

South Africa is the **4th** largest peach and nectarine exporter in the Southern Hemisphere



There are **9.3 million** peach and nectarine trees in SA, which produce **181 996 tonnes** of fruit every year



The ARC-Infruitec-Nietvoorbij has produced **96** peach and nectarine cultivars since research started in 1937



ARC cultivars are used for **100%** of canning peaches, **45%** of fresh nectarine exports and **55%** of dried peach exports



ARC research has improved tree-planting density from **609 trees/ha** to **956 trees/ha** in the last 35 years



Thanks to ARC cultivars that can grow in warmer environments, the Little Karoo now covers **40%** of the peach production area in SA, up from **30%** in 2000



64-77% of ARC's research funding in the peach and nectarine programme goes to **improving existing cultivars and developing new ones**



In 2013 it cost **R102 900/ha** to establish a peach or nectarine orchard, **R36 400/ha** to maintain a non-bearing orchard, and **R158 000/ha** for a productive orchard



The value of South Africa's peach and nectarine industry increases by **R1.56** per annum for each **R1** invested



"The whole canning industry is built on peach and apricot cultivars bred by the ARC. If no new cultivars were bred, there would be no industry. Over the past 20 years, the yield has increased from 14 ton/ha to an average of 35 ton/ha."
 - Mr Wiehahn Victor, CEO of the Canning Fruit Producers' Association



Measuring the economic returns on peach and nectarine research

This study used data from ARC Infruitec-Nietvoorbij along with publicly-available economic data to calculate the contribution of research investments to agricultural outputs. The study built an economic model called a supply response function, using data on research expenditure, agricultural output, deciduous fruit prices (adjusted for inflation), weather, and conventional inputs (fertiliser and packaging material).

The study showed that these variables accounted for 93% of variation in production. Other lesser influences included the prices of grapes, pears, and apricots. Interestingly, the price of peaches and nectarines had no effect on their own production levels – this is most likely because South Africa has limited land available for peach and nectarine production.

Lastly, the model revealed that the modified internal rate of return (MIRR), which is a commonly accepted measure of the return on an investment, was high at 56%. This indicates that an investment of R1 yields an annual return of R1.56, showing that investment in peach and nectarine research is worthwhile.

The economic value of peach and nectarine research in South Africa

Compiled by the Agricultural Research Council's Economic Analysis Unit for ARC Infruitec-Nietvoorbij



written and designed by  ScienceLink

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The history of peach and nectarine research in SA

The first peach trees were planted by Jan van Riebeeck at the Cape Colony in 1655. Two hundred and fifty years later, peaches were the first fruits exported from southern Africa – a shipment was sent to Great Britain in 1892. The industry continued to grow until 1936, when a storage disorder known as wooliness brought exports to a halt.

In 1937, the Western Province Research Station (WPRS) was established to address wooliness and other limitations to peach production in the Cape. The research station, now known as ARC Infruitec-Nietvoorbij, contributed to peach and nectarine production by researching better methods of production and management, and developing new cultivars.

In terms of production and management, this research led to new growing techniques such as adapted pruning, thinning and training systems. These techniques improved field density and land use, fruit quality, and overall yields.

Early cultivars addressed physiological storage disorders, such as wooliness and greatly improved yields, leading to a glut of fruit over a short season. Consequently, researchers looked for cultivars that could extend the harvesting period for peaches and nectarines.

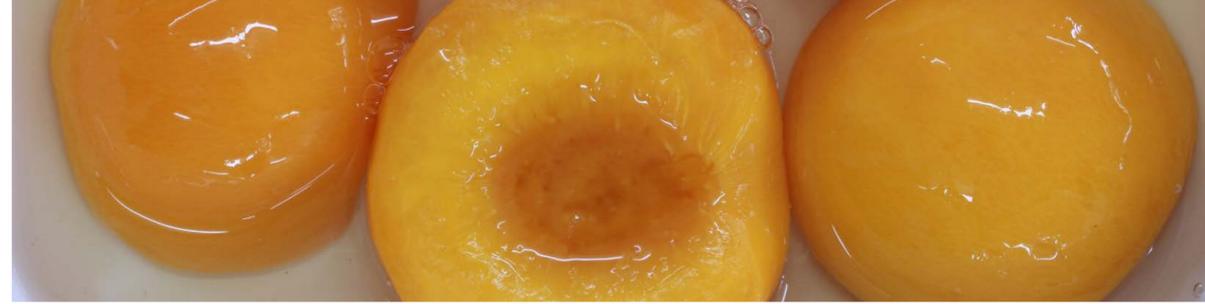
In the 1950's, several cultivars improved the texture of canning peaches, and others allowed for adaptation to environmental conditions by reducing the chilling

requirements (see sidebar). The latter cultivars meant that peaches could be grown profitably in new areas of South Africa, such as the Klein Karoo and the northern provinces.

Breeders also switched from open air pollination to hand pollination around this time, allowing for greater control of the breeding process.

❄️ Chilling units

Peaches and nectarines need a specific number of hours below 7°C, referred to as chilling units, to allow them to flower normally after winter dormancy. In the first half of the 20th century, many of South Africa's peaches and nectarines had high chilling requirements, limiting where they could be grown. New cultivars developed at the ARC Infruitec-Nietvoorbij are better adapted for South African growing conditions and require fewer chilling units for normal fruit production.



The South African peach and nectarine industry has grown strongly in recent years thanks to committed research at the ARC, which has produced almost 100 new cultivars well-suited to local conditions.

