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YIELD EVALUATION OF SOUTH AFRICAN SWEET POTATO CULTIVARS IN THE ZULULAND DISTRICT OF KWAZULU-NATAL.

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ZULULAND DISTRICT

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1. INTRODUCTION

- Sweet potato is one of the main food security crops in Southern Africa.
- It is an adaptable crop.
- It tolerates several adverse conditions.
- There are a lot of sweet potato cultivars in the world.
- Agricultural Research Council-Roodeplaat Vegetable and Ornamental Plant Institute has a breeding programme.

INTRODUCTION....

- Sweet potato cultivars can be found in variety of colours.
- The internal colors of most South African cultivars varies from white to yellow.
- ARC- Roodeplaat breeding programme is breeding cultivars with:
 - Good yield, good taste
 - Wide adaptability
 - Drought tolerance.

INTRODUCTION....

- Different sweet potato cultivars with various colours





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INTRODUCTION....





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BACKGROUND....



2. BACKGROUND

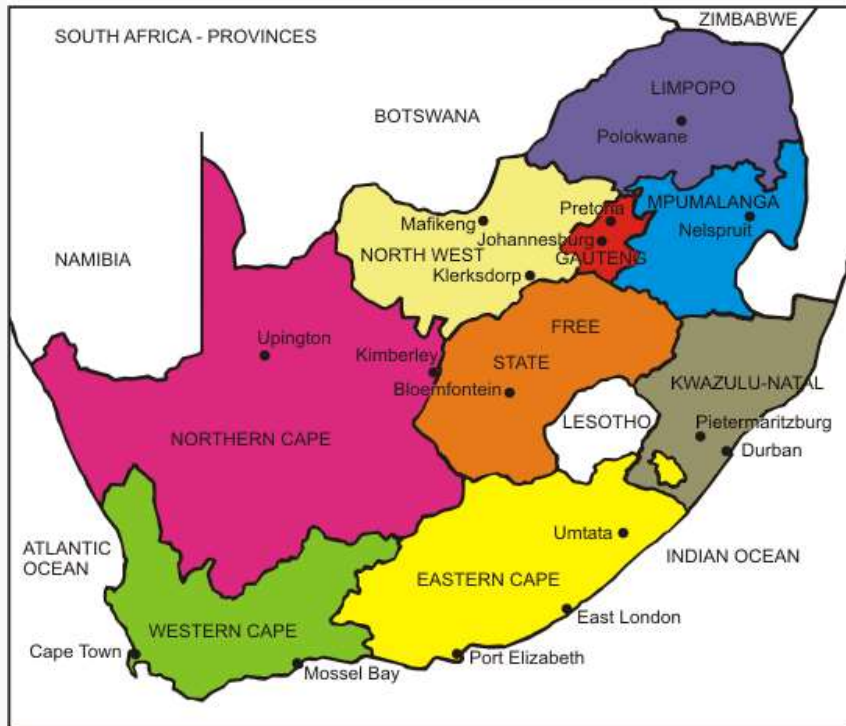
Three trials were planted in different areas of KwaZulu-Natal in Zululand district. (Vryheid: Mondlo and Mvunyanane) (Pongola: Khiphunyawo).2013/14.

Trials were conducted by the department of agriculture in collaboration with Agricultural Research Council.

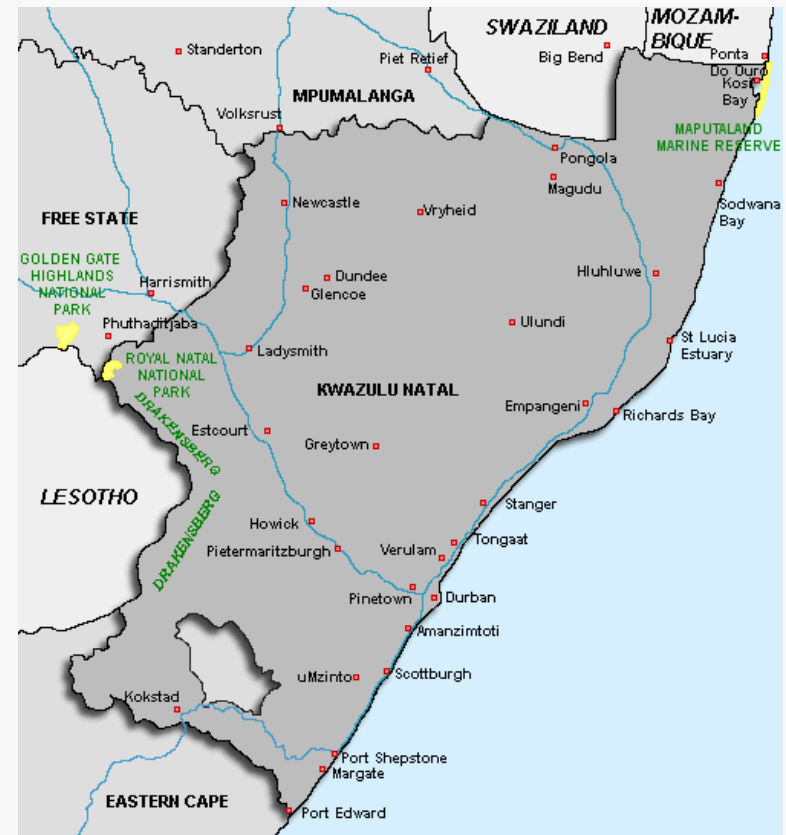
These trials were planted using the virus free planting material from Agricultural Research Council (ARC) in Pretoria.

