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Oranges and labourers: The potential for job creation in the citrus sub-sector of South Africa

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PLAAS Working Paper 54: Oranges and labourers: The potential for job creation in the citrus sub-sector of South Africa

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ABSTRACT

Rural employment is a key policy issue in South Africa, yet the National Development Plan (NDP) of 2012 suggests that one million jobs can be created in agricultural production, processing and related activities. The plan suggests that more jobs can be created by increased investment in water and irrigation infrastructure, linking small scale farmers with markets, creating tenure security for farmers in communal areas, innovative financing and joint ventures. In the plan, a matrix depicting “agricultural growth and employment potential” shows that citrus, nuts, subtropical and deciduous fruit and vegetables demonstrate potential for both high growth and labour intensity. This Working Paper focuses on the potential for job creation in the citrus sub-sector, which is believed to be one of the biggest employers in agriculture as well as one of the sub-sectors with the biggest potential for job creation due to the dynamic nature of its expansion. Ongoing research shows that jobs can indeed be created through the expansion of orchards in the large-scale commercial sector and by establishing orchards on land designated for production by new black farmers, as well as in citrus nurseries, packing sheds and in processing. However, expansion of production is constrained by the availability of water, access to capital to buy land and establish orchards and the struggle to enhance market access in a global environment of proliferating non-tariff barriers and competitive trade negotiations. Furthermore, the recent introduction of a National Minimum Wage (NMW) at a higher level than the sectoral determination for agriculture may lead to efforts to rationalise the present workforce, rather than creating jobs, whereas accumulation strategies of commercial farmers are often aimed at mechanisation, reorganisation and casualisation in order to employ fewer workers.

Keywords: citrus, agriculture, job creation, citrus production, resources, constraints

ACRONYMS

CBS	Citrus black spot
CGA	Citrus Growers' Association
DAFF	Department of Agriculture, Forestry and Fisheries
EU	European Union
ILO	International Labour Organisation
NAMC	National Agricultural Marketing Council
NEDLAC	National Economic Development and Labour Council
NDP	National Development Plan
NMW	National Minimum Wage
NPC	National Planning Commission
PPECB	Perishable Products Export Control Board

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employment dynamics and factors that affect employment, e.g. legislation, mechanisation and other strategies aimed at improving production efficiency. It then describes the methodology used and provides a profile of the farmers and upstream and downstream actors who were interviewed in Limpopo and the Western Cape provinces. Following a discussion of their views on the prospects for job creation, the focus of the report shifts to an exploration of the prospects for job creation, constraints to job creation and recommendations for creating more jobs in the sub-sector.

2. HISTORY OF THE CITRUS INDUSTRY IN SOUTH AFRICA

Citrus was first planted in South Africa in the 17th century. According to the "Dagjoernaal" (daily journal) of the Dutch East Indian Company at the Cape, citrus trees were brought to South Africa from the island of St Helena in 1654, to be planted in the Dutch East Indian Company's gardens in Cape Town. These citrus trees yielded their first fruit in 1661. However, after that entry, the journal is silent about the subsequent use of the citrus fruit. Cartwright (1977:8), who compiled a history of the South African citrus industry, found anecdotes of citrus planting after 1850 in some Western Cape towns, as well as near Grahamstown in the Eastern Cape, near Rustenburg in Northwest Province and Tzaneen in Limpopo.

The story of citrus seems to follow the general narrative of the Dutch and early British colonialists not investing much in the development of agriculture in the colony at the southern tip of the African continent. On the other side of the globe, however, in parts of America, particularly California and Florida, the citrus industry was well developed by 1849 when gold was discovered in California. This discovery brought 10 000 aspirant gold-diggers to the region and raised the demand for food and fruit, especially oranges. By 1894 California and Florida were producing 6 million boxes of oranges per year. Incidentally, that was about the time when gold was also discovered in South Africa. In response to the population influx to the mines, citrus farmers from Rustenburg packed oranges in boxes and tins and sent them to Market Square in Johannesburg where the fruit sold well, but Cartwright (1977:10) reports that this development was hardly the beginning of the South African citrus industry.

According to historians, the South African citrus industry owes a great deal to the Californian industry for most of the early progress made with citrus production and exporting (Cartwright, 1977; Malherbe, 1999). Even though America is located in a different hemisphere, California displays similar agro-ecological characteristics to some citrus growing areas in South Africa, and the American experts that South Africa "imported" would transform the industry (Cartwright, 1977). The development of refrigerated railway trucks and cool chambers for transporting and shipping fruit over long distances in America in the late 1800s opened up possibilities for South African citrus farmers to export their fruit to supply Britain and Europe with citrus fruit during the northern hemisphere summer (Cartwright, 1977:12, 14).

Citrus fruit from South Africa was exported in 1907 for the first time, and thereafter citrus was exported every year. Besides horticultural inputs from American experts, the

industry would in future benefit from co-operative packing, single-channel marketing, supportive legislation and generous state support. In 1910 a group of citrus farmers in the Rustenburg district formed the first co-operative citrus growers' association, and others would follow soon (CGA, 2007). The period after the formation of the Union of South Africa in 1910 was marked by wealthy investors and greedy speculators buying land to establish agricultural "estates". After the First World War, decommissioned soldiers were lured to "sunny" South Africa to take up land and grow citrus in these "settlements". Although many of them failed, as many succeeded to grow oranges, lemons and grapefruit (Cartwright, 1977).

Exports were growing and by 1921 citrus farmers began to discuss the formation of a citrus exchange, but the deciduous fruit growers (and the Department of Agriculture) insisted on a joint fruit exchange. Resultantly, the "Vrugtekwekers Ko-operatiewe Beurs van Suid-Afrika Beperk" (Fruit Growers' Co-operative Exchange of South Africa Limited) was formed in 1922 to represent the growers of citrus fruit, pineapples and deciduous fruit. By 1925 South Africa was exporting a million cases of citrus fruit (Cartwright, 1977; CGA, 2007).

This union did not last very long, and after the citrus and deciduous fruit industries parted ways in 1927 the Citrus Exchange was formed. The exchange would soon become the sole representative of the citrus industry in South Africa. Emboldened by the provision for a single channel marketing system in the Marketing Act of 1937, the Citrus Exchange became successful and rather powerful. In fact, Larsen and Fold (2008:19) consider the resilience of the single channel marketing system a "remarkable feature" of South Africa's citrus export industry:

... between 1940 and the late 1990s, a single organization coordinated all of the country's citrus exports. Known first as the South African Citrus Exchange and later renamed Outspan International, this organization's control over citrus exports allowed it to establish an impressive infrastructure for citrus production and distribution that included nurseries, research laboratories and cooling and packing facilities, both locally and overseas. By the mid-1990s, Outspan International had also established overseas offices in North America, Europe and Asia (Larsen and Fold, 2008:19).

The Citrus Exchange/Outspan International launched a promotion campaign for Outspan oranges. This campaign came to an end after anti-apartheid boycotts in Europe (Marsden, 2008). After deregulation in 1997, Outspan International lost its exclusive control over citrus exports, and for the first time in 50 years independent agents were allowed to export South African citrus, albeit with disastrous consequences.

In the first year after deregulation, more than 150 new agents, both local and foreign, could be found competing for the produce of some 1200 citrus growers in South Africa, Zimbabwe, Swaziland and Mozambique" (Larsen and Fold, 2008:19).

The effects of deregulation were experienced throughout the value chain. After deregulation government export subsidies were ended and the single channel marketing system was dismantled (Greenberg, 2002). The private regulation of the industry and the rise of supermarket power in value chains that followed, forced the sub-sector to shift its focus from volume to quality, in line with overseas market

demands (Mather, 2002). Mather (2008:81) concurs that the citrus industry body could manage quality problems during the regulated era, but with a fragmented supply system after deregulation, these systems “broke down”. Importers and buyers in Europe exploited these quality problems of the post-deregulation era and discounted all citrus from South Africa (Mather, 2008).

The discounting of South African citrus, the arrival of early maturing citrus varieties from South Africa at a time when there were large volumes of unsold northern hemisphere citrus on the market and small fruit due to unfavourable weather resulted in very low prices and a R600 million decrease in South African export earnings in 2000. The industry was in a crisis and the situation was exacerbated by large numbers of export agents who were unskilled in dealing with difficult conditions in the market (Mather, 2008).

Industry stalwarts suggested that if the citrus sector had still been regulated through a single desk, the very experienced single channel agent would have managed the crisis far more effectively. In late 2000, the industry responded by establishing Citrus Southern Africa, a producer’s organization aimed at regulating the activities of private exporters (Mather, 2008:79).

Deregulation and the dismantling of the system of single channel marketing led to the differentiation of citrus farmers (Greenberg, 2002; Mather and Greenberg, 2003) into “larger commercial farmers” and “small farmers”. The former were able to begin marketing and exporting on their own, and taking risks without fearing that they would have to close down if there was a failure for one season (Greenberg, 2002, no page numbers). The larger commercial farmers were also the first to break away from co-operative packing sheds to establish their own.

Another source of differentiation was the citrus black spot (CBS) free status of orchards in the Western Cape that enabled producers in that region to gain access to the lucrative North American market. So successful was their entrance into that market that export volumes increased from 30 000 cartons in 1997 to more than 1,5 million in 2002. Although Western Cape citrus exports to the US represent only 3% of total exports from South Africa, it earns 17% of total citrus export income (Mather, 2008:96).

While the Citrus Exchange performed its functions predominantly for the benefit of white farmers, during the 1980s the apartheid government’s so-called homeland policy saw the establishment of black citrus farmers in large-scale agricultural projects in the former bantustans of Ciskei, Lebowa, Gazankulu and Bophuthatswana. Citrus production remained a small proportion of total agricultural production, but black farmers exported some citrus and were represented on the Citrus Exchange by the agricultural corporations or estates (Mather and Greenberg, 2003:37-38, Mather, 2008).

The period after deregulation was particularly difficult for black farmers. In the former homeland of the Ciskei, the agricultural estates were divided into small farms and from the early 1990s black farmers could buy farms through the Ciskei privatisation programme. A farmer in the Kat River Valley near Fort Beaufort in the Eastern Cape said the ten farmers who bought farms managed to farm well with “guidance, mechanisation and financial support” from the Ciskei Agricultural Corporation (Ulimocor). However,

when Ulimocor was liquidated after deregulation in 1997, it became too difficult to farm (Hollins, 2015).

Although black farmers in Greenberg's (2002) study sample were more privileged than most other black farmers, they were in a "catch-22" situation after deregulation and the demise of Ulimocor:

The farmers are unable to produce at the quality and quantity required for export unless they get access to credit for production inputs and for orchard expansion and upgrading. They are unable to get the required credit because they do not have formal ownership of the land, which would serve as collateral. The reason for the farmers' failure to get formal title is that they have debts outstanding to the government, which wants these debts to be repaid in one form or another before title can be given. The farmers need to increase their export pack-out to generate enough income to cover running costs and repay the debt. In turn, increased export production requires a regular and timely supply of inputs in the short term, and replanting of trees in the short and medium term. This leads back to the beginning of the circle, which is the need for access to credit (Greenberg, 2002: no page numbers).

An industry body, the Citrus Growers' Association (CGA), was founded in 1997 by citrus growers who were concerned about the discontinuation and downsizing of functions that were previously performed by the Citrus Board. The CGA's mandate is to "gain and retain market access, to set standards for fruit and quality, to fund and control research and development, to drive industry transformation and to represent growers" for citrus industry stakeholders, i.e. government, exporters, research institutions and suppliers to the industry. A statutory levy was introduced in 2002, and is administered by the CGA under the guidance of the National Agricultural Marketing Council (NAMC) (CGA, not dated).

3. THE CITRUS SUB-SECTOR AND ITS ENVIRONMENT

The South African citrus industry is the sub-sector in agriculture that makes the biggest contribution to export earnings and job creation. The share of South Africa's citrus exports in terms of the value of total world exports has doubled from 4% to 8%. Citrus is also the country's biggest agricultural export product. (BFAP, 2017:6)

Production

Approximately 1200 citrus growers produce more than 122 million boxes of export citrus per year. In 2017 72 731 ha of citrus was planted, of which 17 859 ha is not bearing fruit yet (Edmonds, 2017: e-mail communication). Four groups of citrus, i.e. oranges (Navels and Valencias), lemons and limes, grapefruit and soft citrus (Clementines, Satsumas, etc.) are grown in all provinces except the Free State Province. Limpopo, with 30 293 ha of citrus orchards, the Eastern Cape (18 969 ha) and the Western Cape (12 136 ha) are the three largest citrus production areas of South Africa, comprising 84% of the total area under citrus in 2017 (CGA, 2017). Mpumalanga, Limpopo and KwaZulu-Natal have warmer climates better suited to the cultivation of grapefruit and Valencia oranges, whereas the cooler winter climates of the Western

Cape and Eastern Cape make them suited to the production of Navel oranges, lemons and easy peelers, e.g. Clementines and Satsumas.

According to CGA records, 17 859 ha was planted (see Table 1), but was not yet bearing fruit at the time of writing this report. Almost 60% of the new plantings are soft citrus and lemons.

Table 1: New citrus orchards, age group 0 to 5 years

Citrus type	Hectares
Grapefruit/Pummelos	476
Kumquats	7
Lemons and limes	4 508
Navels	2 683
Soft citrus	6 174
Valencias/Midseason	4 011
TOTAL	17 859

Source: John Edmonds, 2017: e-mail communication

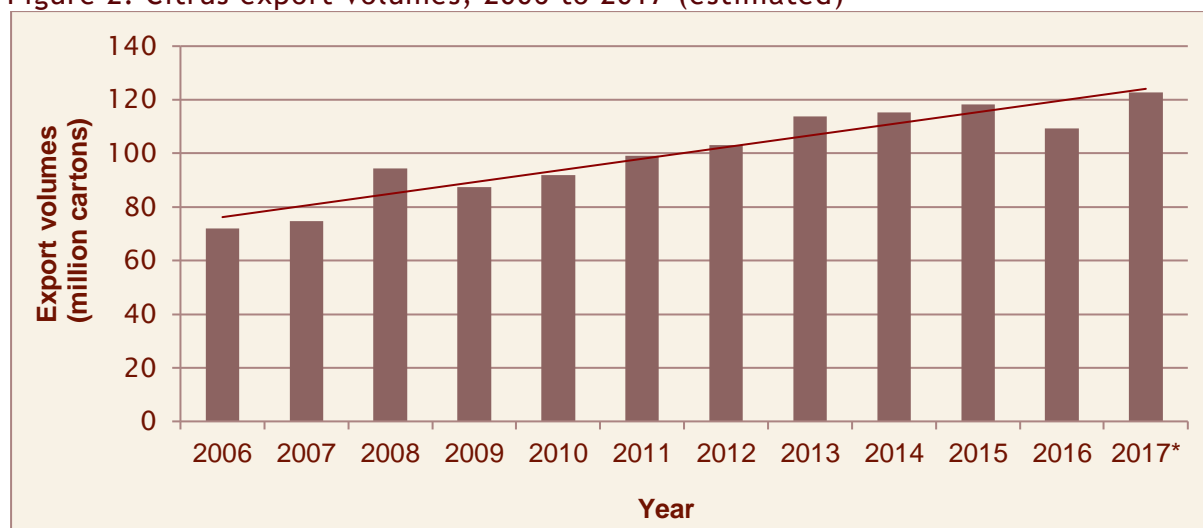
Reasons for the expansion in soft citrus and lemons are increased revenues because of the weakening exchange rate and an improvement in export market opportunities (USDA Foreign Agricultural Service, 2016).