Peaches were the first fruit trees planted in South African soil, as well as one of our first fruit exports. Research on peaches and nectarines started in 1937 and has since then addressed several problems with peach and nectarine production, such as diseases, cold storage issues, and low yields due to poor growing conditions.

Peaches and nectarines in South Africa are dried, tinned or sold fresh, both locally and abroad. South Africa is one of the world's major peach exporters, 4th in the Southern Hemisphere in terms of export volumes. The value of the sector has grown sharply in the last two decades, reaching almost R1 billion in recent years.

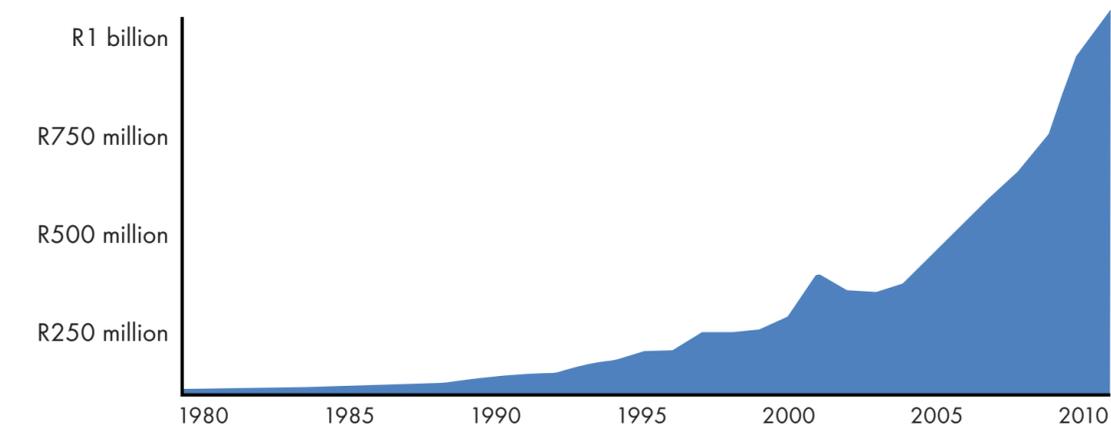
In this study, researchers evaluated the ARC's peach and nectarine research programme to understand the contribution that research and development (R&D) has made to the peach and nectarine industry. They studied the history, funding, and priorities of peach and

nectarine research, then calculated the economic return on investment for the sector.

Since 1970, researchers found that investment in R&D yields returns within the first year and peaks around 13 years after the initial investment before starting to decrease. Immediate production benefits include maintenance and agronomic improvements that affect existing crops, but the (larger) long term benefits are mostly linked to new and improved cultivars.

The study found a 56% rate of return on investment in the sector, which is high for this type of research - the value of the sector increases by R1.56 every year for each R1 invested. Combined with a limited supply (SA's peach and nectarine sector does not grow in response to demand), this indicates that there is a need for more investment in R&D.

The overall value of SA's peach and nectarine industry has grown sharply in recent years



The peach and nectarine research programme

From 1940 to the present, SA peach and nectarine research has been split into five disciplines:

- The **Soil Technology and Irrigation** discipline optimises soil and water use by using good orchard layouts. It also ensures farming remains sustainable by designing and maintaining appropriate farm equipment.
- The **Biochemistry and Pathology** discipline aims to minimise the industry's losses by investigating post-harvest problems such as decay, internal disorders, pests and diseases.
- The **Post-Harvest Technology** discipline investigates all aspects related to storing and processing peaches and nectarines. This research is significant because it improves the quality and efficiency of the canning and drying sectors of the industry as well as cold storage potential.
- The **Horticulture** discipline evaluates and adapts production practices to South Africa's different production areas. This enables farmers to acquire higher returns on their production through improved yields and fruit quality.
- The **Plant Improvement** discipline is responsible for breeding and developing cultivars that are well adapted to South Africa's production and market needs.

Considerable time and money has been put into plant improvement, particularly in recent years, yielding 96 new cultivars overall. Improvements began with two cling peach cultivars, Maluti and Kakamas, and a dessert peach cultivar, Early Dawn. These led to a huge jump in yield and a subsequent glut of peaches over a short production season (in February), and so focus turned to cultivars that could be harvested earlier or later in the season.

Cultivars Oom Sarel, Professor Black, Professor Malherbe and Professor Neethling were released in the 1960's and alleviated this problem as they could be harvested from December to February. Around the same period, researchers also released new cultivars with low chilling requirements (see sidebar) and better flavour and colour characteristics.

Today, breeding is focussed on cultivars with high yields, low chilling requirements, early maturation, and those that require fewer pesticides. Other breeding objectives focus on specific colour and flavour characteristics for canning or drying, improving storage life, or addressing consumer preferences. Researchers have also started using molecular biology methods to speed up trait selection.

"The research and development done at the ARC has enabled our canning industry to compete in China. The Chinese food service market wants fruit with the colour and texture that the ARC has developed. We've seen around 300% growth over the past 6 years."

- Mr Wiehahn Victor, CEO of the Canning Fruit Producers' Association

What's in a name?

There are three major types of fruit grown by the South African peach and nectarine industry: **Clingstone or cling peaches** are those where the stone is stuck to the flesh of the fruit. These are usually used for canning. **Freestone or dessert peaches** are those where the stone is loose and falls away from the flesh easily, these are sold fresh or dried. **Nectarines** are genetically very similar to peaches, except that the skin is smooth rather than furry. Nectarines are also usually smaller and more susceptible to blemishes.