

South Africa: A Smallholder's Innovative Approach to Producing and Exporting Fruit

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Exporting deciduous fruit from the Western Cape Province of South Africa to markets in Europe, North America and Asia contributes significantly to the province's Gross Domestic Product. The main export producers are large-scale farmers. Even with the change in discriminatory legislation and practices in South Africa after 1994, few smallholder farmers have penetrated this market. This is due to:

- the historical political inequalities faced by the predominantly coloured and black smallholder farmers, in particular the lack of access to agricultural resources and inputs, because the law used to exclude them from mainstream commercial farming;
- the subsequent inability of smallholders to produce the volumes and, at times, the quality required for export;
- the significant influence of economies of scale, making it almost impossible for smallholders to achieve a significant profit.

The few smallholders who manage to export their fruit do so through collective or individual arrangements with large-scale commercial operations.

One such farmer is Aubrey Billet from Haarlem. He started exporting apples in the 1970s. Over the decades, he developed his own knowledge and innovations in both fruit production and socio-economic arrangements and could thus continue to export most of his annual apple crop.

Change in agriculture in Haarlem

The hamlet of Haarlem lies in the narrow Langkloof Valley and developed around the mission station established by the Lutheran Church in the early 1800s. The nearly perfect climatic conditions, with cold winters and an altitude of 800 m, have made this area well known for its export-quality apples and peaches. During the 1970s, numerous smallholder farmers exported their deciduous fruit in collaboration with neighbouring large-scale commercial farmers. The Lutheran Church helped the hamlet to buy more land so that local farmers could expand their operations and produce even more for export.

However, the oil crisis in the late 1970s, the closure of the railway station, politically motivated economic sanctions and the decline in value of the South African Rand relative to major foreign currencies led to the almost complete demise of deciduous fruit production by smallholders in Haarlem. By 1989, most had stopped growing apples for export. In the early 1990s, many uprooted the fruit trees and switched to arable cash crops. Agricultural production declined, but agriculture and associated employment remained important economic activities. Many residents were employed on surrounding large-scale farms and a few were employed on the smallholdings within Haarlem. Most smallholders now produce livestock and vegetables for household consumption, the local fresh-produce markets and street vendors. A few still grow deciduous fruit for home and the local market. The remaining fruit trees are scattered and old. Aubrey Billet, however, still exports apples.

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² This article was first published in *IK Notes* No. 78, March 2005; www.worldbank.org/afr/ik

Early innovations

Like other Haarlem smallholders during the 1960s and 1970s, Aubrey used his small piece of land to grow various crops for home consumption and local sales. The smallholders' farming practices were severely constrained because they could not buy inputs in small quantities from the local cooperative, which was geared to large-scale production and supplied inputs only in large quantities. During the 1970s, Aubrey and other smallholders arranged with a large-scale farmer that they would produce high-quality apples, which he would buy and then sell on national and foreign markets. These farmers started planting an increasing number of apple trees. Those who worked as labourers on large-scale farms employed local residents to maintain the small orchards. The smallholders bought the small quantities of inputs they needed directly from the large-scale farmer. Thus, they could enter the national and export markets for apples.

Aubrey has a particularly keen interest in apple production, as does the large-scale farmer. Because of their mutual interest, these two men who differ greatly in socio-cultural background and economic status developed a strong friendship that continues today and extends to friendship between Aubrey and the farmer's son, who now manages the farm.

To sell to export markets, farmers must produce apple varieties that meet the high demands and preferences of consumers. Because of changes in consumer preferences, farmers have to invest in new apple varieties every 10-12 years. Resource-poor farmers with little land and facing high input costs cannot afford to do this.

Aubrey planted most of his existing apple trees, of the Starking variety, in the mid-1980s. When market demand for Starking apples decreased, he wanted to switch to Granny Smith, but could afford to replace only a few trees immediately. He therefore decided to experiment with grafting Granny Smith shoots (scions) on to the existing Starking trees.

He had learned about grafting while discussing apple production with his large-scale farmer friend. He taught himself and soon became adept in using this technique. Rather than spend money to buy scions from a nursery, he asked his friend if he could select potential scions from

the shoots pruned in July from young trees on the large-scale farm. He stored the scions in the vegetable crisper of his refrigerator (where the temperature never went below 5°) until September/October and then grafted them onto his Starking trees. From his discussions with his friend, he knew that nurseries stored their scions in a similar way before grafting, but use a special storage medium too costly for Aubrey.

