. It is envisaged to develop capacity of the smallholder farmers until they are competent enough to join the National Recording Scheme.

The first step involves gathering information about the cattle farmers and their animals. This exercise is carried out in conjunction with other role players such as the extension staff of the provincial departments of agriculture. The following details regarding the farmers and their animals are collected:

- Available social structures, such as farmers' associations
- Farm sizes
- Numbers and breeds of cattle owned
- Available farm facilities
- Production systems
- Management practices.

This information is important in determining the strategy for introducing the technology of performance testing to the farmers. Smallholder livestock farmers in South Africa vary considerably in size of farm and resource endowment. Some live in communal areas and own a handful of animals while others own or lease fairly large tracts of land and own large herds of cattle (up to 400 head). At present, most of the participants in the beef cattle performance testing scheme are from the latter category.

Experiences elsewhere have shown that a major prerequisite for implementing a successful performance testing scheme is that the benefits of such a programme are clearly articulated to the farmers. It is therefore essential that before recruitment of participants is considered, the farmers are sensitised to the importance of performance recording. This is accomplished mainly by organising farmer meetings through their associations or extension staff where information relating to performance recording is

disseminated. These meetings also provide an opportunity for the farmers to provide input regarding their needs and expectations. The following are examples of topics that are presented to the farmers:

- Variation in animal performance and its sources
- Factors affecting the profitability of beef production enterprises
- Traits of economic importance in beef production
- Tools for recording
- What to record
- How records can be used to improve profitability.

Farmers who express an interest in participating in the scheme get enrolled officially. All the animals in a participating herd get ear-tagged to enable easy and reliable identification. Recording of animal and event details such as parentage, breed, birth dates etc. then ensues.

Traits recorded

The smallholder performance testing scheme is aimed at providing the farmer with basic information for comparing within herd animal performance, as well as enhancing managerial practices. The following details are recorded in order to determine animal growth and cow performance:

- Calf birth date
- Weaning date
- Calf birth weight
- Cow weight at calving (optional)
- Cow weight at weaning (optional)
- Weaning weight
- Yearling weight
- 18-month weight.

Indices for comparing animals within the same herd and age group are computed.
The mothering ability of cows is evaluated through the weaning weight of their calves. Birth weight is used to indicate calving ease and fertility is measured by age at first calving and calving interval. The adaptability and post weaning growth of calves under existing farm conditions are evaluated by the yearling and 18-month weights.

ARC–AII technicians visit participating farmers at regular intervals. During their stay on the farm, they weigh animals using portable scales and enter all relevant data into a laptop computer. The technician processes the data, interprets the results and gives advice whilst still at the farm.

Funding

The smallholder performance testing scheme in South Africa is currently funded through a parliamentary grant that the ARC–AII receives from the government. The Red Meat Research and Development Fund, which is administered by the South African Meat Industry Company (SAMIC), complements this grant. Farmers will only be required to pay fees when they graduate to the national performance testing scheme.

Problems and future prospects

Although it is still fairly new, the performance testing scheme for smallholder farmers in South Africa has grown in strength. It is set to extend to Gauteng, Mpumalanga and the Eastern Cape Provinces within a year from this study date. Some of the long-standing participants of the scheme in the Northern Province are now running commercially viable enterprises and are ready to graduate to the National Beef Cattle Performance Testing Scheme during this study. One big constraint however is shortage of resources needed to spread the scheme to the rest of the country. A number of farmers in the country's other provinces have expressed an interest in participating in the scheme but the ARC–AII currently does not have the capacity to cope with this demand.

Implications and lessons learned

Experiences in developed countries and the large-scale commercial sector of developing countries have amply demonstrated that performance testing is a valuable tool for improving animal productivity. In the smallholder farming systems of developing countries, however, the importance and applicability of this technology have largely been doubted and hence, it has been used on a very limited scale. In addition, most of the attempts that have been made to set up performance recording schemes in the smallholder sector of developing countries have been unsuccessful, mainly due to the fact that high-input system technology has been inappropriately employed (Galal 1997). Many social, economical and environmental constraints predominant in this sector also make it difficult to develop sustainable recording systems. The need to improve animal productivity in the smallholder systems of developing countries is however overwhelming and performance recording is a prerequisite to any serious efforts to address this situation (Boyazoglu 1997).