BACKGROUND....

South African Map



KwaZulu-Natal Map





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BACKGROUND

AREA	BIORESOURCE UNIT CODE	BIORESOURCE NAME
Mvunyane	TUc1	Buffelsrivier
Mondlo	Ub10	Vlakhoek
Khiphunyawo	TUb1	Itala

BACKGROUND....

- Sweet potato can be grown in a variety of soil types.
- Soil for all the three sites were suitable for sweet potato establishment: form, texture, depth and structure as well as the climate.
- They were as follows:
 - Sandy-loam
 - Loam

BACKGROUND....

- Seven cultivars were used to conduct the study.
- Cultivars names: **Bophelo, Impilo, Blesbok, Monate, Mvuvhelo, Ndou and 199062.1**
- Their flesh colour are as follow:
- Bophelo is dark orange in colour.
- Impilo and 199062.1 are light orange in colour.
- Mvuvhelo, Monate and Ndou are cream in colour/
- Blesbok is whitish in colour.

3. OBJECTIVES

To evaluate the production potential of the 7 sweet potato cultivars in Zululand district.

To get the farmers involved in selection of preferred varieties.

To recommend the adapted varieties for production in the area after trial.



4. MATERIALS AND METHODS. FIELD LAYOUT.

REP 1

REP 2

REP 3

Impilo	1m	Blesbok	1m	Bophelo
Mvuvhelo		Ndou		Monate
199062.1		Monate		Blesbok
Bophelo		Mvuvhelo		Impilo
Ndou		Impilo		199062.1
Monate		Bophelo		Mvuvhelo
Blesbok		199062.1		Ndou

4. MATERIALS AND METHODS...

38m X 9m

Total area: 342m²

Number of entries: 7

Number of replications: 3

Total number of plants per cultivar: 120

Total number of plants per row: 40

Length of the rows: 12m

Spacing between rows: 1m

Spacing between plants: 30cm

Fertilization: Planting: 17.1kg/342m² of NPK 2:3:4 (30) + 0.5%

Zn

Top dressing: 8.6Kg LAN28% /342m²

MATERIALS AND METHODS

Plots demarcation and fertilization

Plots demarcation



MATERIALS AND METHODS...

- Fertilization:
- Standard fertilizer requirement was used.
- Fertilizer was broadcasted evenly.
- Thereafter the ridges were made.

MATERIALS AND METHODS....

Ridging



Ridging



PLANTING

Marking lines



Informal training before planting



MATERIALS AND METHODS...

Planting



Planting



PLANTING

- After ridging, the vine cuttings planted by opening up the soil using 30cm long stick.
- Same stick was used to measure spacing between the plants.
- Planting on ridges is the most recommended method.
- It improves water infiltration and root penetration.

IRRIGATION

The trial plots were irrigated immediately after planting.

Irrigation is most critical for few weeks after planting.

It responds well to increasing moisture, but is considered as drought-tolerant crop.



MATERIALS AND METHODS....

Trial Plots after planting



MATERIALS AND METHODS....

Maintenance



Monitoring



MATERIALS AND METHODS....

- During the course of the trials, training sessions in cultivation practices of sweet potato were presented.
- At all the three trial sites farmers maintained trials resulting in a hands on experience in cultivation of sweet potato.

MATERIALS AND METHODS....

- Topdressing was done six week after planting.
- Limestone Ammonium Nitrate (LAN) was applied per row.

MATERIALS AND METHODS....

WEEDING



IRRIGATION



WEEDING AND IRRIGATION

- Weeding was done mechanically using hand hoe.
- After few weeks the weeding was not necessary when the vines covered the ground.
- Farmers were responsible for weeding and irrigation.
- Water stress during 30-60 days after planting cause reduce yield.



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MATERIALS AND METHODS....



MATERIALS AND METHODS....

- TOP GROWTH DATA COLLECTION:
 - Leaf shape.
 - Vine colour
 - Flowering habit
 - Vine vigour
 - Vine thickness

MATERIALS AND METHODS....



MATERIALS AND METHODS....

- HARVESTING:
- Counting the number of plants per plot to see how many plants survived up to the harvesting stage.
- Garden forks and spades were used during harvesting.



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COUNTING VINES PER LINE





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HARVESTING





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HARVESTING...



HARVESTING...

- Data Collection:
- External and internal colour of the storage roots.
- Shape of the storage roots.
- Defects (Veins, Cracks, Constrictions and Grooves)
- Marketable yield [kg] and marketable yield number)
- Unmarketable yield (Small [kg], Cracked [kg], Insect and Rotten [kg])

HARVESTING...





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HARVESTING...



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SORTING AND GRADING



SORTING AND GRADING...