At the time of writing this report the citrus sub-sector was experiencing relatively favourable economic conditions due to the depreciation of the Rand from about R7/\$ at the end of 2010 to a band of R11/\$ to R14/\$ in 2018; growth in established European Union (EU) markets and the development of new markets in the Middle East and Asia. However, ongoing expansion of orchards, especially in lemons (Botha, 2016a:50-51) and soft citrus (Barry, 2017), leaves farmers and other industry actors concerned about markets. Farmers are also concerned about the secondary effects of a country-wide drought and pressure on the supply of water (Raats, 2016:18, Van Wyk, 2016a, 2016b), as well as the unresolved phytosanitary matters of citrus black spot (CBS) disease in the northern parts of the country for exports to the European Union and false codling moth (FCM) in other export markets (Hattingh, 2017).

In general, citrus production is expanding where irrigation water is available or citrus can replace other irrigated crops, e.g. potatoes or wine grapes, especially in the Western Cape. Well-founded optimism about the sub-sector has led to new citrus areas being planted across the country, e.g. Burgersfort and Ohrigstad in Limpopo, Humansdorp in the Eastern Cape and the Sandveld, Swellendam/Heidelberg and Robertson/Ashton areas of the Western Cape.

The citrus industry has a stated aim of growing citrus exports by 6% per year. While a countrywide drought in 2015 and 2016 temporarily thwarted this aim in 2016, projections for the 2017 harvest show that the industry is back on its growth path with an expected 122,8 million (122 809 304) cartons of 15 kg each (Raats, 2017). Figure 2 shows the steady increase in citrus exports since 2006.

Figure 2: Citrus export volumes, 2006 to 2017 (estimated)



Source: CGA Annual Reports, 2006 to 2017

Progress with the transformation of the industry is slow. Black farmers grow citrus on 10,7% of the total orchards (68 272 ha), yet only about 2,3 million cartons or 2,1% of the 109,2 million cartons of citrus that were exported in 2016 were grown by black farmers. Of a total of 123 black citrus growers, only 51 (approximately 42%) export citrus. Most of them sell fruit in the local market and for processing (Mashaba, 2017). Table 2 shows the distribution of black citrus growers in the provinces and the average size of their enterprises.

Table 2: Black citrus farmers per province

Province	Enterprises	Citrus planting	Average size of enterprise
Limpopo	44	2 385 ha	79 ha
Eastern Cape	36	1 927 ha	54 ha
KwaZulu-Natal	17	1 337 ha	54 ha
Mpumalanga	11	749 ha	68 ha
Gauteng/Northwest	5	130 ha	26 ha
Western Cape	7	216 ha	31 ha
Northern Cape	3	577 ha	192 ha
TOTAL (BLACK GROWERS)	123	7 320 ha	
TOTAL (INDUSTRY)		68 272 ha	

Source: Mashaba, 2017

In order to grow black farm enterprises, the CGA launched a Citrus Grower Development Company (GDC) on 18 March 2016 with a mission “to support the establishment and growth of sustainable and profitable black citrus growers with market linkage to ensure food security, job and wealth creation” and a vision to become a leading commodity development company that transforms the agricultural landscape by empowering black citrus growers. The development company receives its funding in accordance with the statutory requirement that 20% of the 68 cent levy paid on each 15 kg carton of citrus exported is used for “transformation” (CGA, 2016a:28).

Markets

Markets for South African citrus by *volume* include export (67%), processing (27%) and the local market (6%). A high proportion of 92% of citrus *income* is earned in the export sector, with the remaining 8% evenly split between domestic consumption and processing (Chadwick, 2016:personal communication). Traditionally, South African citrus was only exported to Britain and Europe. While these markets are still important - they received 65% of soft citrus, 43% of the oranges exported in 2016/17, 38% of the grapefruit and 32% of lemons - new markets opened for South African citrus after 1997. In 2016/17 the Middle East and Southeast Asia received 56% of lemon exports and 38% of oranges exported from South Africa (CGA, 2017).

India, as well as countries in the Far East, e.g. China and Hong Kong are important “growth markets” where the CGA is trying to increase export opportunities for South African citrus (CGA, 2016a). In 2015 South Africa’s combined exports of oranges to Indonesia, Japan, Korea, Vietnam, Thailand, China and Hong Kong were 103 802 tonnes, of which 85% went to China and Hong Kong. South Africa’s average market share in these countries is 6% (Kapuya and Sihlobo, 2016).

Even though South Africa is only the 11th biggest *producer* of citrus in the world, it is the second biggest *exporter* of citrus, after Spain (Kapuya *et al*, 2014). Citrus fruit is South Africa’s largest agricultural export product by value. In 2015 the sub-sector exported a record 118 million boxes of citrus and brought in R13,2 billion in export earnings. Due to a prolonged drought in the Limpopo Province and a subsequent decrease in production, citrus exports were lower in 2016. According to the CEO of the CGA the 2017 harvest of an expected 122 809 304 of 15 kg boxes exported will set a new record (Raats, 2017).

The sub-sector’s ability to export such large volumes of citrus can be attributed to three broad factors, namely, the adoption of varieties that are in demand on global markets; improved management for fruit quality; and efficient delivery to markets world-wide. The industry’s ability to meet stringent health, safety and phytosanitary standards and requirements contributes to its success. In view of South Africa’s global competitiveness in citrus production, the sub-sector has an important place in the country’s export-led growth strategy (Kapuya *et al* 2014:125).

The economics of citrus production

It can be quite costly to buy land, plant a citrus orchard and sustain it for the years before it begins to bear fruit and before the operation starts to show a profit, according to Reinhardt Siegruhn (2017), owner of a Paarl-based business which develops benchmarks for the production of citrus, avocados and macadamia nuts.

The price of land suitable for citrus farming ranges between R200 000 and R400 000 per hectare, while it costs R100 000 to R150 000 to establish a hectare of citrus. Annual production costs can be in the range of R30 000 to R102 000 per hectare. Of that, 36% is for labour, 24% for agricultural chemicals, 10% for fertiliser, 9% for electricity and 12% for fuel and oil. These proportions vary between farms (Siegruhn, 2017).

Employment in the citrus sub-sector

The citrus sub-sector is believed to be one of the biggest employers in agriculture. Different employment numbers are quoted, e.g. a labour model applied by Meyer *et al* (2012) shows that the citrus industry is agriculture's largest employer, employing a total of 85 200 workers. This number excludes the "unspecified number of people employed throughout the citrus supply chain services such as transport, port handling and allied services" (Morokolo, 2011, in Kapuya *et al* 2014:125). Also, just over 10 000 of those workers are employed in permanent positions, a fact, which if true, highlights the extent of casualisation in the sub-sector. The National Development Plan (NDP) calculates employment in the citrus sub-sector on the basis of one worker per one hectare of citrus; thus 60 000 workers in 2011 and a further 40 000 jobs were created for six months of the year in packing sheds (NPC, 2011).

Two Department of Agriculture, Forestry and Fisheries (DAFF) reports on the citrus value chain (Morokolo, 2011 and Mogala, 2015) place employment in the sub-sector at "over 100 000 workers", whereas the chairman of the CGA stated in the association's 2016 Annual Report that the number for the sub-sector is approximately 125 000 (CGA, 2016a, 2017). He further asserted that the citrus sub-sector can, "on average, create a permanent job opportunity for every R400 000 capital development compared to a national figure of R2 million" (CGA, 2016a:3).

While the area under citrus orchards has increased from 56 623 ha in 2007 to 65 584 ha in 2015 and the industry's export output has grown from 72 million 15 kg-boxes in 2006 (CGA, 2007) to 118 million boxes in 2015 (CGA, 2016a), job creation has not necessarily grown to a similar extent in the sub-sector as a whole. Evidence from South Africa's two largest and fastest growing citrus regions, the Eastern Cape and Limpopo, shows diverse results. Firstly, Clarke (2014:5) found that the overall number of workers employed on all farms in the Sundays River Valley sample increased, "some by as much as 300%", mostly due to an increase in hectares planted to orchards, but that the number of jobs per hectare may have declined "slightly".

At the bi-annual CGA Citrus Summit, De Klerk (2017) showed increasing employment rates on farms (see Table 3) and in packing sheds (see Table 4), based on surveys conducted among farmers and packing shed managers.

Table 3: Employment on citrus farms, 2009 and 2016

	Surveys	
	2009	2016
Hectares	56 623	68 272
Permanent workers	17 987	24 764
Per hectare	0,318	0,363
Seasonal workers	38 915	52 674
Per hectare	0,687	0,772
Total employment	56 902	77 439
Per hectare	1,005	1,134

Source: De Klerk, 2017

According to De Klerk (2017) the numbers of both permanent and seasonal workers increased between 2009 and 2016 when citrus hectares increased from 56 623 ha to 68 272 hectares. Employment per hectare increased from 1 005 to 1 134.

Table 4: Employment in the citrus sub-sector: Packing sheds

Packing shed survey	2016
No of boxes exported	107 million
Permanent workers	16 166
Per 1000 boxes	0,151
Seasonal workers	53 500
Per 1000 boxes	0,5
Total employment	69 666
Per hectare	0,651

Source: De Klerk, 2017

De Klerk (2017) did an employment survey of packing sheds in 2016 and found that 0,151 permanent jobs and 0,5 seasonal jobs were created per one thousand export cartons of citrus packed. Other studies show that job creation in the citrus industry does not necessarily show a positive correlation between hectares grown and employment, as in De Klerk's surveys. A recent PhD study about accumulation in large-scale commercial farming in the Letaba region of Limpopo found that since 1994 citrus producers reduced the number of both permanent and seasonal workers through mechanisation and re-organisation of production activities, e.g. applying fertilisation, weeding, irrigation and harvesting, in order to enhance cost effectiveness and labour productivity (Genis, 2015). Such strategies and processes aimed at reducing the number of workers and/or increasing their productivity are ongoing activities on the majority of the 141 farm enterprises in this study, of which 26 grew citrus for export purposes (Genis, 2015).

While the former may constitute a form of low-level, but continuous job-shedding, events such as the introduction of a minimum wage for agriculture has led to drastic decreases in employment. For example, Minnaar (2008) found that farmers replaced permanent workers with temporary workers and that 1 270 permanent jobs were lost on 38 farms in the Letaba district of Limpopo after a minimum wage was introduced in 2003.

Prospects for job creation

Job creation in agriculture enjoys considerable attention in different forums, where optimistic projections are often presented. At a job creation *imbizo*¹ in Johannesburg, organised by Standard Bank and academics from the Universities of Stellenbosch and Pretoria, the CGA's (2011b:no page numbers) presentation on behalf of the citrus sub-sector stated that if the industry could "open up China, Eastern Europe and India to the full potential" they could export 45 million cartons more and create 30 000 farm jobs and 20 000 jobs in packing sheds and "the immediate supply chain".

A Bureau for Food and Agricultural Policy (BFAP) exercise to model employment creation in preparation for the rural chapter in the NDP, showed that almost 25 000 jobs can be created in citrus production, upstream and downstream from farming if the area under citrus were expanded by 15 000 hectares (see Table 5).

Table 5: BFAP's job creation projections, with 2010/2011 as basis

¹ A gathering, usually called by a traditional leader (<https://en.oxforddictionaries.com/definition/imbizo>)

Area 2010/11	Potential expansion	Potential expansion	Labour multiplier	Additional jobs on farm	Linkages multiplier	Up/down-stream jobs	Total
60 000	25%	15 000 ha	1	15 000	0.66	9 900	24 900

Source: BFAP, 2011

In her presentation at the 2017 CGA Citrus Summit in Port Elizabeth, De Klerk (2017) used the results of surveys conducted on farms and in packing sheds in 2009 and 2016 to make projections of job creation opportunities on farms and in packing sheds for 2021 and 2026. According to her projections, 30 985 extra jobs could be created in the next ten years. Approximately two-thirds of the jobs would be seasonal.

Table 6: Employment in the citrus industry: Farms

	Surveys		Projections	
	2009	2016	2021	2026
Hectares	56623	68272	87366	95590
Permanent workers	17987	24764	31690	34673
Per hectare	0,318	0,363		
Seasonal workers	38915	52674	67406	73751
Per hectare	0,687	0,772		
Total employment	56902	77439	99096	108424
Per hectare	1,005	1,134		

Source: De Klerk, 2017

De Klerk's (2017) projections show that a further 6 468 permanent jobs and 74 913 seasonal jobs could be created in packing sheds if exports increased in 2021 and 2026 as projected.

Table 7: Employment in the citrus sub-sector: Packing sheds

Packing sheds	Survey	Projections	
	2016	2021	2026
No. of cartons exported	107 million	137 million	150 million
Permanent workers	16 166	20 687	22 634
Per 1000 cartons	0,151		
Seasonal workers	53 500		
Per 1000 cartons	0,5		
Total employment	69 666	89 150	97 547
Per hectare	0,651		

Source: De Klerk, 2017

A measure generally quoted by citrus farmers in Limpopo to measure labour productivity is "hectare per permanent worker". At least one farmer said that this measure had increased from 1 ha per worker to more than 4 ha per worker in the 20 years since 1994 (Genis, 2015). This development challenges the validity of the "one worker per one hectare" rule, as applied by the NDP, and De Klerk's (2017) projections, and may have implications for projections for the job creation potential for the sub-sector.

Another development to watch in all horticultural export sub-sectors is the reorganisation of the way fruit is picked and its impact on temporary or seasonal

worker numbers. By the time Genis (2015) had concluded her study of accumulation and differentiation in the large-scale commercial farming sector in Limpopo, one of the citrus farmers in her study had achieved a 40% reduction in the number of workers needed to pick citrus fruit. That farmer found that by placing several bins, at regular intervals in the orchard rows, pickers could pick more fruit per day because they no longer had to walk to the end of the row to empty their "*pluksakke*" (bags holding the picked fruit). The bins were lifted by forklifts and transported to the packing shed.

This system is also used in citrus farming in the Eastern Cape (Botha, 2015:68-69) and equipment for a similar purpose was built by an engineering company in the town of Ceres, in the heart of one of the deciduous fruit growing areas of the Western Cape (Reid's Engineering, not dated).

Employment issues and factors affecting employment

In the run-up to the finalisation of the National Development Plan (NDP), different aspects of agriculture were discussed at a range of "Agri-Leadership Imbizos" organised by the Standard Bank Centre for Agri-Business Development and Leadership of Stellenbosch University (Standard Bank Centre for Agri-Business Development and Leadership, not dated).

According to the centre's website:

Prominent agri-leaders and opinion makers are invited to discuss "hot topics" in agricultural transformation in a "laboratory setting" to stimulate "out-of-the-box" debate and discussion in the attempt to develop new solutions. Only consensus statements ("one-pagers") are formally published on the Centre's website and are communicated to institutions such as the National Planning Council, various representative groups in agriculture, government agencies and other relevant public bodies. Inputs were also made to, and accommodated in the National Development Plan (Standard Bank Centre for Agri-Business Development and Leadership, not dated).

At a 2011 job creation *imbizo* the CGA's (2011b) presentation on behalf of the citrus sub-sector stated that growth and job creation are curtailed by factors that affect its competitiveness, e.g. huge increases in regulated prices (electricity, fuel, ports etc.) whereas present labour laws act as a disincentive to employ. They suggested that government assist the sub-sector's growth initiatives by partnering with industry in market access activities through breaking down tariff and non-tariff barriers to trade.

Minimum wages

The South African government is pursuing the often conflicting goals of job creation and raising minimum wages (BFAP, 2015). Minimum wages for farm workers were introduced in March 2003, at R650 per month for workers in “rural” areas and at R800 per month in “urban” areas. When the minimum wage was introduced, only about 30% of farm workers were earning more than the urban minimum, and 50% were earning less than the rural minimum (Stanwix, 2013).

Stanwix (2013:2) found that the aggregate employment on farms may have decreased by around 13% in the four years after 2003. Despite fewer workers, output was maintained through “higher labour productivity, increased mechanisation or a combination of these two forces”. Minnaar (2008) found that farmers replaced permanent workers with temporary workers and that 1 270 permanent jobs were lost on 38 farms in the Letaba district of Limpopo after a minimum wage was introduced in 2003. Minnaar (2008) further found that remaining workers were expected to do more, as expressed in increased hectares per worker.