In South Africa, the introduction of performance recording to the smallholder sector has been undertaken with utmost prudence. Cognisance has been taken of the fact that, the successful transfer of this technology to smallholder farmers requires that a wide range of factors, including the ones listed below, are taken into account:

- ***Acceptance of the technology*:** Acceptance of performance recording by small holder farmers in South Africa has been fairly satisfactory. Most of the farmers enlightened about the scheme are keen to participate in it. This may be mainly attributed to the fact that comprehensive delivery of information and broad consultation with the farmers is carried out before any efforts are made to introduce the technology. The farmers are thus well informed about the benefits of participating in the scheme and every effort is made to transfer the technology in a form that is appropriate and acceptable to the recipients. Factors such as traits to be measured to achieve what objectives, the socio-economic situation, delivery structures etc. are also considered..
- ***Institutional capacity*:** The ARC–AII has a wealth of experience in running performance recording schemes. The institute is also endowed with skills in performance testing. These attributes have contributed a great deal to the successful setting up of the smallholder performance recording scheme. The existence of social structures such as farmer organisations has also been instrumental in facilitating the relatively easy delivery of performance recording

and allied services. This has also been demonstrated in other countries such as India (Chacko and Kishore 1997; Mangurkar 1997; Trivedi 1997)).

- ***Funding and sustainability*:** Substantial outlay went into the setting up of the smallholder performance testing scheme. Most of this investment was made using the parliamentary grant that the ARC–AII receives from the government. The scheme can be said to be successful if the farmers and other stakeholders are able to contribute to the costs of running the scheme to make it sustainable in the long run. Indications are that some of the long-standing participants of the scheme are now ready to graduate to the main (national) performance testing scheme where they have to pay service fees. This shows that the farmers are realising benefits from the scheme, to the extent that they are prepared to pay, which is the best means of achieving sustainability.

The lesson to be drawn from the above facts is that successful implementation of performance testing in the smallholder sector of the developing world requires adequate and careful planning, carried out with the close involvement of the farmers, and sufficient investment to kick start the scheme. The technology must be introduced in a participatory manner and the farmers must perceive ownership of the scheme. It needs to be stressed, however, that the South African smallholder performance testing scheme is barely three years old and still needs to stand the test of time.

Gaps in knowledge

In order to enhance the role of performance testing as well as make it simpler to operate in the smallholder sector, the following possibilities may be looked at:

- A monitoring and evaluation system may be put in place in order to assess the impact of the performance recording scheme
- The use of simpler methods of measuring traits of economic importance. For example, weigh scales are beyond the reach of many smallholder farmers. The identification of a cheaper means of determining weight could go a long way in addressing this problem, e.g. how closely is stature correlated with weight?
- Designing the best ways to genetically improve performance tested animals that are in a communal system. Trivedi (1997) observed that the utility of performance testing information to smallholders who have just one or two animals has been questioned by many. Does this mean that performance testing and genetic improvement in such a system is a ‘lost cause’?
- Determining the economic value of performance testing in smallholder systems. For example, how much genetic improvement is achievable in a given situation? What are the returns to investment in smallholder performance recording?

Questions for discussion

1. Describe how performance testing is used to improve animal productivity.
2. Performance testing will play an important role in achieving food security in developing countries through the development of a range of adapted animal genetic resources. Expand on this statement.
3. Smallholder livestock farmers in developing countries are often referred to as

'animal keepers'. Explain what this means and describe how performance recording can help address this situation.

4. Hammond (1994) noted that the introduction of individual animal recording to the livestock subsectors of developing countries has been disregarded as being too hard or not important. Do you agree with this notion? Explain your viewpoint.

5. Technology transfer in many developing countries has failed because inappropriate developed country technology has been 'pushed down the throats' of smallholder farmers (Udo 1997). Discuss this statement, with particular reference to performance testing.

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