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WEIGHING



TAKING SAMPLES FOR ANALYSIS





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SAMPLES



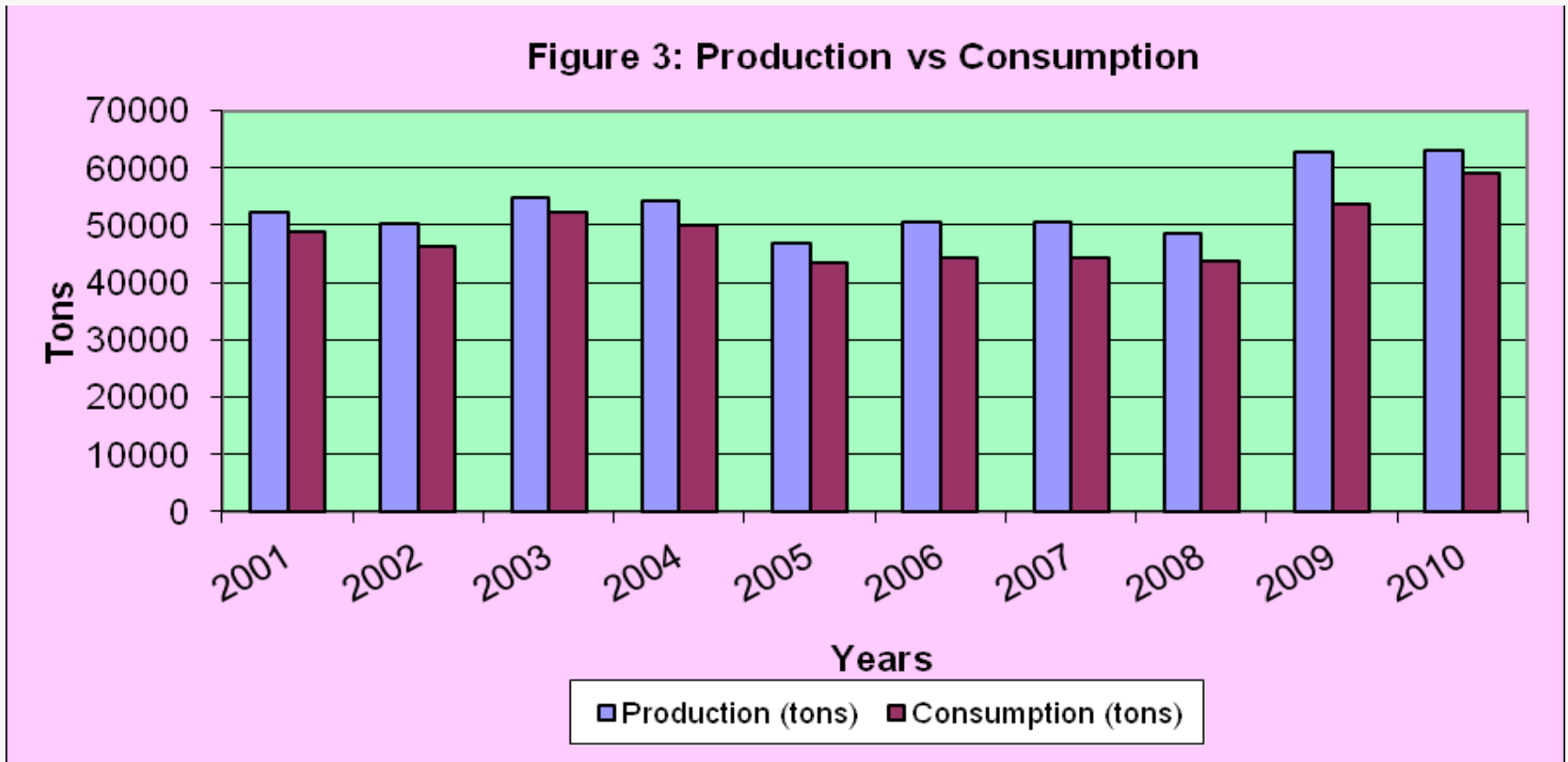
SAMPLES....

- Samples were taken from each cultivar per replicate.
- They were taken to Agricultural Council for analysis.
- Data Analysis was done at ARC using GENSTAT.

PACKAGING AND TRANSPORTATION



CONSUMPTION



CONSUMPTION....

Production vs. Consumption of sweet potato

- Local consumption of sweet potato compared to the production over 10 year period.
- South African average sweet potato consumption is approximately 48 550 tons per annum.
- In 2010 consumption has increased by 1.6% and this can be attributed to 0.8% increase in production in the same year.
- The production of sweet potato is higher than the consumption.
- This indicates that South Africa is self sufficient in terms of sweet potato production and the surplus sweet potatoes are also exported.

CONSUMPTION....

- Sweet potato can be consumed in different ways:
 - Boiled
 - Baked
 - Roasted or fried
 - Juice

SWEET POTATO PRODUCTS



SWEET POTATO PRODUCTS...



SWEET POTATO PRODUCTS...