Following violent farm worker strikes in the table grape and wine growing areas of the Western Cape at the end of 2012 and the beginning of 2013, the minimum wage for farm workers was increased by 51,2%. When BFAP (2015) assessed the impact of this increase, they found that the average self-reported wage of these workers increased by 29,2%.

The shortfall between the legislated and the reported increases can be attributed to some workers already earning more than the minimum wage before the increase; possible under-reporting of wages and increased use of non-wage benefits by employers; or decreased compliance levels by employers. The data also indicated that the number of hours worked declined by 1,2 hours, on average, with the hours of permanent workers showing the greatest decline (BFAP, 2015).

Most of the decline was for higher level permanent workers, while BFAP (2015) found that the wage increase of 2013 had a statistically insignificant impact on the employment of both permanent and seasonal entry-level workers.

After years of research and debates, a national minimum wage was announced in November 2016 (National Treasury, 2016). It was set at R3 500 per month and 20 per hour. When Adelzadeh and Alvillar (2016) used economic modelling techniques to quantify the impact of four national minimum wage (NMW) scenarios for South Africa, they found that an NMW could yield positive overall macro and micro-economic outcomes. The introduction of the NMW would prompt “direct, indirect and dynamic responses in the labour market, household income and expenditure, and production” (Adelzadeh and Alvillar, 2016:53).

On 1 March 2018 the minimum wage was increased to R3 169,19 per month and R16,25 per hour.

Casualisation and externalisation

The casualisation² and externalisation³ of work on farms are two of the most prominent developments in the restructuring of farm labour since 1994. Farm worker statistics show that at some stage after 2000 the relationship between “regular” and “casual” workers became equal, after which the trend changed to proportionally more “casual” workers (Liebenberg, 2013). Roberts (2009:45, in Visser and Ferrer, 2015:59) estimated that between 1996 and 2007 the casual share of total farm labour increased from about one third to almost half.

Research by Simbi and Aliber (2000), Du Toit and Ally (2003), Theron (2012) and Visser and Ferrer (2015) also found an increase in the use of “temporary employment services” (also known as labour brokers). In fact, Du Toit and Ally (2003) found that externalisation is “rampant” in the Western Cape, as 55% of producers on the 77 fruit and wine farms in their survey in that province said that they used “intermediaries”, who are either labour brokers or contractors.

Theron (2012:4) distinguishes between different forms of temporary employment services: “labour brokers”, who provide seasonal workers, who “work under the direct or indirect supervision of the farmer”, and “contractors”, who undertake specialist tasks such as trellising and pruning.

The trend away from employment of regular, permanent workers, and an increase in the use of casual workers impacts on the job security and consistency for workers (Simbi and Aliber, 2000). The increase in casualisation and externalisation offers benefits to employers, because seasonal workers are usually paid less than permanent workers, but also have lower non-wage costs (Visser and Ferrer, 2015).

While permanent workers sometimes have access to a pension fund, seasonal workers do not; and whilst permanent workers are often housed in on-farm accommodation and enjoy access to free, or subsidized crèche facilities for their children, seasonal workers increasingly live off-farm in accommodation that they pay for themselves. Although the farmer usually pays for their transport to the workplace, this cost is minimal considering the costs of providing on-farm accommodation ... Seasonal contracts also provide farmers with a high degree of flexibility to cope with increasing commercial insecurity and competitive pressures (Visser and Ferrer, 2015:52).

Mechanisation and automation

Policymakers and strategists often place much confidence in the ability of the so-called labour intensive agriculture industries to create jobs because some tasks, e.g. harvesting, are difficult to mechanise or automate due to “stringent technical requirements” for export fruit. This does not prevent inventors from trying to develop machines that can replace humans at harvest, though. The challenge is supposedly to design a (robotic) system that can “detect fruits inside a complex canopy” whilst the

² According to Visser and Ferrer (2015) casualisation refers to the process of re-employing workers who were previously employed on a permanent basis on part-time time or fixed term contracts (such as seasonal contracts).

³ Externalisation refers to the process where employees are no longer employed directly by the primary employer, but instead employed via an intermediary (such as a labour broker) that is contracted by the primary employer (Theron (2012) in Visser and Ferrer, 2015).

robotic arms needs to “rapidly, economically and gently, pick the fruit” (Ghaffarzadeh *et al*, 2017: not numbered).

It needs to be mentioned that a citrus harvester, the OXBO 3220, with a “continuous travel canopy shake and catch harvesting system” exists. The harvester is manufactured in the United States of America by Oxbo International Corp and can harvest at a rate of eight seconds per tree, with a removal rate of up to 95%. According to the website of a Turkish company that sells the citrus harvesters, a pair of these harvesters can harvest a million pounds (453,6 tonnes) of fruit per day and can replace 120 workers (<http://www.hasmak.com.tr/portakal-toplama-makinasi/eng/citrus-harvesters.html>).

South African farmers say that the shaking action damages the tree in the long run and the action is too severe to harvest blemish-free citrus fruit for export. It is therefore used for fruit harvested to be processed into juice.

It is worth noting that more gentle fruit harvesting machines no longer seem to be such a far-fetched idea. Energid, an American company that develops software and robotics systems for the aerospace, agriculture, manufacturing and medical industries has tested a robotic citrus-harvesting system in a Valencia orange grove in Florida. The system has a picking speed of two to three seconds per orange, a picking rate of approximately 50% and a picking thoroughness of approximately 80%. The cost of the machine is reported to be comparable to that of human labour (Energid, not dated). In addition, Ghaffarzadeh *et al* (2017: not numbered) report that experiments with fresh apple robotic harvesting are at the point of “late stage prototyping” and that market adoption will start from 2022/2023 onwards, while a machine is being tested to harvest strawberries (Brat, 2015).

Even if South African citrus producers are not employing mechanical harvesting of fruit, Genis (2015) found that citrus farmers in Limpopo have mechanised other tasks and functions, e.g. they changed from hand-weeding to chemical control of weeds and sprinkler or drip irrigation systems that require less labour.

In citrus packing sheds optic sizers that sort fruit into colours and sizes with a very high degree of accuracy (Mather, 2008:98) and sorting machines are quite common. A recent development is automatic packing machines that pick up fruit and pack them in boxes. A South African company manufactures automatic packing machines that can replace four to six workers (Gossamer Structures, not dated).

Skills levels of workers

Despite rural unemployment, the agricultural sector experiences a shortage of skilled labour. Fruit producers and packing shed managers increasingly need workers that are better educated and skilled to manage the complex quality requirements of different supermarkets and to improve efficiency. Even so, public and private training suppliers are not sufficiently resourced to train enough skilled workers (Barrientos and Visser, 2012).

Worker organisation

In South Africa farm workers are notoriously un-organised, often due to isolation on remote farms in the arid areas (Atkinson, 2007) and in labour-intensive sub-sectors due to the fact that a larger proportion of workers are seasonal workers with high job insecurity (Barrientos & Visser, 2012). In their report for the International Labour Organisation (ILO) Visser and Ferrer (2015:30) found that membership of trade unions was “very rare amongst workers in the formal sector of the agricultural industry who have employment of a limited or unspecified duration.”

Additionally, within the category of workers with employment of a permanent nature, the incidence of trade union membership was low for farmhands and labourers (11.4%), motorized farm and forestry plant operators (13.4%) and hand-packers and other manufacturing labourers (19.3%) (Visser and Ferrer, 2015:30).

Visser and Ferrer (2015) also found geographical variation in membership of trade unions, e.g. 10,9% in Mpumalanga, 9,7% in the Eastern Cape and 7,5% in KwaZulu-Natal. In addition, women are on average more likely to be members of trade unions than men.

As for possible reasons for the relatively low membership of trade unions, Barrientos and Visser (2012) reckon that, given the high turnover and low job security of the majority of seasonal farm workers, it is more difficult for trade unions and civil society organisations to represent or support them. For this reason they also have little bargaining power. Du Toit and Ally (2003) support the notion that it is difficult to organise farm workers, especially outside the “core of ‘insiders’ who increasingly constitute a privileged minority within the agricultural labour force”. Even though they admit that it can be a daunting task to organise workers without permanent employment rights, history shows that seasonal and temporary workers in rural towns are not powerless.

The (uncertain) state of the economy

More robust economic growth is necessary to create more employment (Mlatsheni and Leibbrandt, 2014:239). In South Africa employment grew to almost 14,1 million in the 4th quarter of 2008, after which the economy lost more than a million job opportunities. The drop in employment levels during the recession that followed the global financial crisis was so drastic that the expansion of employment that preceded it was “completely nullified” by the end of 2010 (Bhorat *et al*, 2014:4). The biggest losers were workers in agriculture and mining, and according to Bhorat *et al* (2014:4), more than half a million jobs were lost in agriculture between 2001 and 2012 – mainly driven by the promulgation of the minimum wage in this sector.

Dynamics of reproduction and accumulation in large-scale commercial farming

No study of job creation in any of the sub-sectors of agriculture can claim to address all issues without taking into account the pressures bearing down upon farmers or the nature and dynamics of reproduction and accumulation in the large-scale commercial farming sector.

Pressures on commercial farmers

The large-scale commercial farming sector in South Africa operates in a milieu of ongoing political, legislative, environmental and “market” change. Political and legislative changes include efforts to broaden access to land, water and services in rural areas through land and water reform legislation, to offer redress for past injustices and inequality through land restitution and labour legislation and to change the relationship between people and natural resources through water and environmental legislation. All these changes play out within a neoliberal framework and at the behest of powerful processor-buyers and retailers in a world where the financialisation of food and agriculture has “blurred the line between finance and food provisioning” (Isakson, 2014:13). Farmers experience these changes as “pressures” bearing down on their capacity for reproduction and accumulation (Genis, 2015).

In a survey conducted in 2010 and 2011, Genis (2015) found that the top five pressures bearing down on farmers in Limpopo were labour; production costs; climate and weather; the exchange rate; and crime and farm security. At that stage the Rand/US Dollar exchange rate was barely R7/\$, compared to around R12/\$ in June 2018.

Another pressure mentioned by several researchers (Fold and Larsen, 2008; Mather, 2008; Barrientos and Visser, 2012) is the increase in consolidation in the retail sector, the rise of powerful supermarkets and the increasing quality standards that fruit producers are expected to meet.

Due to their size and market power, supermarkets now play the leading role in the horticultural chain and are able to define the allocation of activities along the chain. The requirements that supermarkets specify regarding, for instance, product variety, delivery, food safety and quality standards have led to a process of differentiation in producing countries (Fold and Larsen, 2008:31).

Differentiation of citrus farmers into “winners and losers” does not reveal how difficult it is for all citrus producers to farm sustainably (Mather, 2008:100). Farmers who continue to participate in high value chains do so under increasingly difficult conditions. Meeting process requirements involves ongoing investment and upgrading of equipment and infrastructure. It also requires significant administrative capacity in terms of registration, auditing and record keeping (Mather, 2008:100).

Farmers acknowledged that these practices contributed to improving the efficiency of their enterprise, but remarked that they come at a high cost, and yet improvements are not necessarily rewarded with higher prices for their produce. In a sense, their investments become the “basic requirements for continued participation” in value chains (Mather, 2008:100). Farmers have little control over many of the pressures affecting the economic sustainability of their enterprises, and farm workers are often the ones drawing the short straw of job shedding (Mather, 2008:100).

Accumulation strategies of large-scale commercial farmers

Genis’s (2015) study of the dynamics of change in the large-scale farming sector in three agro-ecological regions of South Africa, in which 26 citrus farmers from Limpopo participated, reveals farmers’ variety of responses to the pressures mentioned in the

previous section. A pattern was found and farmers can be said to employ the following four broad accumulation strategies:

- a) expanding the scale or scope of production, in other words, to increase the capital intensity of production and/or geographic size, and/or the number of products;
- b) expanding the scale or scope of the business by expanding into new enterprises either up or down the value chain;
- c) increasing economic efficiency, which can be achieved by means of (i) lowering the cost of commodity production, (ii) increasing productivity in terms of yield per hectare or per animal through technical and biological efficiency, or (iii) by organising workers and tasks to make workers as productive as possible; and
- d) taking part in political action in order to reduce uncertainties and/or establish preferential access to and control over key resources, markets or policy processes.

Genis (2015:322) found that the third strategy, increasing economic efficiency, was often the one most commonly employed, and that successful farmers in Limpopo are “continuously organising both permanent and seasonal and temporary workers and tasks in order to make workers as productive as possible, thus reducing labour costs while increasing output.”

As orchards and harvests grow larger, one would expect the seasonal labour requirements for picking and packing to increase, yet my data show this not to be the case. Farmers employ various mechanisms to limit the number of seasonal workers they employ, for example by mechanising certain processes in the packing shed or increasing worker productivity by changing the logistics of harvesting, e.g. by shortening the distance that workers have to walk between trees and picking bins, by using mobile and automatic ladders to speed up movement between trees and different tree heights, or by paying workers in accordance with the weight of fruit they have picked, rather than per bag (Genis, 2015:322-323).

Genis (2015) further found that labour productivity is monitored meticulously and the area of land per worker has, for example, increased from 1,8 ha to 4,5 ha per worker during the past 20 years in at least one enterprise, while another farmer managed to decrease the number of citrus pickers by 40% after he changed the harvest logistics in the orchards.

Despite the fact that all farmers employ at least one of the four accumulation strategies, the majority of farmers employed more than one. This determined the future trajectory of their enterprises. How they employed the accumulation strategies resulted in their differentiation into “accumulators”, “successful reproducers”, “struggling reproducers” and “simple commodity producers” (Genis, 2015:98-99). The categories “accumulators” and “successful reproducers” harbour the majority of citrus farmers that took part in the research, and they appear to leave no stone unturned in order to employ all the accumulation strategies to maximise the profitability, productivity and efficiency of their enterprises.

Land reform, mentorships and joint ventures

The South African Constitution commits the nation to transformation in agriculture through land reform. The expectation of the National Development Plan (NDP) is that a substantive number of jobs will be created by the successful settlement of black farmers on restitution land or successful production by black farmers on land obtained through the redistribution programme.

However, apartheid denied many black people developing skills or accumulating capital and resources, increasingly required to farm profitably. Additionally, land transfers without post-settlement support has led to many failures, especially where there was an expectation that the beneficiaries would maintain commercial enterprises (Fraser, 2007). In order to maintain high value commercial farming enterprises after land transfers and in the absence of a suitably able state extension service, government expects commercial farmers to step into that breach and act as mentors or “strategic partners” in a range of “joint ventures”. In fact, government requires beneficiaries to enter into a partnership with a “strategic partner” – i.e., a farming or agribusiness company – in a mentorship or joint venture arrangement” (Hall and Kepe, 2017:3).

However, the path to successful mentorship in joint ventures seems to be strewn with thorns, as research by Davis and Lahiff (2011), Bitzer and Bijman (2014), Lahiff *et al*, 2012, Davis (2014) and Manenzhe (2015) shows. Bitzer and Bijman’s (2014) research in the Eastern Cape shows that partnerships helped emerging farmers to increase their access to value chains and market access, but that these partnerships were not as useful to help emerging farmers become independent entrepreneurs.

After the restoration of land to relatively poor communities in Levubu and the Moletele clan near Hoedspruit, in which the state funded the transfer of land and provided start-up grants, it was expected of the strategic partner to provide technical and managerial expertise and arrange access to commercial sources of credit. In return, the strategic partners expected to benefit from a share of profits, a management fee and opportunities for additional upstream and downstream activities. Communities were expecting to benefit from land rentals and a share of operating profits, as well as jobs and training opportunities for their members (Lahiff *et al*, 2012; Manenzhe, 2015)... joint ventures have struggled to get off the ground and some have already collapsed with major losses. Apart from some limited employment opportunities, few if any benefits have yet reached ordinary community members. In some cases, employment and productivity on the farms has declined severely. Overly complex deals, ineffective support from the responsible state agencies and lack of capacity on the part of commercial partners stand out as the main factors contributing to the failure of the joint venture (Lahiff *et al*, 2012).

