

CLIMATE CHANGE, PEST ATTACKS AND AGRICULTURAL MARKETING: IS THERE A NEXUS IN THE CONTEXT OF SOUTH AFRICA'S TOMATO INDUSTRY?

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1. INTRODUCTION

The tomato industry is critical for food security, agricultural value addition, employment creation, and revenue production in South Africa. Indeed, tomatoes are the second most significant vegetable crop, behind potatoes, with an area planted of over 6 000 hectares and accounting for around 24% of total vegetable output in the country. Towards the end of 2021 the industry was afflicted by pests arising from severe rains, resulting in major losses and supply shortages. Against this background, the policy note seeks to find the connection between climate change, pests and diseases, and marketing of agricultural products in the context of the tomato industry. It further proposes some policy recommendations on how to deal with this complexity for promotion of efficiency in the marketing of agricultural products.

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2. DESCRIPTION OF TOMATOES

Tomatoes are flowering plants of the nightshade family, grown for their edible fruits. The diameter of their fruits ranges from 1.5 to 7.5 cm or more.

In colour, they are often red, crimson, or yellow, however green and purple variations occur with almost spherical to oval, elongated, and pear-shaped (DALRRD, 2020). Tomatoes are typically consumed raw in salads, served as a cooked vegetable, used as an ingredient of various prepared dishes, and pickled. The per capita consumption of tomatoes in South Africa is 12 kg per annum (DALRRD, 2017). However, a large percentage of the world's tomato crop is used for processing, and the products include amongst others, canned tomatoes, tomato juice, ketchup, puree, paste, and "sun-dried"

tomatoes or dehydrated pulp. Thus, tomatoes are one of the most popular vegetables in the world, with an annual value exceeding 90 billion USD (Litskas et al., 2019).



3. CLIMATE CHANGE, PESTS AND DISEASES IN TOMATO INDUSTRY

Tomatoes are a warm-season crop, with ideal temperatures for growth, productivity, and fruit quality ranging from 20 to 24°C (Adams, Cockshull & Cave, 2001). Flowers are often lost at temperatures below 12°C or over 35°C, resulting in poor fruit set and the quality of the fruits produced under such circumstances may also be harmed. Even in frost-free locations, winter tomato cultivation should be avoided if mean temperatures routinely fall below the crucial margin of 12°C (Adams et al., 2001).

Climate change, which often displays itself in the form of temperature changes, is very real. These temperature changes are leading to shifting patterns of precipitation, spatial and temporal distribution of run-off, soil moisture

and ground water reserves as well as an increase in the frequency of droughts and floods (Arora, 2019). This also have a knock-on effect on soil factors for tomato growth and development particularly in the early stages. Recently, South Africa has had excessive rains this summer, causing havoc on crops of critical basic fruits and vegetables. In some instances, this has been compounded by hail damage. Thus, in most areas producing vegetables such as potatoes and tomatoes in particular, farmers were seriously affected. For instance, the tomato industry in South Africa has recorded losses that have reached R94 million in December 2021 (Sinxo, 2022).

Tomatoes are susceptible to a number of pests and diseases, including bacterial wilt, early blight, mosaic virus, Fusarium wilt, nematodes, and tomato hornworms. However, the Farmer's Weekly (2020) identifies 12 main pests in tomatoes. They include: African bollworm (*Helicoverpa armigera*), Cutworm (*Agrotis* spp), Plusia looper (*Chrysodeixis acuta*), American leaf miner (*Liriomyza trifolii*), Aphids (Several types, mainly *Myzus persicae*), Red spider mite (*Tetranychus* spp), Rust mite (*Aculops lycopersici*), Erinose mite (*Eriophyes lycopersici*), Thrips (Several types, mainly *Thrips tabaci*), Nematodes (Several types, mainly *Meloidogyne* spp) and Leaf miner (*Phthorimaea operculella*). The tomato leaf miner can kill entire leaves and stems if the crop gets highly populated, and young plants can be destroyed. Older plants, however, can be more tolerant.

Control costs for these pests exceed \$400 million annually in pesticide sales alone (Pimentel and Burgess, 2014). Furthermore, some of these pests have developed resistance to close to 100 chemical active ingredients, more than any other plant-feeding arthropod, implying greater ability to develop resistance (Van Leeuwen et al 2010, Grbić et al 2011).

4. IS THERE A NEXUS?

The tomato industry uses four existing channels for the marketing of their product. The channels are as follows: local market through national fresh produce markets (NFPMs), exports, processing and direct marketing (DALRRD, 2020). The NFPMs remain an ideal and most important avenue for the selling of tomatoes in South Africa. As a result of this, the NFPMs prices serve as the baseline for all national tomato sales. However, is there a connection between climate change, pest attacks and marketing of tomatoes?