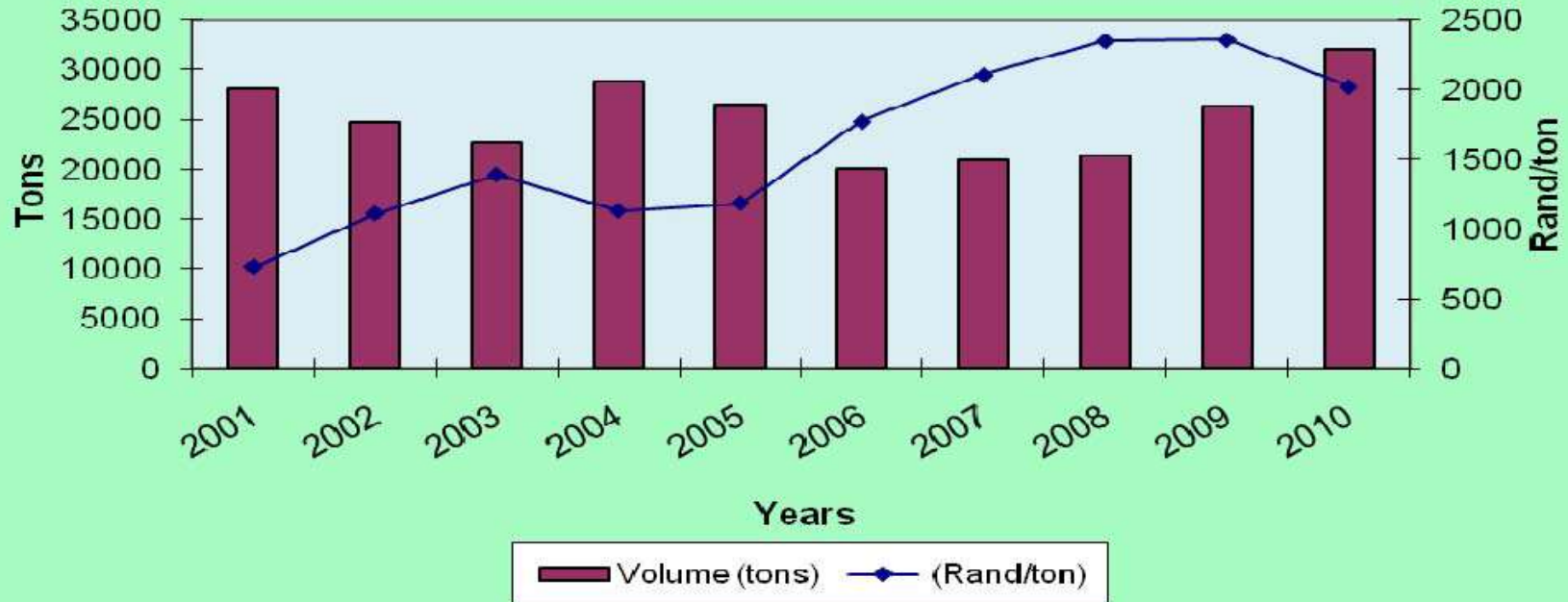


PACKAGING AND MARKETING



MARKET ANALYSIS

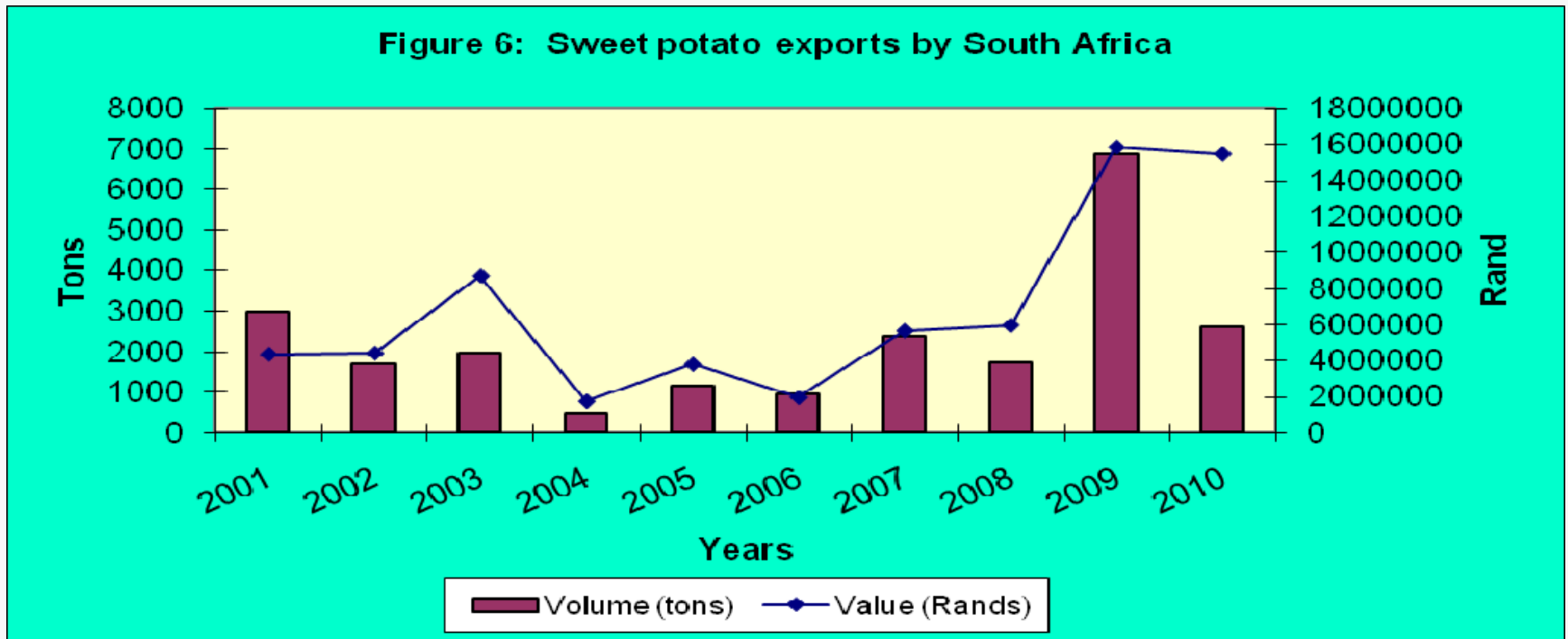
Figure 4: Sales of sweet potato at national fresh produce markets



MARKET ANALYSIS....

- From 2001 to 2010 volumes were unstable.
- In 2001 low price- high volumes supplied.
- In 2002 and 2003 prices increased - decline supplies.
- In 2004 and 2005 prices declined- more volumes supplied.
- Fro 2006 prices increased higher and reach peak in 2009 despite of high volumes supplied.
- In 2010 prices dropped due to increased vol.

MARKET ANALYSIS....