Manenzhe’s (2015:i) research of strategic partnerships in Levubu found that neither joint venture companies nor community-owned farming enterprises “have been able to distribute dividend payments to claimant community members as yet ... rather, when profits have been realised they have largely been invested back into productive enterprises”. Also, other than the preferential employment of some claimant farm workers on the farms and a small number as managers or supervisors, *few other benefits accrued*. Furthermore, the enterprises struggled to maintain employment levels after more people found employment in the early stages of restitution.

Lahiff *et al* (2012:2) recommend that “more plausible models that adequately address both equity and sustainability” be developed. Such models should focus on commercial partners who should “ideally have sufficient resources to fund a venture throughout a prolonged start-phase and a demonstrable commitment to an inclusive business approach”. Affected communities, for their part, will have to ensure that both short term and long term material benefits flow to their members while they work towards developing their capacity to take over the management of farming operations.

Lahiff *et al* (2012) identified a variety of joint ventures, including (a) direct use by community members; (b) management contracts and lease agreements with outsiders; and (c) community-private partnerships, which is in effect a standard lease agreement with an agri-business company. The latter shows promise because it does not place a financial burden on the community and it seems to be less complex than a strategic partnership and holds less risk for the community.

4. METHODOLOGY

Research for this report was conducted to gain a better understanding of the dynamics of employment creation in the citrus sub-sector of South Africa, and to develop a range of policy options for increased rates of job creation in the sector. More specifically, the project sought to: (a) characterise changing employment dynamics in the citrus sub-sector in the past; (b) assess current constraints and opportunities in relation to employment creation; (c) explore the relative weighting of the following variables as determinants of job creation in each specific commodity and sub-sector: wages and labour productivity, costs of capital, costs of inputs, availability and cost of land, domestic and international markets, and uncertainties in the wider environment (e.g. climate change, state policies and political forces); (d) evaluate the potential for sub-sectoral and commodity-specific policies to alter the relative balance of constraints and opportunities; (e) propose and assess a range of policy options aimed at facilitating job creation in South Africa’s rural economy (Cousins, 2015).

A range of quantitative and qualitative methods were used for data collection and analysis, and include questionnaires and a literature study. I decided to conduct semi-structured interviews with farmers in the three biggest citrus producing areas of Limpopo, the Eastern Cape and Western Cape. For Limpopo I selected the names of farmers from the contact list that I developed while I did a part of the field work for my PhD there. In the Western Cape I contacted their CGA representative to provide me with the names of farmers who would be willing to take part in the research.

I managed to interview only four farmers in each of the Limpopo and the Western Cape provinces during the limited time that I could visit them. Field work conducted by a student from the University of Fort Hare in the citrus sub-sector in the Eastern Cape did not yield any data. Fortunately, a report by Jeanette Clarke (2014) for the ILO to a certain extent filled the gap. The Limpopo interviews were conducted during the first week of November 2015, while the Western Cape interviews were conducted on 23 February, 8 March and 5 April 2016. The farmers will be referred to as Lim1 to Lim4 and Cape1 to Cape4.

In order to capture the extent of job creation from orchard to export harbour and the potential for job creation upstream and downstream from citrus production, I also interviewed the managers of a co-operative box factory, a citrus nursery and a packing shed. For those interviews I made small changes to the questionnaire. I interviewed the CEO of the Citrus Growers' Association (CGA) and the CGA Information Manager on 28 June 2016. All the interviews were recorded on a digital sound recorder and transcribed for further analysis.

Secondary sources such as CGA Annual Reports and marketing reports, water resource policy reports and books about the South African economy were also consulted. I made good use of the findings of my PhD thesis on the accumulation strategies of commercial citrus farmers, particularly in the Letsitele area of Limpopo, as well as extensive research and case studies about strategic partnerships and a national minimum wage for South Africa.

I attended the bi-annual CGA Citrus Summit in Port Elizabeth, Eastern Cape, in March 2017, and gained valuable insights during the summit and on a study tour to orchards, packing sheds and a juice processing plant in the Sundays River Valley prior to the summit.

5. FINDINGS AND DISCUSSION

Profile of survey participants

The farmers interviewed in Limpopo represented large-scale farms, i.e. farms that export more than one million 15 kg-boxes of citrus annually (see Table 8). Due to the area's warmer climate they predominantly grow a range of different Valencia and grapefruit varieties.

Permanent worker numbers ranged from 200 to 990 per business, while seasonal/temporary workers varied between 80% and 200% of the permanent worker numbers from May to September. All the farms were integrated businesses with on-farm packing sheds where a further 20 to 1200 workers were employed, and all held shares in plants that manufactured boxes and process citrus fruit to juice. I found quite steep job hierarchies in Limpopo with a growing proportion of middle and junior management and workers with technical training, e.g. mechanics and electricians employed on a permanent basis (see Table 10).

Women are usually the majority of workers in packing sheds, and are increasingly employed as line managers, supervisors and tractor drivers. Most permanent workers live on the farm during the work week and are expected to go to their homes in surrounding villages at weekends. Limpopo farmers said they were phasing out workers from Zimbabwe and Mozambique and were participating in a drive to employ bigger proportions of South Africans as seasonal workers.

On average, citrus farmers in the Western Cape were found to operate on a smaller scale than their northern counterparts. This could be due to the more profitable citrus varieties that the Mediterranean climate of the region allows them to grow, as well as

the fact that the Western Cape is the only region that is allowed to export citrus fruit to the United States of America (USA).

The successful negotiation of the new round of the African Growth and Opportunity Act (AGOA) during the first quarter of 2016 had far-reaching positive consequences for Western Cape citrus producers. It ensured that the 20% import duty on South African fruit remained waived, thus maintaining the 30% price advantage that farmers who export to north America have enjoyed since entering that market in 1999. Also, because the Western Cape climate allows farmers to grow navels and various varieties of “soft citrus” (e.g. Clementines, Mandarins and Satsumas), which respectively fetch higher prices in export markets and deliver higher yields per hectare than Valencias and grapefruit which are most commonly grown on citrus farms in Limpopo (CGA, 2016b).

While the old co-operative packing shed of the Citrusdal area still exists, there are also private packing sheds owned and operated by groups of farmers. Also, because they grow popular citrus types, e.g. navels and soft citrus, a larger proportion of their fruit is sold in the local market than is the case in Limpopo. The Western Cape production areas are also on average 800 km closer to the nearest export harbour than the Limpopo production areas.

Table 8: Export output and employment types and numbers

LIMPOPO	Hectare citrus	No. of 15 kg boxes of citrus exported	Packing shed	No. of permanent workers	No. of seasonal workers	Employment months of seasonal workers
Lim 1	1600	2,5 million	Own	650	450 (200 for 3 months only)	April to September
Lim 2	750	1,3 million	Own	200	200 (picking) 280 (packing)	April to end of September
Lim 3	4000	5 million	Own	995	1200	April to August
Lim 4	436	Not supplied	Jointly owned with 3 other farmers	232	180	April to October
WESTERN CAPE	Hectare citrus	No. of 15 kg boxes of citrus exported	Packing shed	No. of permanent workers	No. of seasonal workers	Period of employment of seasonal workers
Cape 1	200	350 000	Jointly owned with other farmers	74	120	After Easter weekend until the end of October
Cape 2	300	1,2 million	Own	180	210	
Cape 3	50	Not supplied	Joint venture	15	30 to 60	Mid-April to September
Cape 4	600	1,2 million	Own	120	250	2 May to 10 October

Source: Data from author's own research

Another novel finding in the Western Cape is the fact that at least one packing shed owner “buys orchards”:

We have 300 ha of citrus orchards, but only produce half of what we export. We buy the harvests of other farmers. Depending on the deal, we may even go and pick the fruit. The biggest farmers whose harvest we buy produce 15 000 bins. Each bin yields approximately 16 export cartons of citrus. For that amount you cannot afford to erect and operate a packing shed, but by packing with us, he can make a living out of his harvest and be relieved of the risk (Farmer Cape2, 2015).

Upstream and downstream

In order to get a more complete picture of employment in the citrus sub-sector I also interviewed the manager of a citrus tree nursery, a packing shed and a box factory – all in Limpopo. Their output and worker numbers are presented in Table 9 below.

Table 9: Output and employment profile of citrus-related agribusinesses

Company	Physical output	No. of permanent workers	No. of temporary / seasonal workers
Citrus tree nursery	1 million citrus plants per year	104	80
Packing shed (Lim)	1 400 000 boxes of citrus	22	200
Box factory	40 000 tonnes of boxes (30-35 million citrus boxes, a third of SA's citrus boxes)	83 wage workers (+ 20 managers / professional workers)	250

Source: Data from author's own research

The managers all said that job creation in their operations were dependent on the expansion of citrus production.

Citrus tree nursery

The nursery manager said that while most of the seasonal workers that they employed were unskilled, the majority of them were “repeaters”, in other words, they return every year:

They have developed fair skills levels through training and experience, and can work faster than workers who are employed for the first time. They sow, plant, fill plant bags, move plant bags and water the plants. They also load the plants on lorries. We transport up to 30 000 plants per day and need workers to do it quickly (Nursery Manager, 2015).

He said that although the company paid more than the minimum wage, the 50% increase in the minimum wage in 2013 added a “quick R9 million extra” to the company's budget, but they did not retrench workers.

Although there are not many activities in a nursery that can be mechanised, they had mechanised spraying and the mixing of plant mediums. They also applied fertiliser through the irrigation system. They were continually considering other methods for increasing productivity and efficiency in the nursery, and to improve the growth of the plants:

We changed the grow mediums and application of fertiliser. We also did time study analyses to determine where the bottlenecks in our production process are, and where workers have to wait (Nursery Manager, 2015).

As the business grew, they realised that more was expected of existing workers, so they started programmes to improve their motivation, health and wellness.

When the Nursery Manager was interviewed in November 2015 he said they did not experience constraints in the growth of their business:

We are taking orders for November 2017. It takes two years to grow a small citrus tree. Even if I double the output of this nursery, I would sell all the plants. I think expansion in the citrus sub-sector is organic, not exponential. Most of the demand is in order to change the varieties grown and to a lesser extent for orchard replacements. Everybody wants *naartjie* and lemon plants (Nursery Manager, 2015).

Labour, at 30 to 35% is the biggest cost item in a citrus tree nursery. Grow medium adds another 5 to 10%, while seed and budwood that they buy from the *grondvesblok* (foundation block) in Uitenhage (Eastern Cape) adds 5 to 10%. Fertiliser and pest control adds 10%. Electricity to power the fans that cool down the greenhouses is not a large proportion of the costs of the nursery.

Due to citrus black spot (CBS) the nursery near Letsitele can only supply citrus trees to areas with CBS. For that reason they have opened a nursery at Citrusdal to supply trees to the black spot-free areas of South Africa.

Citrus packing shed

The packing shed is owned by three citrus and mango farmers and packs all their fruit. It packs citrus fruit from May to the end of September and mangoes from December till February. They also pack navel oranges in November. The packing shed does not operate in March, April and October. The packing shed manager also said that the majority of the seasonal workers in the packing shed returns every year.

He says they still work in the “old way”, with the eye-hand method and wrap and roller sizers:

We plan to mechanise in the near future, but it will not affect employment in the packing shed. It will make their work easier and help them to be more accurate (Packing shed manager, 2015).

The packing shed manager said he knew about optic sizers that can sort the fruit according to colour and size and automatic citrus packers, that “you can set for a

specific market”, but he did not think South Africa is at that stage, because labour is cheap and workers are hardworking:

In Australia and New Zealand they use machines that can pack, strap and load. There’s only one guy in the office pressing a button because they do not want to employ workers. I don’t think it should happen here. What would people do? (Packing shed manager, 2015).

According to him workers need to have more skills, therefore their workers receive training every year.

Farmers do what they can to deliver pest-free and unblemished fruit to the packing shed where sorters and packers have to comply with quality requirements of buyers. A lot of tests are done at the packing shed by the Perishable Products Export Control Board (PPECB) and Department of Agriculture, Forestry and Fisheries (DAFF) staff, but the packing shed manager complained that DAFF was very slow in returning results of the tests:

DAFF puts a brake on our operations. They have done many of the tests and inspected the orchards for citrus black spot, but are slow to give feedback. That means we cannot pack for a whole month. Urgency is not in their books (Packing shed manager, 2015).

The biggest inputs at a packing shed are water, chemicals and energy (diesel or electricity) for forklifts, or gas for drying of the fruit. They use 80 000 litres of water per day and 100 kg of liquid petroleum gas for drying. In November 2015 they were planning to change the forklifts to electricity in order to reduce energy costs by 25%.

Productivity is a major issue in the packing shed. A packer can, on average, pack 250 15 kg-boxes per day, but “fast packers” can pack up to 300 boxes per day. They can pack citrus fruit for four different “markets” (countries) simultaneously, but “packing instructions” can change throughout the day as prices change. “Although all oranges look the same once the peel is removed, the different countries demand different qualities and classes.” (Packing shed manager, 2015).

Box factory

The box factory in Letsitele is a co-operative and all farmers who buy the boxes are members of the co-operative. The factory manufactures 30 to 35 million citrus boxes per year and supplies about a third of South Africa’s citrus boxes. The factory also manufactures boxes for litchis, mangoes, bananas, tomatoes, guavas, papayas and eggs. The box factory manager indicated that they employed fewer permanent workers than 15 years ago because they mechanised by installing improved technology:

We had a machine that cut the cardboard and another one that folded it. These processes are now performed by one machine. During the past 15 years we have changed the factory quite drastically in terms of installing state of the art machines. Saving on labour is not the only reason for that. If we do not adapt, we’ll lose business. We always have to offer a competitive carton in terms of art work, the quality of the printing and the style of the box (Box Factory Manager, 2015).

He said that the growth of the factory was constrained by the seasonality and growth of agricultural production and the fact that making cartons for agriculture was the business' first priority:

I can increase the turnover of the factory by R100 million if I can get a contract with other companies, but this co-op is an extension of agriculture and therefore limited to members' business (Box Factory Manager, 2015).

The factory used the services of a contractor to supply seasonal labour. The contractor trained the workers with the help of government funding for learnerships. The manager said that in an ideal world he would have preferred to install the world's most sophisticated machines and "just press a button to do all the work", but he was conscious of the social responsibility of employers in South Africa to employ people.

Apart from labour costs, the factory's other major cost items were electricity and diesel, paper and maize starch mixed with other chemicals to use as an adhesive in the manufacturing process. Besides acting as an input supplier to agriculture, the factory also had linkages with the South African forestry sub-sector:

Sappi plants approximately half a million trees per year just for us, and cut down 3 000 trees per day for us. As a matter of principle we do not import paper. We buy 40 000 tonnes of paper from Sappi and Mpac each year. We want them to stay in business here (Box Factory Manager, 2015).

Workers

There is a wide divide between permanent and seasonal workers in terms of status, job security, training and remuneration.

Permanent workers

This study's findings confirm the results of research by Barrientos and Visser (2012) and Visser and Ferrer (2015) of permanent workers who enjoy relatively more job security and training opportunities, earn more and receive other benefits, e.g. contributions to a provident fund, 13th cheques, medical and child-care benefits.

Permanent workers earn more than the minimum wage and can earn overtime payment (e.g. tractor drivers in the Western Cape who spray chemicals at night in order to prevent drift by the wind). They usually live on the farm and pay a rental of about R50 per month and they get free or cheap electricity. They undergo regular training, can "move up the ranks" and obtain scarce skills to work as tractor and forklift operators, which also makes them more employable elsewhere. Steeper/deeper organisational hierarchies on the relatively larger scale Limpopo farms offer workers more opportunities for promotion.