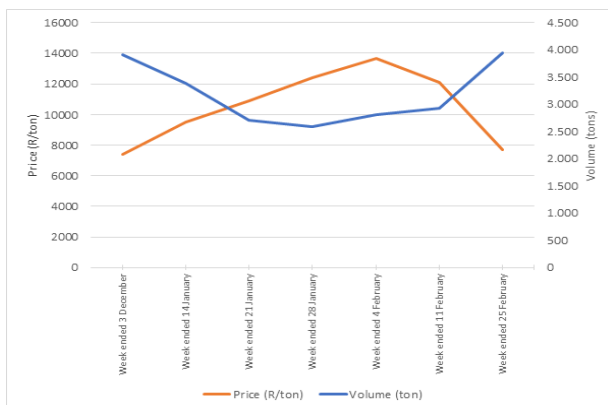


Figure 1: Trends of tomatoes: volume and price, Dec 21 to Feb 2022. Source: ABSA (2021-22)

Recent pest assaults on tomato crops in South Africa have occurred and resulted in crop losses. Excessive rains have also resulted in lower-than-usual levels of tomato harvests (Absa, 2021). This implies low volumes to the market and thus leading to a rise in tomato prices. It is clear that lower supply levels due to rainfall as well as insect pressure were keeping tomato prices on a high level. For

instance, during the week of 23 - 29 Jan 2022, prices for tomatoes shot as much as 11%, to R10.72 per kilogram (see Figure 1). Tomato quality across the country was not good due to insect damage resulting from excessive rains. It is clear that climate in the form of heavy rains played a major role in the production and marketing of tomatoes.

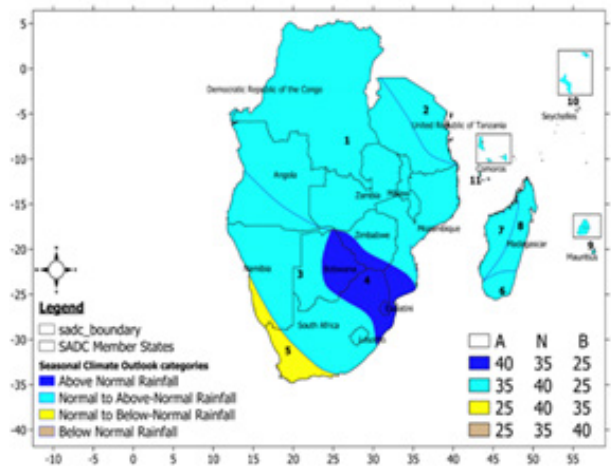


Figure 2: Rainfall forecast for Dec 2021-Jan-Feb 2022.

Source: World Meteorological Organization (2021)

According to DALRRD (2020), Limpopo province is the largest producer of tomatoes in South Africa with 3 590 ha (Northern Lowveld at 2 700 ha and far Northern areas of Limpopo at 890 ha). The province experienced heavy rains in December 2021 until February 2022 (see Figure 2). This coincides with the previous discussion of Figure 1 and therefore confirms the impact of heavy rains on tomatoes. Absa (2021) also reported that tomatoes were also sourced from the Western Cape. The quality of tomatoes was much better in this province compared to Limpopo but some of its regions were unable to produce good harvest due to below normal rainfall (see Figure 2) over the reported period. The Western Cape has also experienced a heat-wave in early February 2022, and this too would have affected the marketing of tomatoes.

5. CONCLUSION AND POLICY RECOMMENDATIONS

This policy note was designed to examine the impact of climate on marketing of agricultural products within the context of the tomato industry. Its key question states: Is there a nexus between climate change and marketing? The findings clearly show that when the major producing area (Limpopo) of tomatoes was hit by heavy rains and pest attacks, the compounded impact of this was poor quality and reduced volumes to the market and a subsequent increase in prices. Therefore, there is a clear connection between climate change and marketing of agricultural products. Previous research has often said less about this because climate has been deemed a non-economic factor. However, now the evidence suggests that the impact of non-economic factors (climate, disease) cannot be ignored in agricultural marketing policy. Key policy priorities should therefore be to increase investment in research and development on amongst other things the improved cultivars, drainage systems and pesticides. This can be achieved if the industry gets more organized and start collecting levies which will then be invested in amongst other things research and development and transformation. This is one possible solution to fight the impact of climate change on marketing of agricultural products as far as tomatoes are concerned.

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