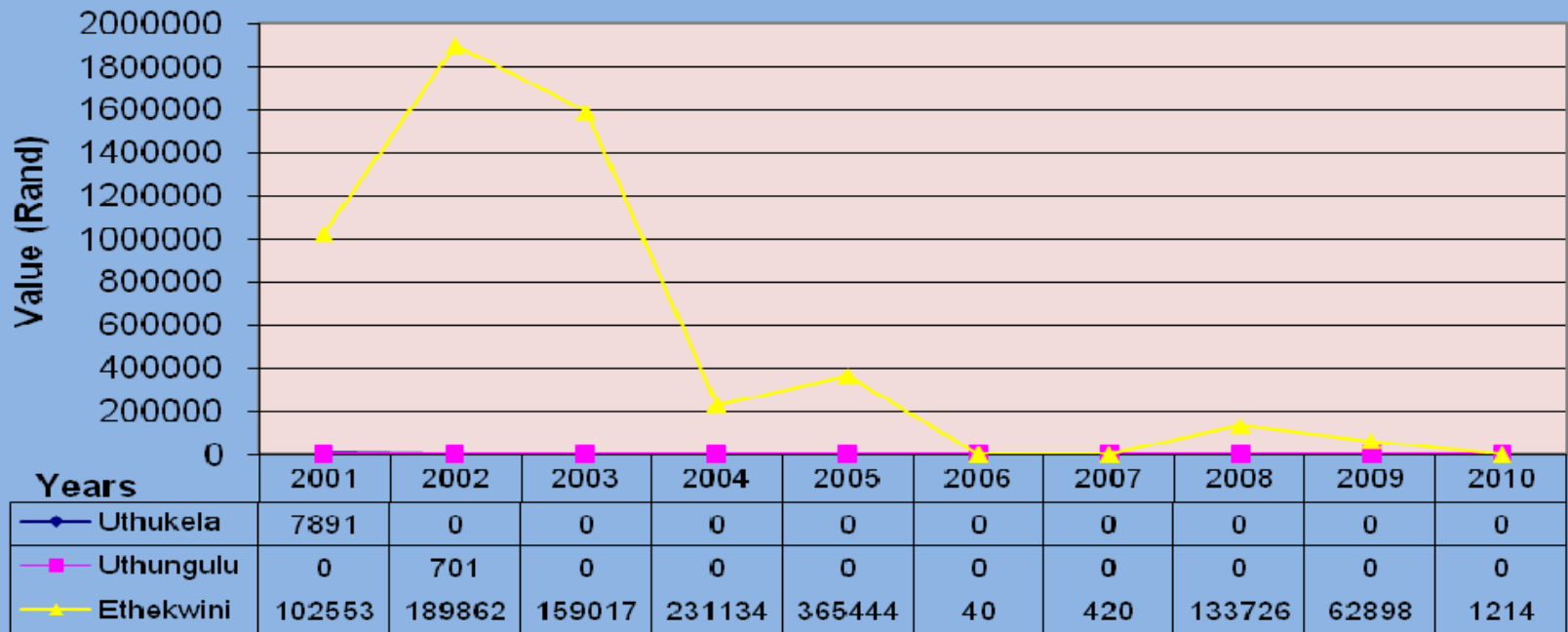


MARKET ANALYSIS....

- The high export volumes in 2001 due to highest production volume in the same year.
- From 2004 to 2006 the exports decrease due to decline in production volumes in the same years.
- In 2009, exports increased by 297% and this are attributed to high production volume in the same year.
- In 2010, export dropped by 61% despite 0.7% increase in production volume.
- Generally, it appears that it was less profitable to export sweet potatoes except in 2003, 2008 and 2010 since less export values were recorded for higher volumes exported.

MARKET ANALYSIS....

Figure 12: Value of sweet potato exports by Kwazulu Natal Province

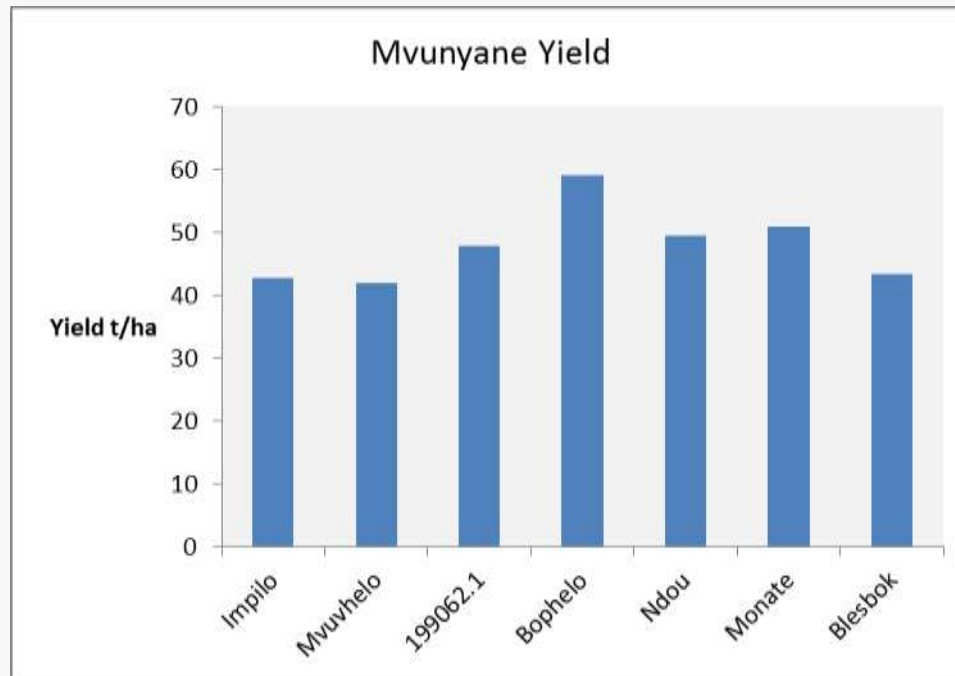


MARKET ANALYSIS....