After a few trials, Aubrey discovered that he needed to use young scions, not older than one year, and to locate a place on the tree that would take new growth, i.e. where a new branch or shoot was emerging. He also had to make sure that the cut made on the tree was an almost perfect match to the cut on the scion, so that the newly grafted scion would take easily. As Aubrey could not afford a grafting knife, he used a sharpened kitchen knife that produced clean razor-edged cuts that ensured a good fit. He noted that, when he changed apple varieties by grafting onto existing trees, he could harvest suitable fruits two to three seasons after grafting. This was more cost effective for him than replacing the trees, which had to be bought from a nursery and from which he could harvest only four to five seasons after planting. He did, however, buy a few Granny Smith trees to replace some older Starking trees.

Scaling out

A few years after grafting Granny Smith onto the Starking trees, the market preference changed yet again. A new variety, Royal Gala, became popular amongst local and foreign consumers. Aubrey obtained some Royal Gala scions from his friend and grafted these on to Starking and some Granny Smith trees. He also grafted a few onto some Starking trees that were producing Granny Smith apples, resulting in one tree producing both varieties on the same rootstock. He found that he could harvest Royal Gala apples within two seasons after grafting. However, he encountered some problems with the trees on which he had grafted both Granny Smith and Royal Gala. Each variety reacts differently to pests and diseases and therefore needs a different spraying schedule. If early and late cultivars are grown on the same tree, timely spraying for one variety affects the quality and size of the other. This had serious financial implications. Thus, although he could successfully graft two varieties on one tree, his

knowledge of pest and disease control led him to decide to use only one variety per tree. He therefore grafted Royal Gala only on to the remaining Starking trees.

When to graft and when to replace trees

Despite his success with grafting, Aubrey sees this as a short-term solution. He has noticed that a newly planted rootstock, with a pre-grafted scion, produces a better yield and fruit quality over a longer period in comparison to one of his “innovative trees”. He suggests that these trees be replaced with new trees when the rootstocks are about 20 years old. According to his experience, the quality and quantity of the fruit start to deteriorate in later years. Most of the trees on to which he grafted a new variety were ten years old at the time. The grafting effectively gives each tree another ten years of productive life with a different variety currently in high demand from consumers. By saving his income, he could buy replacement trees when the production of the “innovative trees” started declining. He has not tried to graft onto the new trees, as these are purchased with the market required variety pre-grafted on to them.

Some lessons

During the twelve years that Aubrey Billet has been experimenting and grafting in this fashion, he identified a number of important considerations:

- Grafting saves some money, as new trees do not have to be purchased immediately when market demand changes. He can buy these when he has enough money. Since it is hard for a smallholder to get a loan, he needs sufficient cash to pay for the inputs required to produce for national and export markets;
- Use of locally available resources (in this case, scions from a fellow farmer) slightly reduces reliance on external resources. Aubrey could select young scions of quality material, as his friend uses only nursery-approved varieties;
- When grafting a new variety on to an old tree, only the newly grafted variety should bear fruit. The fruit-bearing shoots/buds of the original variety must be removed. Otherwise, the same problems are encountered as when more than one variety is grafted on to a single tree;
- The condition of the tree is important. Old or damaged trees should be replaced, as they produce lower-quality fruit when a new variety is grafted on them.

The relationship that developed between two farmers who come from quite different backgrounds and have different resources but share a common interest in apple production has played a pivotal role in Aubrey's access to materials and ideas which he could integrate into his local knowledge and thus develop his innovations. It also gave him access to a relatively closed market. Such relationships and exchange of knowledge between farmers are important if they are to survive in a time when research and extension services are being increasingly downsized.

Sharing innovations

Only one other smallholder in Haarlem still grows apples for commercial purposes. Because he produces for the local market, his produce need not be of such high quality as is required for export. A few Haarlem farmers produce peaches and plums, but most grow vegetables such as potatoes and onions. Therefore, there is currently little local interest in Aubrey's ideas. However, some smallholders producing stone fruits might be able to try his grafting innovation to see if it can be applied successfully to their fruit types.

Times have also changed in Haarlem, and social reform in South Africa has made it possible for some smallholders to obtain loans and some government support. This means that they are in a better position than Aubrey was to purchase trees when needed. While less fortunate individual households might be interested in Aubrey's grafting techniques, social reform has not been extended to give them access to land on which to plant fruit trees.

By expanding his knowledge through his own experimentation, and without the direct support of agricultural extension and research services, Aubrey continued producing apples for the market while most of his fellow smallholders sought other alternatives to maintain their livelihoods. His innovation allowed him to secure his family's livelihood and educate his children. Unfortunately, he will soon have to stop growing apples because

of his health and age, and none of his children are interested in continuing. It is important that the innovations developed by a smallholder farmer to fit his circumstances are recorded so that farmers elsewhere facing similar circumstances can have access to such knowledge. These farmers may innovate further and improve what Aubrey developed. His innovations clearly demonstrate that smallholder farmers, like their scientific counterparts on research stations, are experimenters and innovators in their own right.