

# The value of National Cultivar Trials in South Africa

Compiled by the Agricultural Research Council's Economic Services Unit with input from the ARC Grain Crops Institute, University of Pretoria, seed companies, GrainSA and the Department of Agriculture, Forestry and Fisheries.



*"Yields of most of the crops started picking up after the 1960s and gained serious traction after the mid-1970s when farmers' ability to select seed of good character was improved."*

## Introduction

Reliable cultivar performance information helps summer grain crops farmers select cultivars that are better adapted to the conditions where they are grown. This leads to an increase in yields and profits with little or no additional cost.

That is a key finding of a study that quantified the economic value of the National Cultivar Trials (NCTs) for maize, sorghum, sunflower, soybeans and dry beans in South Africa.

The study sought to understand the economic value of the NCTs and it established that the NCTs facilitated farmers' abilities to identify, compare and select summer grain crops' cultivars in different regions and bio-environments in the key summer grain crops producing environments in South Africa.

It found that the trials made it possible for extension officers to recommend cultivars to farmers based on impartial information on cultivar performance - a practice that has boosted the growth of the summer grain crops sector.

## Results and benefits

The study demonstrates that:

- The NCT programme contributed significantly to yields, resulting in substantial income benefits to farmers. Even at the lowest assumed plausible yield-gain estimate of 5% attributable to the trials, the benefits are significant.
- The programme added between 7.67kg per hectare per year for sorghum and 24kg per hectare per year for maize.
- The trials generated a substantial pay-off for the summer grain crops sector, netting economic benefits between 1977 and 2012 of an estimated R1.35 billion at the 5% level. This represents nearly 4% of the gross value of production of field crops in South Africa in 2010 or 1% of the gross value of all agricultural production in South Africa in 2010. The South African economy received more than R40 of benefits for each R1 invested by the ARC in the trials, with beneficiaries including consumers and food or feed processors;
- The national maize cultivar trials produced the biggest economic benefits of R1.4 billion in 2012 prices, which is 10% of the total 2010 gross value of maize production.
- For every rand spent on trials, a significant benefit was delivered to the SA economy between 1977 and 2012 (in 2012 prices):  
Sunflower - R2.84 benefit for each rand invested  
Maize - R37 benefit for each rand invested  
Dry beans - R4.97 benefit for each rand invested  
Soybeans - R4.96 benefit for each rand invested  
Sorghum - R3.19 benefit for each rand invested

*"The National Cultivar Trials played a key role in the development of a summer-grains economy in South Africa."*

## Recommendations and future benefits

The trial localities for the NCTs should be increased and expanded into the smallholder farming sector where, except for limited dry beans cultivar trials, NCTs are not currently conducted. This would enable improvement in cultivar selections by smallholder farmers and a growth in yields, as well as improved understanding of the real causes of poor crop productivity in the subsistence sector.

Most importantly, it could lead to an increase in knowledge about the 'genotype x environment' interactions in the smallholder sector, which until now have remained the privilege of commercial farmers.

## IN NUMBERS

**Total economic benefits of NCTs to the South African economy from 1977 to 2012**

**R1.35 billion**  
in 2012 prices

**4%** of South Africa's agriculture's total gross value.

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**For every rand spent on trials:**

**Sunflower**  
**R2.84** benefit

**Maize**  
**R37** benefit

**Dry beans**  
**R4.97** benefit

**Soybeans**  
**R4.96** benefit

**Sorghum**  
**R3.19** benefit

## Study objectives

The study set out to determine the proportion of yield growth attributable to the adoption of information provided by the NCTs, and to quantify the economic value of the gains in yields as a result of investments made in the trials. The study's main goals were to:

- Establish the contribution of the trials to summer grains' output growth;
- Attribute the value of seed choice to yield improvement;
- Establish how much of the overall yield gains can be attributable to the trials; and
- Conduct a benefit-cost analysis of the investments made by the ARC and its co-operators in the trials.

## Period covered

The study covered the period 1977 to 2012.

## Other yield growth factors

The study found that other factors that contributed to increased grain output between 1977 and 2012 include investments in germplasm research, improved agronomic and cultural practices and advisory services, and the use of hybrid seeds and nitrogen fertilizer.



# South Africa's summer grain crops

Maize is the most important of the five summer grains covered by the ARC study. It is South Africa's staple crop, ranks first in volume and area planted, and is used extensively as feed for livestock, particularly beef cattle and poultry. Since 1988, the Free State province has produced the highest amount of maize in tons and had the highest area planted to maize in hectares.

Other summer grain crops such as sorghum, dry beans, sunflower, soybeans and groundnuts play an equally important role in the South African economy.

## Advisory services

The adoption of the results of the NCTs was made possible by the extension system of the Department of Agriculture, Forestry and Fisheries, which communicated the results to farmers.

Dry beans are an important protein source, especially for people in the low-income bracket, whereas sunflower and soybeans are important sources of oil and protein for both household and industrial purposes.

Sorghum is an important feedstock in the manufacture of beverages and as a source of carbohydrates for human consumption.

The production of these economically important grains is central to food security in South Africa.

The estimated gross annual benefits of the NCTs started to increase as more farmers became aware of the value of making decisions based on results of the trials.



## The value of independent research

Every one to three years, several new summer grain crop cultivars are introduced to the South African seed market, either as a replacement of older cultivars or as new entries with desirable traits.

Farmers need impartial information about performance in order to choose the cultivar best suited to them. Without the NCTs, farmers could have chosen any one of 50 cultivars based on subjective information sourced from other farmers or seed suppliers. But decisions based on this potentially biased information could prevent farmers from selecting high-yield cultivars.

The NCTs are the only independent source of objective cultivar-performance data available to South African farmers, making it easier for farmers to identify the best-performing cultivars for their area.

They further enable farmers to boost crop production through the adoption of technologies that take account of strengths and weaknesses of particular farming environments.