- Sweet potato exports by KwaZulu-Natal Province were mainly from Ethekewini and the highest export value was recorded in 2002.
- From 2004, the exports values have decreased significantly.
- In 2010, the value of sweet potato exports from Kwazulu Natal was less significant.



5.RESULTS

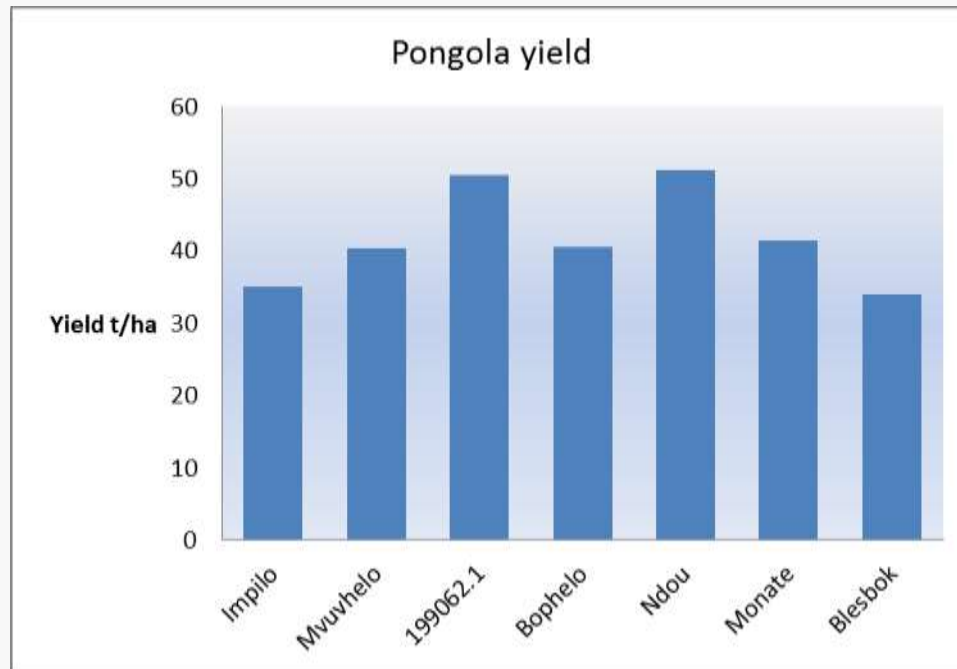


RESULTS....

Mvunyane results under Abaqulusi Local Municipality.

- Bophelo – 59t/ha.
- Monate - 51 t/ha.
- Mvuvhelo - 42 t/ha.

RESULTS...

