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

ARC Impact Study Series
No. 7
Completed Mar 2016

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

The 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 outputs, 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 ARC-Infruitec-Nietvoorbij has produced peach and nectarine cultivars since research started in 1937. There are 9.3 million peach and nectarine trees in SA, which produce 181 996 tonnes of fruit every year. South Africa is the largest peach and nectarine exporter in the Southern Hemisphere. Thanks to ARC cultivars that can grow in warmer environments, the Little Karoo now covers 64–77% of ARC’s research funding in the peach and nectarine programme goes to improving existing cultivars and developing new ones. ARC research has improved tree-planting density from 609 trees/ha in the last 35 years to 956 trees/ha in 2000.

The ARC-Calcula-Network has produced 96 peach and nectarine cultivars since research started in 1937.

ARC research has improved tree-planting density from 609 trees/ha in the last 35 years to 956 trees/ha in 2016.

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In 2013, it cost R102,900/ha to establish a peach or nectarine orchard, to maintain a non-bearing orchard, and for a productive orchard of the peach production area in SA, up from R36,400/ha in 2000.

The value of South Africa’s peach and nectarine industry increases by R1.56 per annum for each R1 invested.
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 fruit trees brought to South Africa – a shipment was sent to Great Britain in 1892. The industry continued to grow until 1926, when a storage disorder known as brown rot 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, training and trellising systems. These techniques improved fruit density and land use, fruit quality, and overall yield.

Early cultivars addressed physiological storage disorders, such as wooliness and greatly improved yields, leading to a glut of fruit over a short season. Peaches could only be grown. New cultivars developed at the ARC Infruitec-Nietvoorbij are better adapted to South Africa’s growing conditions and require fewer chilling units for normal production.

In the 1950’s, several cultivars improved the texture of nectarines. In the 1960’s and alleviated this problem as they could be grown earlier in the season.

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 to South Africa’s growing conditions and require fewer chilling units for normal production.

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 last 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 to South Africa’s growing conditions and require fewer chilling units for normal 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 Africa, and as well as one of our first fruit exports. Research on peaches and nectarines started in 1937 and has since addressed several problems such as diseases, cold storage issues, and low yields due to poor growing conditions.

Peaches and nectarines in South Africa are grown in the Cape Province and the Northern Cape Province. South Africa is one of the world’s major peach exporters, 4th in the Southern Hemisphere in terms of export volume. 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 past 30 years.

The study found a 35% 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 existing crops), this ensures farmers can achieve higher returns on their production through improved yields and fruit quality.

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 optimizes 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 manage pests and diseases of peach and nectarine, 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 packaging and drying sectors of the industry, which is high for this type of research.

• 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, and to date, 95 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 focused to cultivars that could be harvested earlier or later in the season.

Cultivar Oom Sarel, Professor Black, Professor Malherbe and Professor Neethling were released in the 1960’s and alleviated this problem as they could be grown earlier in the season.

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

What’s in a name?

There are three main 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, freestone or dessert peaches are those where the flesh is loose and falls away from the stone easily, these are sold fresh or dried. Nectarines are genetically very similar to peaches, except that the skin is a smooth rather than furry. Nectarines are also usually smaller and more susceptible to blisters.