Permanent workers get salaries and live on the farm. They do not pay rent, while water is free and the farm pays 60% of their electricity. It is convenient to have the workers living on the farm, because sometimes we have to work late (Farmer Cape2, 2016).

Table 10: Skills categories of workers

Skill category of workers	Number of workers in each category							
	Lim1	Lim2	Lim 3	Lim 4	Cape 1	Cape 2	Cape 3	Cape 4
• Top management	5 directors	4 directors	4	2	2	2	1	4
• Senior management	15-20	Directors also serve as	4	6	2	2	1	0
• Professionally qualified and experienced specialists and mid-management	1	managers, prof. qual. engineers, HR & marketing experts	12	6	0	5	0	6
• Skilled technical and academically qualified workers	15	4	19	4	0			10
• Junior management	20	0	0	6	0	12	0	0
• Supervisors	35	12	0	0	5	0	0	0
• Foremen	0	18	0	9	0	0	3/4	0
• Superintendents	0	0	0	0	0	0	0	0
• Semi-skilled and discretionary decision making	The rest = "the squad"	48	114	0	16-18	0	0	40
• Unskilled and defined decision making		143 + environmental team of 15 + 34 domestic workers & gardeners	202	199	58	180	15	60

Source: Data from author's own research

The skills profile changed during the past ten years towards a bigger proportion of workers in managerial and supervisory positions and more technically skilled workers, or, as Farmer Lim1 said, "the middle part of the table got fatter". This is because farms are larger and require more intensive management, while quality standards required by buyers of citrus fruit are becoming higher all the time. The hierarchy of workers changed in the sense that permanent workers were given more responsibilities. They all earn more than the minimum wage. A tractor driver without a drivers' licence has a position of B1, and when he gets a licence he gets promoted to B2 and get a bigger salary. We conduct a lot of training, especially for the supervisors (Farmer Cape4, 2016).

Farmer Lim2 said they only employed people with matric in permanent positions. His company “back to training workers” because they expected fewer workers to be able to do more work. They appointed a professional company to do the monitoring and accreditation of workers.

Not all the farmers who were interviewed supplied information about wages and salaries. Tables 11 and 12 show wages and salaries paid by farmers who supplied the information. Workers’ wages were based on the weekly minimum wage for the lowest level of workers of the category “unskilled” and defined decision-making. Workers in higher job levels received higher wages and production bonuses where applicable.

Table 11: Samples of salaries and wages of permanent workers, 2015

Skill category of workers	Salary or wage (monthly)			
	Job level	Lim2	Lim3	Lim4
Top management	E	Not supplied	Cost to company, incl. housing.	R80 000
Senior management		Not supplied	Do benchmarking with two corporate service companies to ensure market-related remuneration	R35 000 to R40 000
Professionally qualified and experienced specialists and mid-management	D	Not supplied	R53 000 (includes perks)	R35 000
Skilled technical and academically qualified workers		Not supplied		R20 000
Junior management	C	Not supplied	R17 000 (+ R2000/month housing allowance for some)	R10 000
Foremen	C	R4500 to R7500	-	R3 500
Semi-skilled and discretionary decision making	B	Supervisors and tractor drivers: R2800-R3000	R3 200 to R6 000	R3 000
Unskilled and defined decision making	A	General workers min wage of R2500 (Nov. 2015)	Minimum wage of R13,37 per hour + production bonus	R2 500

Source: Data from author's own research

While remuneration for senior positions seemed to be on a par with other industries, workers at the lower levels received more than the minimum wage according to their post level. Farmers said lower level workers were encouraged to undergo training and improve their skills in order to be considered for promotion to higher levels. They often boast about “a worker from the farm” who is a section or line manager (Farmer Lim1 and Farmer Cape2):

Our business focuses on motivating workers at the lower levels to aspire to higher positions. We had helped one of the workers’ children who grew up with my brother’s children, to finish school and get a degree in agriculture. I told him

to work well because I want him as a section manager (junior management) in the next five years (Farmer Lim1, 2015).

In the Western Cape, only one of the farmers, Cape4, supplied information about wages (see Table 12 below), and only for job levels B (semi-skilled and discretionary decision-making) and A (unskilled and defined decision-making).

Table 12: Wages for job level B (Semi-skilled and discretionary decision-making) and job level A (unskilled and defined decision-making) on a Western Cape farm for 2015

Skill category of workers on job level B (Semi-skilled and discretionary decision-making) and job level A (unskilled and defined decision-making)	Job level	Cape4 (weekly wages)
General worker. In packing shed this category includes sorters and crate operators	A1	R601 to R621
General worker with specific tasks, e.g. water management or senior general workers with years of service, drivers. In packing shed this category includes packers and palletisers	A2	R622 to R649
Forklift drivers and workers doing more sophisticated jobs on the farm, learning category, tractor drivers	A3	R650 to R730
Specific tasks with responsibility	B1	R731 to R730
Senior forklift drivers (senior tractor drivers), more responsible jobs, e.g. fruit stocks, recording of information and supervisors	B2	R767 to R899
Senior supervisors, junior lorry drivers, line managers, more responsible tasks where people have discretionary decision-making	B3	R900 to R1 020
Line managers, i.e. senior positions with a degree of training, or lorry drivers	B4	R1 021 and more

Source: Data from author's own research

Table 12 shows that skills make a difference to a worker's remuneration, even at the lowest job levels.

Temporary and seasonal workers

Seasonal workers (fruit pickers and packers) are paid the hourly minimum wage. Opportunities exist to earn more than that for "piece-work". Seasonal workers are paid weekly, according to farmers.

We pay the prescribed minimum wage and they can earn more for piece-work. There are opportunities to earn more every week (Farmer Cape2, 2016).

We pay the minimum wage, but I have to say that our country's problem is that we do not have performance-driven remuneration. According to the rules it is wrong to pay per "*pluksak*" (bag for picked fruit) (Farmer Lim1, 2015).

For the harvest we employ Sothos that my father employed as shearers when he farmed with sheep. Some of them stayed behind or return to harvest the fruit we grow. They come by train from Queenstown to Worcester where we fetch them. They go home for two weeks around Easter weekend and again for a month in November (Farmer Cape2, 2016).

We use six picking teams of 40 or 50 workers each. Two of the teams are from Citrusdal and the other four are *kontrakteurmense* (workers supplied by a contractor). They are a combination of black and coloured people. Most of the workers have been working here for years. They stay in a hostel on the farm (Farmer Cape4, 2016).

Recruitment of seasonal workers no longer seems to be the informal and arbitrary affair of the past. At least three of the seven farmers and managers interviewed in Limpopo and one of the farmers interviewed in the Western Cape said they used the services of “labour services”, “labour contractors” or “labour managers”, i.e. persons whose business it is to supply workers to farmers and factories on demand on a temporary basis. The interviewees made it sound quite formal, with these operators making contributions to the Unemployment Insurance Fund (UIF), paying other industry fees and offering training programmes for the workers “on their books”.

Two labour services are in operation in Limpopo: one that specialises in supplying pruning teams, and another one that employs a corps of workers that are employed during peak times either by the box factory or juice processing plant in Letsitele or a large-scale farming operation in the vicinity. The labour services in Limpopo seem to operate so as to help farmers and factories achieve productivity and effectiveness objectives. Not all farmers are in favour of contractors. Two Limpopo farmers, Lim1 and Lim2, said they did not use the services of contractors to find temporary workers:

We employ workers directly. We feel we can save on costs if we do it ourselves. We know how to do it. Some farmers use contractors because they are a bit lazy or because they try to sidestep the administrative requirements (Farmer Lim1, 2015).

Even though the use of labour contractors is becoming more common, we don’t use them. Our responsibility should not be transferred to a contractor. We do, however, use the services of a contractor to help us prune the trees when our pruning team falls behind on their schedule (Farmer Lim2, 2015).

A Limpopo farmer (Farmer Lim1) said that a local contractor created new jobs when farmers started to prune for more productive trees or to change back to manual pruning. He started to work with Farmer Lim1’s family’s enterprise:

He put together a pruning team and he trained them with inputs and support from our side. He saw a gap for a business because many farmers do not do the pruning themselves and it is quite labour intensive (Farmer Lim1, 2015).

In the Western Cape contractors serve to save farmers a lot of hassle, according to Farmer Cape4:

Many people say contractors are evil, but I think they protect people’s work and deliver a service to the fruit industry. For me to go driving through the location trying to find 250 workers is an impossible task. We make sure that they pay UIF and abide by the country’s laws. They do all the administration. I think they do a good job. They conduct meetings with team leaders and discuss the terms and how they will pay, and then they bring workers to the farm. They work for seven months, but now the law says they should get permanent status. How do I keep

them busy during the other five months? I think all the new laws just cause more unemployment (Farmer Cape4, 2016).

Different arrangements for finding temporary harvest workers were also found in the Western Cape, where farmers said they either employed “self-organising” teams of workers from the Northern Cape and Lesotho during the harvesting season from April to October (Farmer Cape2), or Ceres-based teams that follow the fruit harvest in the Western Cape. In farmers’ minds the latter are regarded as having permanent status by way of being employed for most of the year. During the summer months they would harvest table grapes around Piketberg and De Doorns, followed by apples and pears around Ceres, Tulbagh and Wolseley or rooibos tea around Citrusdal and Clanwilliam. In winter they harvest citrus (Farmer Cape1, 2016).

In the Western Cape teams of pickers – each bringing its own supervisor – come back every year. On some farms, male workers bring their wives along. The women also work and some of the farms supply day care for their small children and facilitate access to school for primary school children (Farmer Cape4, 2016).

Worker organisation

As discussed earlier, in general, farm workers are not well organised. This study’s findings confirm this (see Table 13). Where workers are members of unions, unions exert pressure on employers for higher wages, but they generally do not have an impact on the level of the wages. One of the farmers remarked that the introduction of the minimum wage has rendered the unions toothless with regards to wage negotiations. All the farms in the sample had workers’ committees, farm committees and/or employment equity (EE) committees that met weekly, monthly or quarterly and kept minutes of meetings. The only farmer who reported strikes during the past five years, was Farmer Lim3, owner of the largest farm of all interviewed.

Table 13: Worker organisation

	Strikes in past 5 years?	Union membership	Union impact on wages	Workers’ Committee	EE committee
Lim1	No	No – Letsitele citrus workers Yes – Tzaneen banana workers	None	Farm committees meet monthly or weekly, keep minutes	Yes
Lim2	No	No	None	Meet monthly	Meet quarterly
Lim3	Yes, 2015 FAWU ⁴ strike on one of farms, 2013 on other non-union farm	2 farms no union, other 2 farms FAWU or HOCAFAWU ⁵	None	No info	No info
Lim4	No	Farm near Magoebaskloof –	None	All farms, but owners and	No info

⁴ Food and Allied Workers’ Union

⁵ Hospitality, Catering and Farm Workers Union

		none; Hoedspruit farm 20% HOCAFAWU, Letsitele farm 50% NUFBWSAW ⁶		managers are hands-on farmers and in presence of workers throughout the working day	
Cape1	No	No	None	Yes	No info
Cape2	No	No	None	Yes	No info
Cape3	No	No	None	Yes	None
Cape4	No	No	None	Yes	No info

Source: Data from author's own research

As shown in Table 13, no farmer in the Western Cape reported union activity in their enterprise, while a variety of smaller and less well-known unions are active on some farms in Limpopo. It seems as if workers' committees and employment equity committees fulfil roles that unions would otherwise have fulfilled and serve to keep workers contented:

Every farm in our enterprise has a workers' committee that meets monthly and keeps minutes (of the proceedings). At the meetings the committees talk about workers' concerns. We use the workers' committees to announce salary increases. We work with them, and in doing so, keep the unions out. They never have big demands, rather small things that need attention. We do not have strikes (Farmer Cape4, 2016).

On Limpopo citrus farms, trade unions are also not involved in wage decisions:

When deciding on wage increases we do not get inputs from the lowest level of workers. Section managers and line managers who know the workers in their sections or teams would sit together and make a recommendation for higher wages. We do not work on a percentage across the board – they decide who gets what and sign it off with me (Farmer Lim1, 2016).

Worker productivity, skills and training

Even though farmers said that that worker productivity was improving, its further improvement remains a relentless goal of accumulation in the commercial farming sector. In spite of that, few of the respondents in this study could quantify the physical or financial output per worker. They reported though that both benchmarks have improved. Only Farmer Lim4 reported that the financial output per worker in her business was "on average" of R89 000 per person, and that it was higher than 10 or 20 years ago.

Farmers consider the productivity of labour one of the key contributing factors to the profitability of their enterprises. While Farmer Lim2 said the productivity of workers is something that a manager or supervisor determines, not the worker, Farmer Lim1 said worker productivity would improve and farmers would be willing to pay higher wages

⁶ National Union of Food, Beverage, Wine, Spirits and Allied Workers

if increases in the minimum wage could be linked to higher productivity. All farmers agreed that more is currently expected of workers than in the past:

We now need more skilled workers because the production processes had become so complicated. The scope for illiterate workers is small ... we still need foot soldiers who can work with a spade, but there is no time to slash grass with a hand-slasher. We have a growing need for workers that understand what they do and what the consequences of their actions are (Farmer Lim3, 2015).

We don't want to mechanise completely because it is negative for job creation, but workers need more skills. We spend a lot of time and energy on training workers (Farmer Lim1, 2015).

We employ more artisans ... electricians and mechanics. In the past we used contractors for that work, but now we employ them full-time because we need them (Farmer Lim3, 2015).

Farmers said the requirements of export markets increase every year, so more skilled and educated workers are required (Farmer Lim1):

I support productivity remuneration. We can employ more people that earn more if we can pay according to productivity. The norm for picking fruit is 80 bags per day. We've had to work it back to an hourly wage that everybody receives. When we paid per bag we had workers who picked 250 to 300 bags per day and were paid more. Now we are not allowed to do it. That is why I say we should have remuneration linked to productivity (Farmer Lim1, 2015).

We can afford to pay the minimum wage because we export and get the benefit of the exchange rate. I do not have a problem with an increase in the minimum wage as long as we can get a concurrent increase in productivity. I want to pay a worker for what he does. The money that a worker earns is not the problem, the problem is that I have to guarantee the wage, but workers are not expected to work more (Farmer Cape2, 2016).

Farmer Lim3 also said that employment has become too expensive to carry "spare tyres". Training plays an important role to empower workers and teach them to understand their work. Farmers are also bound by health and safety requirements.

The skills requirements are higher and we expect more from workers. In the packing shed we have more lines and the work of supervisors, operators and tractor drivers are becoming more complicated. Every farm has a worker that mixes agricultural chemicals who needs to be trained. We have a worker that does maintenance and welding. We employ a boiler maker in the juice factory. We can no longer work with unskilled people (Farmer Cape4, 2016).

Factors affecting employment

Farmers said the factors affecting employment are the profitability of the business, labour legislation, the level of the minimum wage and ESTA (Extension of Security of Tenure Act).

Minimum wage and tenure security (ESTA)

The level of wages has gone up annually, since the introduction of a minimum wage for agriculture in 2003. In 2013, when the minimum wage was increased by 50%, some farmers shortened the working hours from 9 hours to 8 hours. Farmers no longer supply in-kind compensation, e.g. maize meal or chickens. On-farm accommodation is still supplied, but workers pay a nominal rent. Even though it is quite convenient to have certain workers living on the farm, farmers are trying to have fewer workers living on their farms.

Farmer Lim3 mentioned that he expected the National Minimum Wage (NMW) due to be introduced in 2017 to have a bigger impact than the 52% increase of 2013:

We could make plans then. We reduced the hours from 9 hours to 8 hours, but this time we will have less room to manoeuvre. I think we shall see more direct retrenchments, and then farmers will mechanise (Farmer Lim3, 2015).