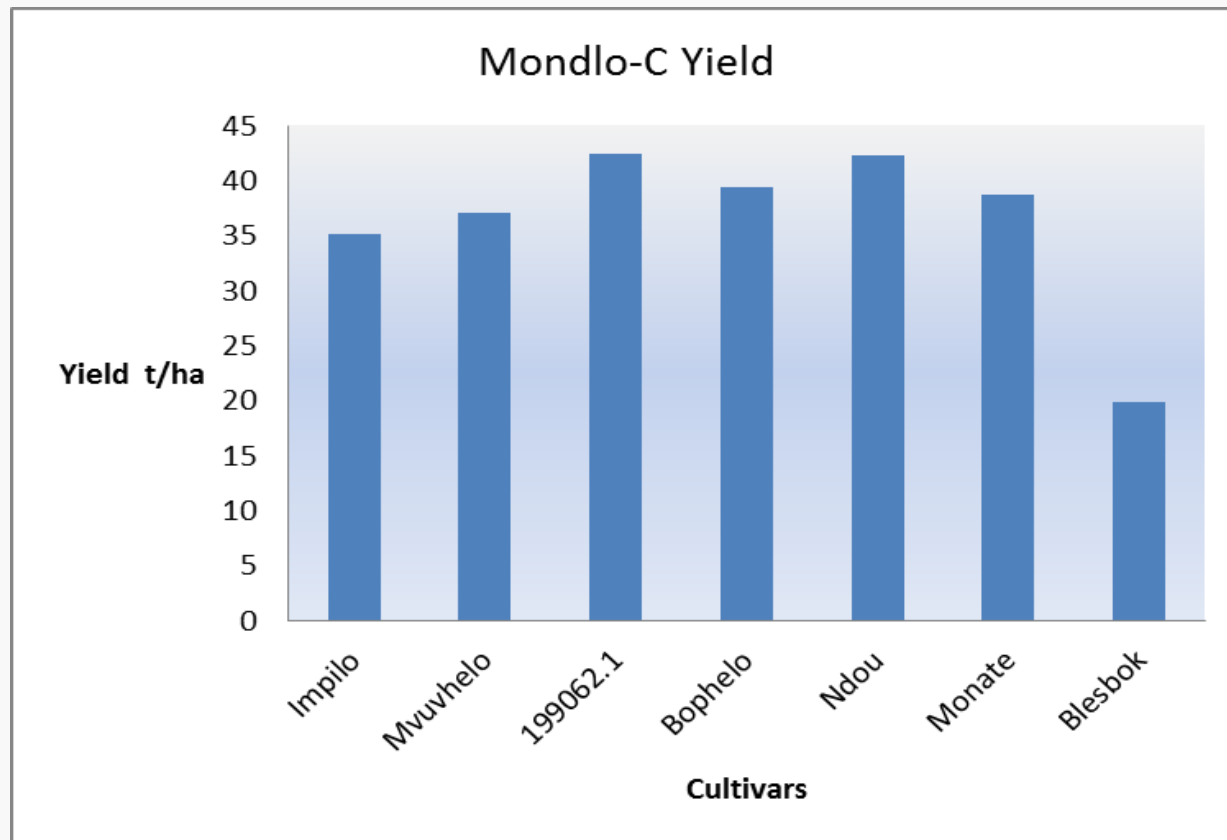


RESULTS....

Khiphunyawo under Pongola Local
Municipality.

- Ndou – 51.3 t/ha. Best
- 199062.1 – 50.5 t/ha. Better
- Blesbok – 34 t/ha. Least

RESULTS....



RESULTS....

Mondlo-C under Abaqulusi Local Municipality.

- 199062.1 – 42,5t/ha
- Ndou – 42.3t/ha
- Blesbok – 19.9t/ha

SWEET POTATO TASTING

ASSESSMENT



ASSESSMENT



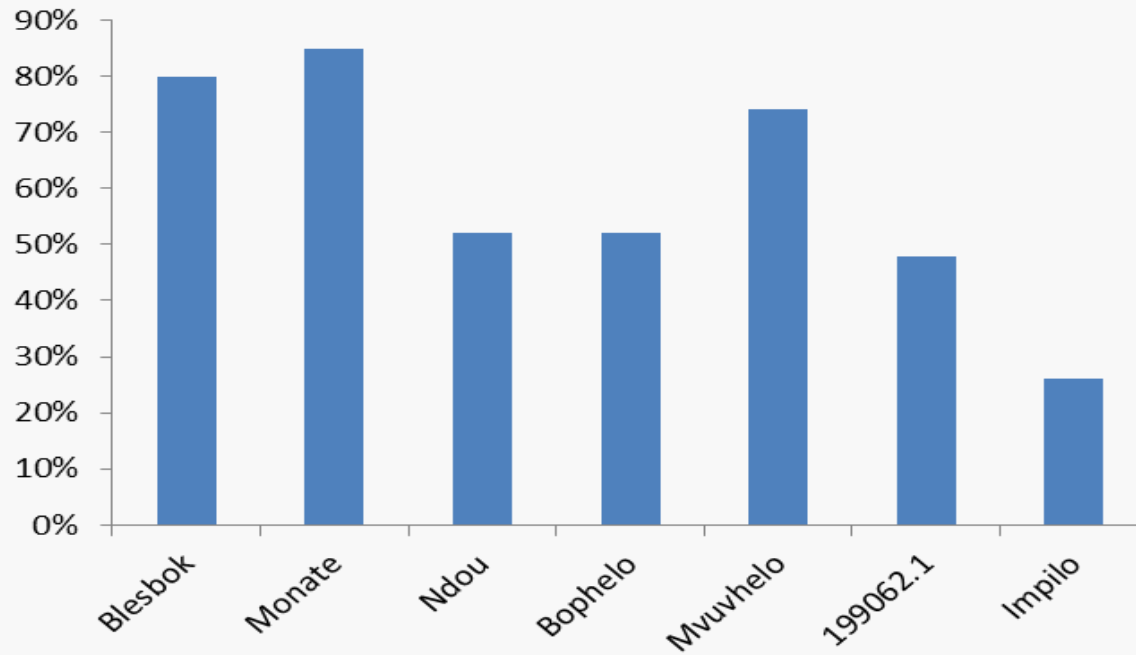


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RESULTS...

Mondlo- Mvunyanane Tasting Results



RESULTS....

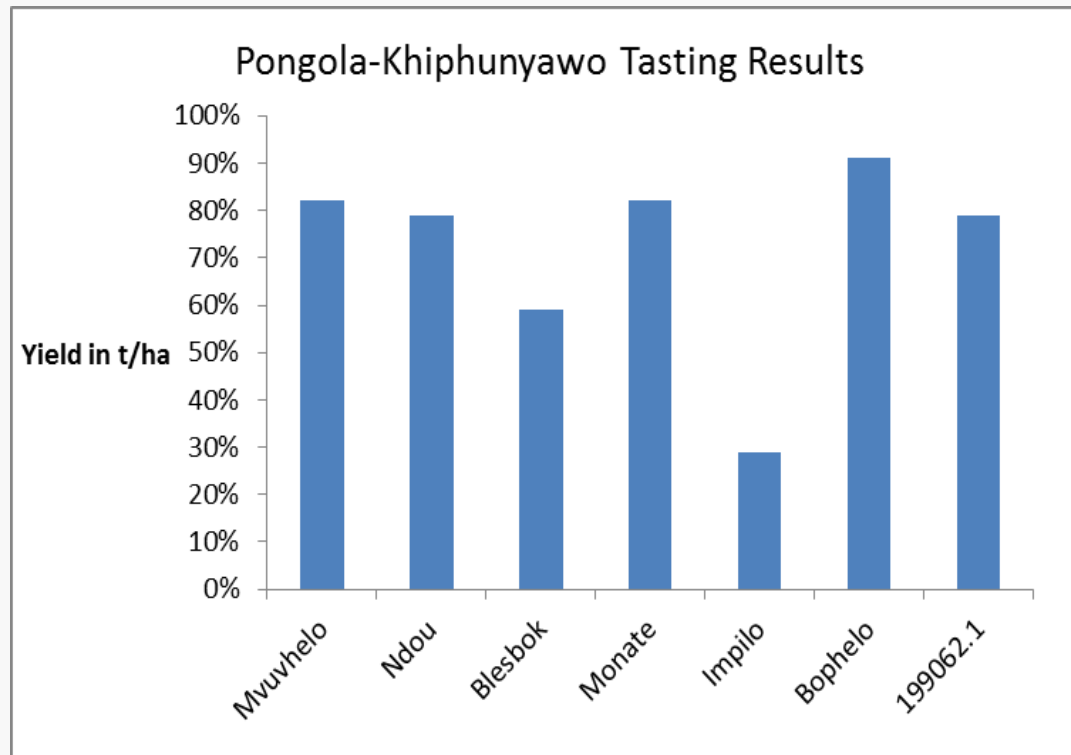
- Monate was the best in terms of taste followed by Blesbok.
- Most cultivars preference is above 50%.
- Impilo was selected as the least tasting cultivar in Mvunyane. Below 50%



