



**Title: Impact of
climate change on
the quality of fruit
and vegetables
produced in South
Africa**

Introduction

The main objective of this study was to evaluate the impact of climate change on the quality of fruit and potatoes produced in South Africa



Project plan

- In conducting the projects, specific areas and products were selected as case studies
- Products included in the project:
 - Citrus, Plums, Apples – main export fruit types
 - Potatoes
- Provinces in South Africa for data collection
 - Limpopo, Western and Eastern Cape



Grower Survey Results

Qualitative survey on climate change

- **88% of growers who participated in survey are aware of climate change and concerned about this phenomenon going into the future**
- **These growers report experiencing rising temperatures, less rainfall and an increasing frequency of extreme weather events in their production regions**
- **44% of growers who participated in the survey reported reduced productivity and changes in fruit quality**
- **Some of the quality changes seen on fruit were: higher sunburn, higher acid values and higher °Brix**



Results continued

Qualitative survey on climate change

- **75% of growers found it necessary to use more advanced or more scientific production techniques to succeed in production**
- **44% of the growers already have some orchards under nets**
- **50% of respondents use degreening to improve colour on citrus fruit**

Results continued

In summary:

- there is a high grower awareness of climate change;
- there is concern for the future, there are some negative effects on fruit quality; and
- growers are adapting production

Climate change adaptation



- **Agriculture is faced with the task of improving productivity and quality in the midst of unfavorable temperature and rainfall trends**
- **To maintain productivity and quality, agriculture must adapt**
- **Adaptation is adjusting processes and practices at farm level to overcome the negative effects of climate change**
- **There are several approaches to adaptation**



Production Technology

Cultivar selection: fruit crops require a specific combination of climatic conditions to reach their full potential

- **Therefore, cultivars do not produce and perform optimally in all production areas**
- **With climate change, marginal climate for a cultivar or product could result in higher crop failures**
- **Planting the correct product or cultivar in the correct area reduces the risk of crop failure**



Production Technology

The use of shade netting: **shade nets are used to protect crops from adverse environmental factors**

- **Shade nets protect against wind scarring, sunburn, lower water consumption and losses through reduced evaporation**
- **It a good cropping technique to cope with climate change**



Production Technology

Climate smart agriculture: as the world slowly migrate towards a climate catastrophe, none scientific farming will have limited success

- With limited water resource, scientific farming technique will allow crop production to be resilient
- the innumerable production and fruit quality challenges will be overcome by high tech. crop production



Post-Harvest Technology

Packhouse quality control: packhouses are able to remove defective fruit either manually or electronically

- Some of the effects of climate changes (sunburn, hail marks, poor colour etc) can be removed in the packhouse
- Out of grade fruit, due to the above mentioned, are culled or sent to a juice factory



Post Harvest Technology

Degreening: Climate change may result in poor fruit colour in some fruit type including citrus

- **While fruit colour can limit marketability of fruit, in citrus this issue can be overcome by degreening**
- **Degreening is the process of exposing poor coloured citrus fruit to exogenous ethylene to enhance colour development**



Plant breeding

- The development of new varieties that can withstand adverse effects of climate change is key for breeders
- Example:
- South Africa has a robust cultivar breeding program run by the Agriculture Research Council
- It has successfully released new citrus and deciduous fruit varieties

Conclusions

Several factors are prominent in this study:

1. There is evidence that climate change may affect fruit phenology and result in a change in the time cultivars mature
2. There is evidence that climate change may affect fruit quality, in some cases negatively and in some cases positively
3. There are differences in the way different fruit types respond to the phenomenon of climate change. Plums and apples seemed more responsive compared to citrus



Conclusions

4. There is evidence that fruit in different areas responds differently to climate change

5. While the work was done diligently, we were limited by the data we received from packhouses. With increases in out of grade fruit, there is a lot of information that is lost because this fruit is either culled on the farm or lost to juice in the packhouse.

6. There is need to continue with this work in a more structured manner and select orchards in different areas and monitor them for a period of time



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Thank you for
your attention



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