Farmer Lim2 said that they did not think the wages were too high, but it did not mean that they were going to employ more workers:

We will just have to structure our business in such a way as to pay the higher wage, but employ fewer people to do the same amount of work. Government is forcing us to improve productivity. The most serious consequence of higher wages is that it removes the negotiation mechanism of lowly skilled workers. They cannot enter the job market because they are not allowed to (Farmer Lim2, 2016).

Farmers in the Western Cape said most of their permanent workers live on the farms because there are no houses available in the nearby towns. However, they are often prevented from appointing permanent workers because they struggle to get people who do not work on their farms, evicted from the houses on the farms. Temporary/seasonal workers live in compounds on the farm.

Housing may be the biggest problem. We do not manage to evict people from the houses on the farm. That puts new permanent workers at a disadvantage because we are not in a position to give them houses (Farmer Cape2, 2016).

You ask what the impact of government policy will be on farming? We will definitely consider going to 4,75 hectare per worker. In some parts of our enterprise we are working on 6 hectares per worker. When I began to farm we had one hectare per worker. We employ fewer workers to do more (Farmer Lim1, 2015).

The majority of the farmers interviewed said that they were not going to build more houses, and some of the farmers in Limpopo were considering paying workers more in order to get rid of on-farm housing. Workers who apply for permanent positions are required to supply a street address in one of the surrounding villages so that they can go home on weekends.

The impact of government policy and ESTA is that it disadvantages permanent workers, and that is the origin of many squatter camps. If a worker's house on my farm needs to be repaired, then it is my house, but if a worker does not work here anymore, it is their house (Farmer Cape2, 2016).

Permanent workers stay on the farm. There are no houses available in town, we actually have a huge housing crisis in the valley (Farmer Cape4, 2016).

We have started to talk about getting rid of all houses on the farm, and rather pay workers more. I do not think we have one worker that lives permanently on the farm – they all have houses elsewhere to which they return at weekends. We are not going to build more houses (Farmer Lim1, 2015).

Production efficiency, mechanisation and re-organisation of tasks

Farmers said the reason for mechanisation is not to replace workers, but to enable workers to be more productive and prevent the need to employ additional workers. They acknowledged that mechanisation is expensive and machines need to be maintained, while labour is still relatively cheap and human workers are more flexible than machines.

We will mechanise to a greater extent if we are forced to do so by a higher national minimum wage. The cut-off point between human workers and machines depends on the exchange rate. That is our bread and butter. We won't make it if the exchange rate goes back to R7/\$. We've been selling a box of Clementines (soft citrus) on average for £9 for the past ten years. The buyers also demand a part of the exchange rate benefit (Farmer Cape2, 2016).

Farmers seemed to have mechanised and re-organised everything they could on the production side, e.g. pest, weed and disease control, irrigation, as well as the organisation of fruit pickers (see Table 14). Two of the farmers in Limpopo have already changed the organisation in their orchards during harvest in order to reduce the number of seasonal workers required, and it would not be surprising if other farmers followed in their footsteps:

We have changed two of our seven units to bin-picking. We used to have *lemoenwaentjies* (tractor-drawn wagons with bins for gathering citrus) at the end of the tree rows. The new system is 20% more effective and workers pick bigger volumes per day. I'd say it is because the new system is more flexible and workers do not have to run so far to drop the fruit in a bin at the end of the row (Farmer Lim1, 2015).

When interviewed in March and April 2016, farmers in the Western Cape were not considering these changes that could reduce the number of workers picking citrus fruit by 20 to 50%. One of the reasons quoted was that it would be too time-consuming and that the sand could damage the fruit:

We use little wagons and tractors. We do not have time to put bins on the ground ... it will anyway damage the fruit, what with our loose sandy soil (Farmer Cape4, 2016).

Western Cape farmers, however, do try to make citrus trees as 'picker-friendly' as possible. That means that workers do not need ladders but can stand on the ground to pick, and thus work faster (Farmer Cape2, 2016):

Trees are shorter and planted more densely like a fence. The drawback of that is that you have to prune more. We chop the prunings and leave them in the

orchard. It serves as a mulch to help us save water. We try to leave as much organic material as possible in the orchards. We also bring in a lot of straw which we get from neighbouring grain and sheep farmers in exchange for citrus fruit that cannot be packed and pear kernels to feed to their sheep. We used to hoe a lot and made *bankies*⁷ (berms), but we don't do that anymore. Mulching is better for the structure and water retention capacity of the soil. I'd think manual hoeing would be more expensive (Farmer Cape2, 2016).

Farmers made (and continue to make) changes to irrigation systems, e.g. from micro sprayers to drip irrigation, which on the one hand helps to use water more effectively, but also eliminates job opportunities:

We are changing our irrigation to a drip system in order to save water and to computerise our irrigation system. With the new system we will need fewer *waterspuiters* (workers charged with the manual irrigation of orchards) because irrigation scheduling is being controlled from the pump room by one person. With micro sprayers one man can control 30 hectares. With drip irrigation one computer literate person who had been trained to apply fertiliser, can handle the 'fertigation' of 150 hectare of orchards (Farmer Cape2, 2016).

Here at Letsitele we use mostly micro irrigation which is relatively labour intensive, but on our farm near Ohrigstad we use an automated drip irrigation system. Drip irrigation is not good for job creation. Where you would need three or four workers for 40 hectares of micro irrigation, you only need one worker for an automated drip irrigation system (Farmer Lim1, 2015).

Another activity that was eliminated is manual hoeing to get rid of weeds. These days all the farmers do chemical weed control:

When I started to farm 25 years ago, we had 30 women hoeing. We stopped it to save on costs. After that we used a tractor with a driver and two people to spray the rows. Now we use a motorcycle with a driver and a small tank with "arms" to spray both rows. The motorcycle uses less fuel than the tractor and you need one worker instead of three (Farmer Lim1:2015).

Table 14: Examples of labour reduction practices in Limpopo and the Western Cape and their impact on employment

Task or activity	Reduction in workers	Farmers employing these strategies
Weeding and pest control	20 years ago: Team of 30 women with hoes; then tractor with driver and two workers to control sprayer, now motorbike driven and sprayer controlled by one worker.	All farmers do chemical weed control
Irrigation	Changing from relatively labour intensive micro sprayers to drip irrigation: Reduced workers from three or four workers per 40 ha to one. From opening and closing taps manually by five workers, now use computerised irrigation control system operated by one worker with a motor bike.	

⁷ A "bankie" is the strip of soil directly below the row of trees (SAWIS, not dated)

Harvesting	While no machines exist to harvest oranges for the fresh market, at least two farmers have re-organised the harvest process to such an extent that workers no longer need to walk to the end of the row to transfer the picked fruit in a bin. Bins are now placed in the rows and removed by a forklift. This practice reduces worker numbers by 20 to 40%.	Lim1 (two of seven units), Lim2 (all orchards)
Fruit packing	Automatic sorting machine that determines which oranges go to fresh market and which to juice, reduced labour by 20%.	Lim1, Cape2, Cape4
Automatic packer/place packer	Can replace four to six workers	None in Western Cape and Limpopo, but some in Eastern Cape

Source: Data from author's own research

Farmer Lim2 says they have *mechanised* many processes and activities, but have not *automated* anything:

We still use a mechanical irrigation system where the taps have to be opened and closed manually. Our most dramatic mechanisation action was the change to our harvesting process. We have halved the number of workers needed to bring in the harvest. Because workers do not have to walk so far to empty their harvesting bags in bins, they pick faster, and twice the volume they picked with the previous system (Farmer Lim2, 2015).

According to Farmer Lim2 they also improved the process of spraying the citrus trees:

Our new sprayers spray trees on both sides of the orchard row. We fill the sprayers from gravitation tanks and we have more filling points. We improved the efficiency of the spraying process by 30 to 50%. If everything goes well with the supply of chemicals and we have a good changeover of shifts, we can do twice as much work with tractors and sprayers than with the manual systems of the past. We need to be able to spray fast because of the pressure of pests (Farmer Lim2, 2015).

Interestingly enough, certain production tasks, e.g. the pruning of trees, cannot be mechanised without compromising the productivity of citrus trees. Farmer Lim2 said they employ a full-time pruning team for 12 months of the year. The team of 30 workers do a "structural" prune in winter and smaller cuts in summer to remove re-growth:

We give them the best and most expensive manual saw. If you use pneumatic secateurs with a compressor that moves with a team of pruners, the work rate will be determined by the slowest worker. Productivity is improved if each worker works independently (Farmer Lim2, 2015).

Farmer Lim2 said they employ "intelligent pruning" to improve the light exposure of all parts of the tree and to increase the amount of fruit borne inside the tree:

We want smaller and shorter trees that are spray-friendly and harvest-friendly. We want light to enter the tree in order to reach the *binnevrugte* (fruit borne on the inner branches of the tree) and improve fruit quality. Intelligent pruning also fosters healthier orchards and trees with bigger leaves because chemicals reach every part of the tree (Farmer Lim2, 2015).

There was agreement among the farmers:

Pruning practices have developed astronomically over the past five years. We don't use one formula for all different citrus types or cultivars anymore ... you prune a grapefruit tree this way and a Valencia tree that way. We don't use mechanical pruning saws anymore. It is too detrimental to the trees. When mechanical pruning is used, trees become too dense and sunlight does not reach every part of the tree. Now that we are pruning by hand we can see the difference in terms of the improved productivity of the trees (Farmer Lim1, 2015).

With manual pruning you remove only specific branches. You want sunlight to penetrate the whole tree. Methods for pruning have developed quite a lot during the past five years. Before, it was trial and error, and we learnt the hard way, but now we get results in terms of harvesting more tonnes of fruit per tree and per hectare (Farmer Lim1, 2015).

We do not like the saws because they densify the citrus trees. We have a small permanent pruning team that prunes once the harvesting is done (Farmer Cape2, 2016).

The largest farmer in the Western Cape sample said they used manual and mechanised pruning, because "if the machines don't help, we'd never get all the pruning done.

Machines do the big work, followed by hand pruners who cut in windows and holes to increase the production of the trees" (Farmer Cape4, 2016).

There seems to be more opportunities to mechanise activities in packing sheds, only where finances allow, though. Most packing sheds in Limpopo are fitted with electronic sizing equipment, which, according to the farmers, helps the workers to work more productively:

Automatic packing sheds are available, but they are very expensive. If government increases the minimum wage to R3 200 per month tomorrow, everybody will install them. You get a machine that takes pictures of every orange and sorts them according to markings, colour and size. In the end all the fruit in the box look the same. If you add an automatic packing machine that works right through the night, you only need a palletiser. You can go wild with mechanisation in the packing shed (Farmer Lim3, 2015).

We can only mechanise in the packing shed. That is where packing shed owners install electronic sizers that can decrease workers by 30 to 40% (Farmer Cape4, 2016).

Harvesting has to be done by hand, but in the packing shed we are moving away from human sorters to electronic sizers. We don't use the automatic packers that they use in the Eastern Cape. An autopacker picks up fruit with a sucking mechanism and places it in the boxes. It does the work of many people, but can do only one fruit size at a time. You usually install it to do the peak sizes. But we have to employ people (Farmer Cape2, 2016).

There are not so many activities in citrus farming that can be mechanised at this stage. Citrus fruit still needs to be picked and packed by hand. We have made progress with mechanisation in the packing shed, with a mechanical sorter which can be considered the brain of the packing shed. It determines which oranges will be packed for export and which will go to juice processing. That reduced the need for workers by at least 20%. We could install automatic packers that will eliminate many jobs, but an autopacker that can replace four workers costs R1 million to R2 million. We'll have to install 12 to 15 in our packing shed. It's an expensive sum – one that we are not making yet (Farmer Lim1, 2015).

Often the possibility of generating higher profits, is a reason for mechanisation:

The new sorting machines can already read brix (a measure of the sugar content of the juice in a fruit). If you send fruit with a brix higher than 12 you can earn a pound per box more. Also, Wholefoods, our biggest client demands a clean fruit, and those machines can just sort the fruit better. By four o'clock in the afternoon people get very tired. However, we will always need people to pick the fruit by hand (Farmer Cape4, 2016).

When the farmers were interviewed in Limpopo in November 2015, there was much talk about automatic machines that can 'pack, stack, strap and load' boxes, but those interviewed all agreed that labour was still cheap enough in South Africa to avoid the enormous capital layout on such machines. The farmers also agreed that it would not be possible to pick citrus fruit for fresh exports, using a machine. Citrus picking machines do exist and are used in Brazil, but the oranges picked with such machines go straight to juice processing factories. However, farmers said the machine's action can be detrimental to the tree in the long run:

In Brazil citrus producers use a machine that shakes the tree to harvest the fruit, but those oranges go straight to the juice factory. No machine exists that can pick oranges for exporting fresh. Of course, there is always room for improvement, but it will never be as radical as other factories (Farmer Lim1, 2015).

As Genis (2015) found, most large-scale farmers not only change and adapt processes and activities to expand their enterprises or rationalise their work force, they also employ many different methods to ensure that citrus trees yield as much as possible:

We monitor the yield of our orchards on a continuous basis. If we plant a new variety, we change the application of fertiliser. It costs R100 000 per hectare to establish a new orchard. If our navel trees yield less than 40 t/ha, we take them out. We monitor our orchards to make sure we harvest 50 or 60 t/ha. It is lower than yields for Limpopo and the Sundays River Valley (Eastern Cape), but we have trees that are 80 years old, so we have to replant more regularly (Farmer Cape4, 2016).

To increase production, we start at the rootstocks. We match rootstocks with the soil type and temperature of a new orchard. We may use as many as three different rootstocks depending on the location of the orchard. It is a very technical process (Farmer Lim1, 2015).

We spend a lot of money on preparing the soil for a new orchard and doing soil analyses to ensure we do things correctly. Every little thing you do, you have to do better (Farmer Lim1, 2015).

Production costs

The contribution of different cost items to total input costs is presented in Table 15. Labour, agrochemicals, energy and packing material appear to be the biggest cost items. Farmers said that the cost of most of these items has increased more than inflation. However, because of the extent of variation between cases in the table, the numbers are not really useful. Industry figures were therefore sourced.

Table 15: Proportional division of input costs, 2015

Input category	% of total input costs (2015)							
	Lim1	Lim2	Lim3	Lim4	Cape1	Cape2	Cape3	Cape4
Cost item	Lim1	Lim2	Lim3	Lim4	Cape1	Cape2	Cape3	Cape4
Labour	15-20	-	25	16	30-40	18	30-40	35
Fertiliser	25	10	6	13	25-30	5	*	*
Herbicides		35	9	13		5	*	*
Fungicides							*	*
Pesticides							*	*
Diesel	-	-	3	4		8	*	*
Electricity	15	-	Part of overhead costs	7	25-30	3	*	*
Water		3	3	1	-	-	*	*
Packing material	30-35	-	31	15	-	48	*	*
Transport costs to harbour	-	-	16	13	-	5	*	*
Packing costs	-	-	-	11	-	-	*	*
Other	-	-	-	6	-	-	*	*
*= could not supply the information								

Source: Data from author's own research

Farmers' views and perceptions about the prospects for job creation

All the farmers who were interviewed expressed optimism for the future of the citrus sub-sector and its ability to create more jobs if the development of export markets improved, and policies and legislation that cause uncertainty or hamper employment creation and competitiveness were changed. The majority of them also agreed that the domestic market as well as citrus processing can be expanded.

Farmers seem to think twice before they employ more workers and are critical of labour legislation:

The bottom line is (that we need) policy that can help us improve our profitability and relieve the pressure. As soon as we are under pressure we have to save money by driving less and employing fewer workers. Labour legislation

is extremely strict. As soon as someone has worked for three months, you have to employ him permanently, in which case you would rather not employ him. This means that more is expected of the other workers (Farmer Lim3, 2015).

The jobs that Mohammad Karaan (former Commissioner for Agriculture in the National Planning Commission) is going to create, will be at the bottom of the ladder (Farmer Cape2, 2016).