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RESULTS...



RESULTS....

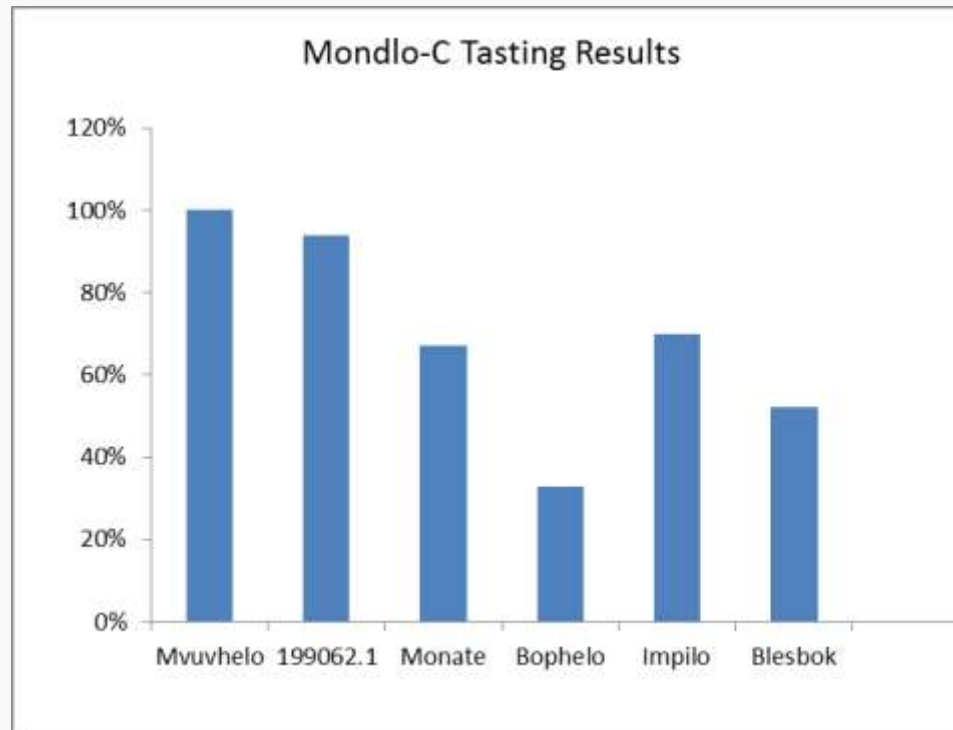
- Bophelo was selected as the best tasting cultivar at Pongola.
- Most cultivars were preferred by the consumers in terms of taste. Score above 50%
- Only Impilo was below 50%



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RESULTS...



RESULTS....

- The above graph shows that Mvuvhelo is the best tasting cultivar at Mondlo followed by 199062.1.
- Bophelo is the least preferred cultivar.
- Ndou was not assessed, it was no longer available during tasting session.

5.4. Expected yield

- Sweet potato yield according to handbook for Agricultural Advisors in KwaZulu-Natal:
 - Conservative: 15-20 tons per ha.
 - Average: 25-30 tons per ha.
 - Target: 40 tons per ha.

6. Discussions and Conclusions

- The trials were successful in selecting the best performing cultivars.
- The best performers in Pongola and Mondlo-C were Ndou and Monate.
- In Mvunyane the best performer was Bophelo followed by Monate.
- This will assist the farmers to select the best performer to maximize their production and income.

Discussions and Conclusions

- Most cultivars performed above target yield and others above average.
- Only one cultivar performed conservatively in one site.
- This is an indication that these areas are the most suitable areas for sweet potato production.

Discussions and Conclusions

- In 2014/15 the same cultivars were evaluated in Mamphokgo area of North West Province.
- The highest yield obtained was 19.7t/ha of Mvuvhelo.
- Ndou and Blesbok followed with the yield of 19.3t/ha.
- The least performer was Bophelo with the yield of 14.2t/ha.

CONCLUSION

- The trials conducted in Zululand district performed very well.
- Soils and good maintenance (irrigation, weed control and fertilization) are the contributing factors.
- The potential yield is obtained if all these factors optimal under good climatic conditions.

ACKNOWLEDGMENTS

- Agricultural Research Council technicians.
- Agricultural Advisors for the areas where the trials were conducted.



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THANK

YOU.