



Technological developments in South Africa's fruit industry and implications for market access

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Fruit as a central focus of high-value agriculture-led growth

- Opportunities to increase exports, participation and jobs
 - USD 3bln export industry ~287 000 direct & indirect jobs
- South Africa is an established global player in fruit exports
 - Second largest exporter of citrus fruit in the world in 2017
- However, SA's overall export growth lags behind competitors
- SA not maximising substantial opportunities for export growth in high-value & globally in-demand fruits
- Sustainable growth requires adopting and adapting to advances in technology & shifting to high-value fruits
 - Improve market access & industry's global position

Research questions

1. What have been the most important technological changes in the fruit sector in the past 5-10 years?
2. What are the implications of technological changes for market access?
3. What are the key challenges to adopting and adapting to advances in technology?
4. What policy responses are required by government and public institutions to drive more positive outcomes?

Upgrading in GVCs & Technological capabilities (TCs)

- Upgrading requires specific level and depth of TCs
- Firms build and accumulate TCs through dynamic process of technological learning
- Technological learning is a function of a firm's absorptive capacity
 - existing knowledge base & intensity of effort
- GVC literature treats innovation as exogenous to local firms within the vc
 - TCs determined by governance structures
- Adopt TC approach to better explain upgrading and performance in GVCs

Key developments in fruit technology

Inputs

- Biotechnology

Growing

- Pest development software
- Irrigation & precision farming technologies

Sorting & cold storage

- Higher resolution camera-sorting equipment with Intelligent Flavour Analyser light technology

Export process

- Digital platforms & electronic certification

Distribution & ports facilities

- Integrated digital platforms
- Internet of Things

Implications for market access

- Market access not a technological issue in itself, but enabled by advances in technology

Type of technology	Market access
Biotechnology	<ul style="list-style-type: none">• Comply with SPS• Produce better quality fruit varieties• Maintain markets
Irrigation & precision farming technologies	<ul style="list-style-type: none">• Traceability right down to the farm level
Sorting, grading, packing & cold storage	<ul style="list-style-type: none">• Accuracy in sorting improves quality & consistency in supply of defect-free fruit• Compliance with SPS
Cold storage and packaging technologies	<ul style="list-style-type: none">• Access to wider & distant markets
Digital platform - Phytclean	<ul style="list-style-type: none">• Speedy & efficient export processes
Integrated digital technologies & IoT	<ul style="list-style-type: none">• Faster movement of goods through ports

Key challenges to wide-spread adoption of technologies

- Biotechnology
 - Limited investment in local breeding programmes
 - Under-investment in quarantine laboratory facilities
- Sorting and grading equipment
 - limited research, technical and engineering skills to develop in-house technology
 - Reliance on imported technology increasing costs of adoption
- Cold storage and packaging technologies
 - limited government funding and lack of private sector investment interest
- Integrated digital platforms; pest & disease software; precision farming & irrigation technologies
 - Poor internet and cell phone connectivity

Policy responses to technological changes in fruit

1. Invest in spectrum and internet infrastructure in fruit growing areas (mainly rural areas)
2. Develop integrated systems of linking growers and producers' in-house systems to ports, logistics companies and shipping lines to address congestion at the ports
3. Investments in laboratory equipment and skills in quarantine facilities to promote local breeding of varieties and timeous processing of imported varieties