We just want to carry on with our lives, but then government changes everything with draconian laws. We bought land in the Sandveld and want to employ 30 people for three months to install irrigation pipes and prepare the land. After that we won't have work for them, but the government does not allow us to employ them for such a short period. That is why we mechanise. We are installing a new line in our packing shed at a cost of R25 million. It will do the work of 50 people. But that is not what is supposed to happen here; we should have 50 more people working, yet we cannot be expected to pay all the time. We have to make a profit too, so we employ fewer people (Farmer Cape4, 2016).

Farmers are concerned about markets for their products, especially in five years' time when large plantings of lemons and soft citrus start to bear fruit, and feel that government is not negotiating market access as effectively as possible:

Trade agreements, e.g. AGOA, are not negotiated at farm level. We almost lost it. Here we are doing rather well because we can export to America and earn 30% more, and do not have to pay import duty of 20%, but we need a government with competent officials (Farmer Cape2, 2015).

We can still explore markets in India, the Far East and China, but there will have to be co-operation on governmental level. We need a strong team of negotiators with a greater sense of urgency, but our government is simply hopeless. If we do not open more markets soon, the citrus industry will have serious problems in three years' time. We are planting too many trees (Farmer Cape2, 2016).

Our government needs to invest more in trade agreements with other countries. If we compare ourselves to Chile, I have to say they have already forgotten what we still need to learn. That puts us in a precarious position, especially in the growth markets in Asia. Non-tariff barriers, e.g. phytosanitary regulations for citrus black spot, need to be sorted out because they are a nightmare (Farmer Lim4, 2015).

Farmer Cape4 believes that joint ventures are the solution for the future of agriculture:

You have to be invested in the value chain in which you are involved, because volume is important. It is better to join forces with other farmers to build a packing shed. Joint ventures can also support smaller farmers. That is why joint ventures are also the way forward for involving new black farmers in agriculture (Farmer Cape4, 2016).

6. THE PROSPECTS FOR CREATING MORE JOBS

Expansion of citrus production seems to be a key factor for creating more permanent and seasonal or temporary jobs. Besides, an increase in the production of citrus has the potential to increase employment upstream and downstream from production, i.e. in packing sheds, at plants manufacturing packing material, citrus tree nurseries, the breeding of beneficial insects and factories processing citrus fruit for juice, citrus oil and pectin. It can also lead to job creation in other parts of the citrus supply chain, e.g. cooling and refrigeration, transport, port handling and agricultural chemicals.

In order to increase production, farmers need access to affordable capital for establishing new orchards and bridging the time it takes before the trees begin to bear fruit, more water for irrigation through improved water infrastructure and regulation as well as certainty about policy and confidence in the economy.

Creating jobs in citrus production

What then are the prospects for creating more jobs in the citrus sub-sector? The possibilities will be dealt with here in terms of the job creation potential in the established commercial citrus production areas, new citrus areas for emerging black farmers, rehabilitation of land reform orchards and orchards in the former bantustans, as well as creating jobs in agro-processing. This section serves as the first part of a rather ambitious attempt to quantify the potential for job creation in citrus production. It is probably not correct and the numbers may not add up, but it has been a valuable exercise, even if it only reveals the lack of credible information on future prospects for an increase in citrus plantings.

Opportunities for job creation exist in the traditional large-scale “commercial” production sphere, as suggested by the CEO of the CGA:

Every hectare we add is one job opportunity. We see citrus volumes increasing at 6% per year. Part of the increase is because of better packouts, but some are due to an extension of hectares. The industry added 10 000 hectares in the past ten years. If we can grow, get rid of tariff and phytosanitary barriers and raise awareness of our fruit, expansion will create more jobs (Chadwick, 2016:Personal communication).

At a job creation *imbizo* in 2011 the CGA proposed even higher potential employment figures:

If we could open up China, Eastern Europe and India to the full potential for citrus exports we could add 45 million cartons to the present exports – potentially an additional 30 000 hectares: 30 000 on-farm jobs and 20 000 jobs in the packing sheds and immediate supply chain (CGA, 2011b).

At the bi-annual CGA Citrus Summit in Port Elizabeth in 2017, De Klerk said that a further 27318 ha citrus will be established by 2026. It ought to include the expansion into “new” commercial areas, e.g. the grain-growing areas of Swellendam and Heidelberg and the fruit and vine growing area of Robertson, with irrigation water from the Breede River (about 500 ha); the potato growing areas of the Sandveld, Burgersfort and Ohrigstad, if water availability allowed it.

At the time of writing this report, more than 17 000 hectares were planted with different citrus types, but were not yet in production. When these orchards start to come into production by 2017 and the years after, (mostly seasonal) jobs could be created for pickers, pruners and packers; at what rate, it is uncertain.

More employment can be created in citrus orchards established by new black farmers with water allocated specifically for that purpose. The National Water Resource Strategy of 2013 promised “additional water” - between 100 000 and 200 000 hectares for irrigation use by emerging farmers (DWS, 2013:44). It is not clear where these hectares are, but if a very conservative 5% of that could be planted with citrus, it would mean an extra 5 000 to 10 000 hectares.

In 2016 the Eastern Cape Department of Water and Sanitation awarded water rights for 675 ha near Uitenhage to the empowerment project of the Sundays River Valley Citrus Company (SRCC) (Botha, 2016b:16). Approximately eight years ago the citrus industry embarked on the “Badplaas lemon oil project” on 2 000 ha of land near Badplaas, Mpumalanga. Black farmers would grow lemons to process into juice and oil for the Coca Cola company. The project never came into fruition because established producers feared that those lemons would land on the fresh market and lower the price. The CGA sold the trees and the prospectus to the Industrial Development Corporation. Nothing has come of it, but some potential remains. “The land is still there, the water and the people are still there,” according to Chadwick (2016:Personal communication).

Vumelana Advisory Fund (VAF), a Johannesburg-based company that “helps communities in the land reform programme to put their land to productive use by establishing properly structured commercial partnerships” (VAF, 2016:no page numbers), mentions a number of projects, most of which are in the early stages of negotiations for financing. Among the projects are, the Bohwa Bja Rena Gillimburg project which will rehabilitate 267 ha of citrus and establish 90 ha of new orchards, and approximately 400 ha on Bathlabine Farms in the Letsitele Valley between the Lowveld towns of Letsitele and Tzaneen (VAF, 2014). Also on Vumelana’s books is the Injaka Waterval lemon project on 1 000 ha (VAF, not dated).

In the last instance, jobs could be created in rehabilitated orchards on land transferred as part of restitution or redistribution and orchards in the former bantustans. The National Development Plan (NDP) (NPC, 2011) mentions that 70% of the almost 10 000 hectares of citrus that had been redistributed by the land reform programme, are in distress. This proportion is extrapolated from an analysis by the subtropical fruit growers’ industry body who found that 70% of subtropical fruit orchards transferred to black farmers were distressed (CGA, 2011). If those orchards could be rehabilitated, and it is assumed that one permanent job will be created for each hectare of citrus, it could provide about 7 000 additional on-farm jobs.

A caveat needs to be added here: because there are no organised records of the land involved in projects, the hectares mentioned above may be included here.

Creating jobs upstream and downstream from production

If production can be expanded, there could be opportunities for creating jobs upstream and downstream from production. When interviewed, the managers of a citrus tree nursery, a box factory and a packing shed said that expansion of job creation in their operations depends on expansion in citrus production.

Both the CEO of the CGA and farmers who were interviewed said that there are huge opportunities to process citrus into different products. Compared to other citrus producers in the southern hemisphere, e.g. Argentina and Brazil, the South African citrus processing industry is “negligible” (Chadwick, 2016: Personal communication). At this stage the citrus processing industry consists of a number of juice processors and two or three citrus oil processors. The possibility of pectin production from citrus waste was investigated during the first decade of the century (Botha, 2003; CSIR, 2005), but nothing seems to have come of it, even though potential seems to exist to produce it for both the domestic and export markets.

Job creation prospects in numbers

In this section the available information is used to present different scenarios for job creation. This section should be read with the different projections described in an earlier section.

The BFAP (2011) and certain sections of organised citrus, e.g. CGA (2011a) accept the “one hectare, one job” multiplier that is also used by the NPC (2011). The BFAP (2011) also brings a “linkages multiplier” of 0,66 jobs upstream and downstream from farming per additional hectare of citrus to the debate (see Table 5).

At the 2017 CGA Citrus Summit in Port Elizabeth, Jacomien de Klerk, head of the CGA’s Citrus Academy, presented another set of multipliers for permanent and seasonal workers on farms and in packing sheds, based on surveys she conducted in 2009 and 2016 (on farms) and in 2016 at packing sheds (see Tables 3 and 4).

Lastly, farmers measure the productivity of labour in their enterprises in terms of hectare per worker. Figures of 4 ha per worker (Farmer Lim2) and 4,75 ha and 6 ha per worker (Farmer Lim1) were mentioned for permanent workers. By changing logistics in orchards at harvest time, Farmer Lim2 reduced pickers by 50%, while Farmer Lim1, using the same system, reduced workers by 20 to 40% in different orchards.

These different job creation “multipliers” are summarised in Table 16 below.

Table 16: Job creation multipliers

Multipliers	On farms jobs per hectare		Packing sheds		Upstream and downstream linkages
	Permanent workers	Seasonal workers	Permanent workers	Seasonal workers	
CGA (2011b)	1				
BFAP (2011)	1				0,66
NDP (NPC, 2012)	1				

De Klerk (2017)	0,363	0,772	0,651		
Genis (2015)	0,25				
Genis (2017c)	0,17	0,46			

In order to calculate the number of jobs that can potentially be created in the citrus industry, permanent and seasonal worker numbers from a recent CGA projection for 2026 based on surveys on farms and in packing sheds (De Klerk, 2017), are used as the baseline scenario (see Table 17 below). Two other scenarios for permanent workers are derived from remarks by farmers and one other scenario for seasonal workers in which only 60% of the jobs in the first scenario are realised.

The additional hectares that De Klerk (2017) projected to be grown by 2026 are 27 318 ha. In Table 17, hectares from other projects are added, e.g. Gillimburg Farms and the Injaka Waterval lemon project (VAF, not dated), the author's extrapolation for Bathlabine Farms in the Letsitele Valley and the area known as Alice Kat, of which only 10% is said to be utilised yet (Hollins, 2015).

The different scenarios for the creation of permanent jobs are: "CGA@2016" (the baseline of 2,75 hectares = one job), "Limpopo" (4 ha = 1 job) and the "Accumulator" (6 ha = 1 job). For seasonal workers (fruit pickers) the scenarios are "CGA business as usual" (0,772 picker per hectare) and "Bins in the row" at 40% fewer pickers than "CGA business as usual".

Table 17: Opportunities for job creation on farms: Scenarios and numbers

Place	Additional hectares	JOB CREATION SCENARIOS				
		PERMANENT JOBS			TEMPORARY JOBS (e.g. pickers for 6 months)	
		CGA@2016 (2,75 ha = 1 job or 0,363 worker/ha)	Limpopo (4 ha=1 job or 0,25 worker/ha)	Accumulator (6 ha=1 job, 0,17 worker/ha)	CGA business as usual (0,772 picker/ha)	Bins in the row#: 40% fewer pickers (0,46 picker/ha)
Labour multiplier		0.363	0.25	0.17	0.772	0.4632
CGA projection for 2026⁸	27 318	9 916.4	6 829.5	4 644.1	21 089.5	12 653.7
Gillimburg Citrus Project	357	129.6	89.3	60.7	275.6	165.4

⁸ De Klerk, 2017

(Waterberg, Limpopo)⁹						
Injaka Waterval Lemon Project¹⁰	1 000	363.0	250.0	170.0	772.0	463.2
Bathlabine community, Letsitele Valley¹¹	500	181.5	125.0	85.0	386.0	231.6
Badplaas¹²	2 000	726.0	500.0	340.0	1 544.0	926.4
Sundays River Valley¹³	675	245.0	168.8	114.8	521.1	312.7
Alice-Kat¹⁴	800	290.4	200.0	136.0	617.6	370.6
TOTAL	32 650	11 852	8 163	5 551	25 206	15 123

With that information and the multipliers for the different scenarios, 11 852 permanent jobs and 25 206 seasonal jobs can be created with the baseline CGA scenarios. Fewer jobs can be created with the other three scenarios, which, in this author's opinion, are more realistic scenarios.

For job creation beyond the orchards, especially in packing sheds, the different scenarios for packers are "CGA business as usual" (0,651 packer per hectare), "optic sizer" (20% fewer packers than "CGA business as usual") and "automatic packer" (one sixth of "CGA business as usual"). A fourth scenario depicts the effect on job creation by linkages upstream and downstream from the farm, as suggested by BFAP (2011).

Table 18: Opportunities for job creation in packing sheds and other linkages: Scenarios and numbers

Place	Additional hectares	Additional cartons of citrus (1 500 boxes/ha)	Packers per hectare			Linkages (upstream/downstream from farm)
			CGA business as usual	Mechanise Optic sizer	Automatic packer	
Multipliers	-	1500	0.651	0.52	0.11	0.66
CGA projection for 2026	27 318	40 977 000	17 784.02	14 227.21	2 964.00	18 029.88
Gillimburg Citrus Project	357	535 500	232.41	185.93	38.73	235.62

⁹ Vumelana, 2016

¹⁰ Vumelana, not dated

¹¹ Vumelana, 2014, Genis, 2017a.

¹² Chadwick, 2016

¹³ Botha, 2016b

¹⁴ Hollins, 2015, Chadwick, 2016

(Waterberg, Limpopo)						
Injaka Waterval Lemon Project	1 000	1 500 000	651.00	520.80	108.50	660.00
Letsitele Valley	500	750 000	325.50	260.40	54.25	330.00
Badplaas	2 000	3 000 000	1 302.00	1 041.60	217.00	1 320.00
Sundays River Valley	675	1 012 500	439.43	351.54	73.24	445.50
Alice-Kat	800	1 200 000	520.80	416.64	86.80	528.00
TOTAL	32 650	48 975 000	21 255	17 004.12	3 542.53	21 549.00

With the best scenarios for permanent and seasonal farm workers and packers, a total of 58 313 jobs can potentially be created. The more realistic scenarios promise fewer opportunities, i.e. 40 290 or fewer.

7. CONSTRAINTS TO JOB CREATION

Even though it should be possible to create more jobs in the citrus sub-sector by expanding citrus orchards, a number of serious constraints may diminish this potential. Constraints include access to water for irrigation and the capacity of government to help develop new markets by negotiating with the governments of receiving countries in order to get access to new markets for South African citrus and to facilitate the removal of trade and phytosanitary barriers, as well as making policies that create an environment in which it is easy to produce citrus and develop and maintain an infrastructure.

Further constraints include the introduction of a national minimum wage at a level that is much higher than the present sectoral determination for agriculture, the nature and dynamics of accumulation in capitalist farming, the cost of establishing new orchards and the difficulty to find a suitable model(s) of support to new farmers. It is difficult to rank the constraints in terms of importance because they are so interlinked, but there is a likely sequence, i.e. water and capital first, then markets, etc. These constraints are discussed in the following sections.

Access to water

Increased access to water for irrigation purposes is considered key to the expansion of citrus production and job creation. According to Chapter 6 of the NDP, the 1,5 million hectares currently under irrigation can be “expanded by at least 500 000 hectares”. Expansion on this scale can be achieved through the improved use of existing water resources and by developing new water schemes (NPC, 2011:219).

However, farmers interviewed for this research indicated that a lack of access to water is already limiting their capacity to expand. Every farmer reported that they only used half the land that they owned because they did not have water to plant the rest to citrus. During the drought of 2015 and 2016 farmers attained water savings of 20 to 30% through better management of irrigation and monitoring of water losses.

Furthermore, the National Water Resource Strategy, Version 2 (DWS, 2013:52), states that the increasing demands on South Africa's water resources also increase the competition between agricultural, industrial, power generation, mining, commercial and domestic needs. The strategy therefore does not envisage an increase in the amount of water allocated for agriculture, but suggests that all sectors must improve their water-use efficiency and conserve water:

... all land reform projects and revitalisation of smallholder irrigation schemes will use the same amount of water as before. An increase in irrigation will be effected through water-use efficiency, and selected new developments, such as in the Mzimvubu (DWS, 2013:10).

New water infrastructure will only be developed or authorised if effective water conservation and water demand management interventions have been put in place in the affected area (DWS, 2013:28).

Farmers are concerned about the prospects for irrigation and water supply, but have had success with water use efficiency measures:

There is no more water in the valley. That is why we are planting in the Sandveld. We cannot do more here, yet it is also true that we are still wasting water. This past year (2016) I have seen how much water we can save. The drought has taught us a lot about water management. Because we were forced to save water, we managed to cut water use by 25% by improving our irrigation scheduling and monitoring of water use (Farmer Cape4, 2015).

The question is whether the knowledge and technology exist to improve water-use efficiency beyond the levels of efficiency that citrus farmers have already achieved or the 20 to 30% that they managed to save during the recent drought. In addition it is not clear whether we know how far such water-saving efforts can be implemented before production and the future productivity of citrus trees and fruit quality are jeopardised (Genis, 2015). Also, one can expect that water use may change (increase) in response to heat and higher rates of evapo-transpiration due to climate change (Western Cape Government, 2016).

Demand for citrus fruit and access to (new) markets

For the past ten years the citrus sub-sector managed to increase export volumes in different markets. While there is still potential in markets in Asia, and exporters managed to increase exports to the important European markets by 5% in 2016 (Joubert, 2016), there is also concern about overproduction, especially with regards to lemons (Botha, 2016a). In addition, access to a growing number of markets is becoming more difficult because of increases in technical barriers (sanitary and phyto-sanitary) and other non-tariff measures (Kapuya, 2015:2).

South Africa has, for instance, not yet been able to convince the EU health authorities that the virus that causes citrus black spot disease cannot be transferred by fruit to infect citrus orchards in member countries, while longer cold treatment for South African citrus exports to the United States of America have been imposed to control false codling moth (Joubert, 2016).

A modelling exercise by Kapuya *et al* (2014:125) found 17 countries (out of 51) that can be considered “strategic” and high potential markets. These countries represent the most attractive markets that present opportunities for export expansion. They concluded that more aggressive trade policy efforts should be directed towards nine countries which are “high potential markets”, but exhibit trade-inhibiting features discouraging South Africa’s citrus exports.

Government’s role and capacity

Farmers who were interviewed indicated that job creation is possible where conditions exist to expand citrus production, such as access to water for irrigation, continuous development of new markets, maintenance of current export markets, and upgrading of road, rail and port facilities and infrastructure, in other words, where the state does its part.

In its latest Annual Report the CGA (2016a) states that its mission to “gain, retain and optimise market access” has been challenged by the growth of the industry, new market protectionism risks and the fact that DAFF finds it difficult to cope with the growth and demands of international trade.

While government does and should play an important role in this context, there is concern about its long-term commitment to fostering the expertise needed to successfully conclude trade negotiations (Cramer and Sender, 2015; Lemmer, 2016). Cramer and Sender (2015:33) suggest an expansion of South Africa’s commercial diplomatic capabilities because of a shortage of “experienced, well-trained trade negotiators”:

... embassy staff do not appear to have appropriate training to support strategic exporting interests. Not only is there a need for more staff who understand agribusiness, but also, they need to be clear about the priorities in negotiations, rather than turning up for trade talks pitching broad shopping lists against the acumen and resources of US or Chinese or EU trade negotiators.

ABSA economist Wessel Lemmer (2016:26) warns that government should “wake up about citrus” and find the expertise and good negotiators to ensure that South Africa’s competitors do not make inroads in export destinations of South African citrus. Lemmer said that government officials were doing good work, but that the state’s investment in expertise is not keeping up with investments made by the country’s competitors.

The CEO of the CGA said while government is putting all of its capacity into concluding a continental free trade agreement for market access to other African countries, that initiative puts the citrus sub-sector at a disadvantage because the country’s competitors are “signing free trade agreements with Asian countries left right and centre” (Chadwick, 2016:Personal communication. He said in an interview:

Our biggest concern is around market access and government's capacity to ensure that we can unlock those obstacles, i.e. all the phytosanitary issues we have with China, etc. The only way can get a better protocol or better arrangement is when our Department of Agriculture talks to the plant health people in China or Europe. We cannot do it, although we do it through our special envoy. We do it because DAFF's plant health division is under-capacitated. That is probably our biggest limiting factor. If the plant health division had more officials working just on fruit issues we could solve a lot of phytosanitary issues and send more fruit to those areas (Chadwick, 2016:Personal communication).

The citrus industry has taken steps to support government in this task. In 2014 the CGA appointed Deon Joubert, an experienced fruit exporter as special envoy to the European Union in order to strengthen its negotiation team to avoid a continuation of the ban on South African citrus which was introduced by the European Union in 2013 amid fears that citrus black spot may pose a threat to EU citrus producers (Meintjies, 2014). In order to improve the capacity at the Department of Agriculture, Forestry and Fisheries (DAFF) the CGA seconded Mike Holtzhausen, a retired scientist at DAFF, to work there again (Chadwick, 2016):

We have concerns about the capacity at DAFF and the DTI (Department of Trade and Industry) around tariffs. We've been to DAFF, we'll pay for someone. From 1 July we will have someone at DAFF, who will only work on fruit issues. That division is a problem. They are just overworked. Plant pathologists or entomologists need to be experienced in dealing with international trade matters. DAFF has quite a few young people there, but negotiating is not necessarily what you know, but how you present it. Mike Holtzhausen used to work for DAFF. He knows how to package issues and will play a mentoring role in DAFF's division for inspection services and plant health (Chadwick, 2016):Personal communication.

Cost to establish and produce citrus

It can be quite costly to buy land, plant a citrus orchard and sustain it for the years before it begins to bear fruit and before the operation starts to show a profit, according to Reinhardt Siegruhn (2017), owner of a Paarl-based business which develops benchmarks for the production of citrus, avocados and macadamia nuts.

The price of land suitable for citrus ranges between R200 000 and R400 000 per hectare, while it costs R100 000 to R150 000 to establish a hectare of citrus. Annual production costs can be in the range of R30 000 to R102 000 per hectare. Of that, 36% is for labour, 24% for agricultural chemicals, 10% for fertiliser, 9% for electricity and 12% for fuel and oil. These proportions vary between farms (Siegruhn, 2017).

Introduction of a National Minimum Wage (NMW)

The National Minimum Wage (NMW) panel of experts has recommended a minimum wage of R3 500 per month or R20 per hour. According to the panel's calculations, 47% of wage earners currently earn below this level. The NMW will take effect on 1 July 2017, but fines for non-compliance will only be implemented after 1 July 2019 (*Mail & Guardian*, 2017). Initially, farm workers would get 90% of the minimum, or R3 150 a month (TIPS, 2016).

While the National Economic Development and Labour Council (NEDLAC) partners have reached consensus on the introduction of a national minimum wage as a way to restore the dignity of the majority of South Africans, and “address the triple challenges of poverty, under-development and inequality, and reduce pay differentials while maximising job creation”, there are also concerns that the introduction of the wage at R372 higher than the current minimum wage for agriculture of R14,25 per hour and R2 778 per month for the period 1 March 2016 to 28 February 2017 may lead to job losses because 80% of farm workers earn less than the NMW (TIPS, 2016).

Can citrus producers afford to pay a higher wage without reducing the numbers of workers? On aggregate, the numbers in terms of new orchards, the gross earnings of the industry and the new packing sheds, paint a picture of a prosperous industry and seem to suggest they can. Even though the establishment and production costs for citrus are high, the steady devaluation of the Rand since 2011 from about R7/\$ to around R12 at present most certainly made it possible for some marginal farmers to stay on the farm.

The dynamics of accumulation in large-scale commercial farming

Large-scale commercial farmers in three agro-ecological regions of South Africa employ four broad accumulation strategies: a) expanding the scale or scope of production; b) expanding the scale or scope of the business by expanding into new enterprises either up or down the value chain; c) increasing economic efficiency by means of lowering the cost of commodity production, increasing productivity through technical and biological efficiency, or by organising workers and tasks to make workers as productive as possible; and d) taking part in political action in order to reduce uncertainties and/or establish preferential access to and control over key resources, markets or policy processes (Genis, 2015).

Even though Genis (2015) found that large-scale commercial farmers in her study are differentiated into four categories, “accumulators”, “successful reproducers”, “struggling reproducers” and “simple commodity producers”, and all of them have employed at least one of the strategies mentioned in the previous paragraph, “accumulators” and “successful reproducers” never stop to employ all or most of the strategies, as if on a treadmill driven by competition.

An earlier section of this report relates how farmers have over the years changed tasks and increased mechanisation in order to employ fewer permanent and temporary workers. These processes are ongoing and their outcomes do not bode well for job creation prospects in the citrus sub-sector. Farmers said their aim was to increase the hectares per permanent worker:

We want to get to 4,5 ha per worker. That is without temporary workers. We shall try to improve on it to a point that we do not know at this stage. I think we shall have another 10% improvement. Maybe we shall be on 5 ha per worker within the next two years for the citrus hectares (Farmer Lim2, 2015).

We'll definitely be looking at an average of 4,75 ha per worker. On some of our production units it is already 6 ha per worker. When I started to work 20 years ago it was 1 ha per worker. We employ fewer workers to do more (Farmer Lim1, 2015).

Worker numbers have decreased a lot. During the past five years we have reduced permanent and temporary workers by at least a thousand. We did that by means of improved labour practices and mechanisation. We farm more sophisticatedly and scientifically (Farmer Lim3, 2015).

Support for new citrus farmers

The NDP (NPC, 2011) envisages agricultural development based on successful land reform, employment creation and strong environmental safeguards achieved through the expansion of both irrigated and dry-land agricultural production, especially by smallholder farmers. To achieve this goal, the established section of agriculture should act as “enabling partners” in collaboration between existing farmers and the beneficiaries of land reform.

Despite government’s stated aim to expand the smallholder sector in order to promote job creation, Aliber and Hall (2012:548) found that government attempts to support smallholder farmers have generally been “costly and ineffective”. In other words, while budgetary allocations to the sector have “increased impressively” in the 15 years before 2012, few farmers benefitted and the overall impact was small because of the way that the resources were distributed and used.

Chadwick (2016: Personal communication) believes that financing is going to be the biggest inhibiting factor in terms of expansion:

It costs you R100 000 to R150 000 to establish a hectare of citrus, then it takes five years before you begin to get any sort of money back and ten years before you break even. That massive capital intensity inhibits citrus to be a big developmental project. The only way it will work is in some sort of joint venture with a citrus farming concern. For them to add on another 20 ha next door is fairly easy (Chadwick, 2016: Personal communication).

The pitfalls of joint ventures in high value agriculture are discussed earlier in this paper. Partnerships may help new farmers gain access to value chains, but not necessarily to become independent entrepreneurs (Bitzer and Bijman, 2014). Furthermore, Lahiff *et al* (2012:1) found that joint ventures “struggled to get off the ground” or “collapsed with major losses” and only created limited employment opportunities and few benefits for ordinary community members. They ascribe it to overly complex deals and ineffective support from state agencies and lack of capacity on the part of commercial partners.

More plausible models need to be available to ensure equity and sustainability. That would include commercial partners with “sufficient resources to fund a venture throughout a prolonged start-phase and a demonstrable commitment to an inclusive business approach” (Lahiff *et al*, 2012:2).

8. CONCLUSION

Possibilities to create more jobs in the citrus sub-sector exist in both the traditional large-scale farming sector, but also in “new” areas earmarked for emerging black farmers. The most obvious way to create more jobs would be to increase the production of citrus through an expansion of orchards and reaping the benefits of increased

employment opportunities on farms and in the upstream (nursery and input sectors) and downstream (packing, processing, packing material) industries.

However, there are many real constraints in terms of access to more water for irrigation and markets that can absorb bigger volumes of citrus. The nature of commercial farmers' accumulation strategies as they relate to enhancing the productivity of workers, will limit – and already does – the extent of job creation in citrus production. On many farms the CGA and NDP rule of thumb of one job created for each hectare of citrus trees established, no longer holds; it may be much lower as farmers adopt more efficient production processes, change harvesting logistics and mechanise or automatise certain activities.

Efforts to create more jobs by expanding export citrus production are capital, water and time- intensive, compared to, say, vegetables and extensive or intensive livestock production. This means that choices must be made where funds are limited. In many cases citrus production is expanded by replacing other relatively labour-intensive sub-sectors such as wine grapes and potatoes, and this may lead to a zero-sum situation.

Farmers also feel constrained to invest by the uncertain state of the economy and politics, the subsequent volatility of the currency and government's less than optimal capacity to negotiate market access and the abolition of trade barriers. Although it is not expected of the state to create jobs, farmers reckon it is the responsibility of the South African government to negotiate favourable trade terms for South African exports with the governments of trading partners.

Lastly, it seems the type of jobs that will be created will mostly be lowly-paid seasonal jobs for lowly schooled workers.

9. RECOMMENDATIONS

Mlatsheni and Leibbrandt's (2014:239) contention, that "the reasons for high unemployment are too complicated for there to be a single, simple policy solution" to the problem, informs this section. There is no silver bullet solution to job creation in the citrus sub-sector, and recommendations should reflect the need for a multidimensional approach. Efforts to create more jobs by expanding export citrus production are extremely capital, water and time intensive, compared to vegetables, extensive or intensive livestock production, for example. However, if citrus is the best way to invest the country's limited public funds, this study recommends the following:

- Substantive opportunities exist to establish black citrus farmers with sustainable support, especially finance, technical expertise and market access. More research is needed into different kinds of joint ventures to develop more plausible models that "adequately address both equity and sustainability" (Lahiff *et al*, 2012:2) as a way to transfer knowledge to new farmers and strengthen their capacity and by doing so, ensure that they become independent farmers. It is also important to find ways to help these farmers to diversify in order to grow some food.
- As opportunities for the expansion of citrus production exist in the former bantustans, it is important to find solutions for problems pertaining to tenure security in those areas.

- Smaller-scale citrus enterprises exist alongside the very large citrus growing enterprises. The former could be an appropriate model for new farmers, and need further investigation.
- Development of markets for South African citrus fruit is important, but will require strengthening the capacity of government departments to negotiate reduction or removal of technical trade barriers, and conclude beneficial trade agreements with receiving countries.
- The South African citrus industry and relevant government departments need to launch a co-ordinated study into the potential and feasibility of citrus processing, e.g. citrus oil and pectin, waste products as fodder for livestock. If these alternative citrus processing options prove to be feasible, South Africa should pursue them with energy and sufficient funds, as well as ensure that people benefit from them. Such a study should include an investigation into market opportunities for small-scale fresh juice processing in-season.
- South Africa should be governed in a way that creates policy certainty for citrus producers with regards to tenure security, property rights, access to water and markets, etc.
- Government agencies responsible for the management and development of water resources, as well as water-related infrastructure, should be strengthened in order to ensure water availability to citrus growers and processors in terms of quantity and quality.
- The citrus industry and relevant government institutions should improve research about water use efficiency measures and breeding of water efficient cultivars by strengthening the research capacity of the CRI (Citrus Research International) and the Water Research Commission (WRC).
- Government should heed the pleas of the agricultural export industry and maintain and improve national road, rail and harbour infrastructure.
- Finally, there is a dearth of centrally accessible and useful data about the citrus sub-sector. It is difficult to assess the job creation potential of the sub-sector in the absence of data about hectares available to black farmers and hectares listed for irrigation. The creation of an accessible and comprehensive data base about the citrus sector is therefore a paramount priority.

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