

## **Commercial NovaCane® production of SASRI N sugarcane varieties**

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# PRESENTATION OUTLINE



Overview of Dube TradePort



Dube AgriZone Agricultural Precinct



Commercial NovaCane® production of SASRI N varieties



Conclusion and Acknowledgements

# DUBE TRADEPORT SPECIAL ECONOMIC ZONE



Schedule 3C provincial government entity

Mandated to implement 50-year Durban Aerotropolis master plan



Airport city with activities that stimulate economic growth

Strategic business location within KwaZulu-Natal



Landowner of 3 800 hectares

Home to King Shaka International Airport (KSIA)

# DUBE TRADEPORT DEVELOPMENT ZONES



**dube iCONNECT : PREMIER CLOUD AND TELECOMMUNICATIONS PLATFORM**

# TARGET SECTORS

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**AEROSPACE AND AVIATION-LINKED MANUFACTURING AND SERVICES**



**AGRICULTURE AND AGRO-PROCESSING**



**ELECTRONICS MANUFACTURING AND ASSEMBLY**



**MEDICAL AND PHARMACEUTICAL PRODUCTION AND DISTRIBUTION**



**CLOTHING AND TEXTILES**



**AUTOMOTIVE COMPONENT MANUFACTURING**



# BENEFITS AND INCENTIVES

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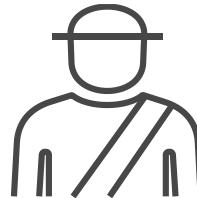
## FOR QUALIFYING SEZ ENTERPRISES



**COMPETITIVE  
RATES**



**BUILDING  
ALLOWANCE**



**CUSTOMS  
CONTROLLED  
AREA**



**REDUCED  
CORPORATE  
INCOME TAX RATE  
(15%)**



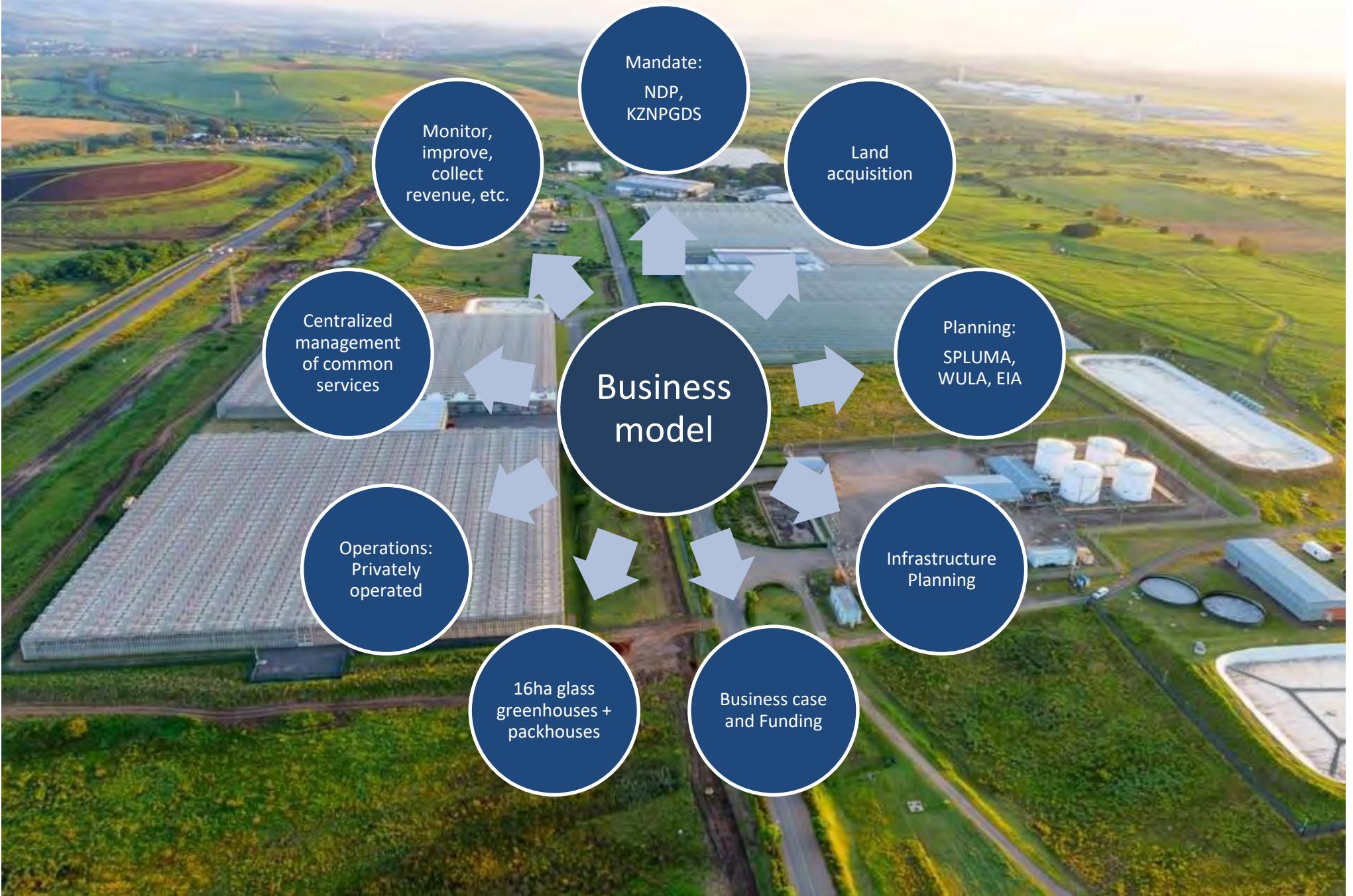
**EMPLOYMENT  
TAX  
INCENTIVES**

# dube agrizONE

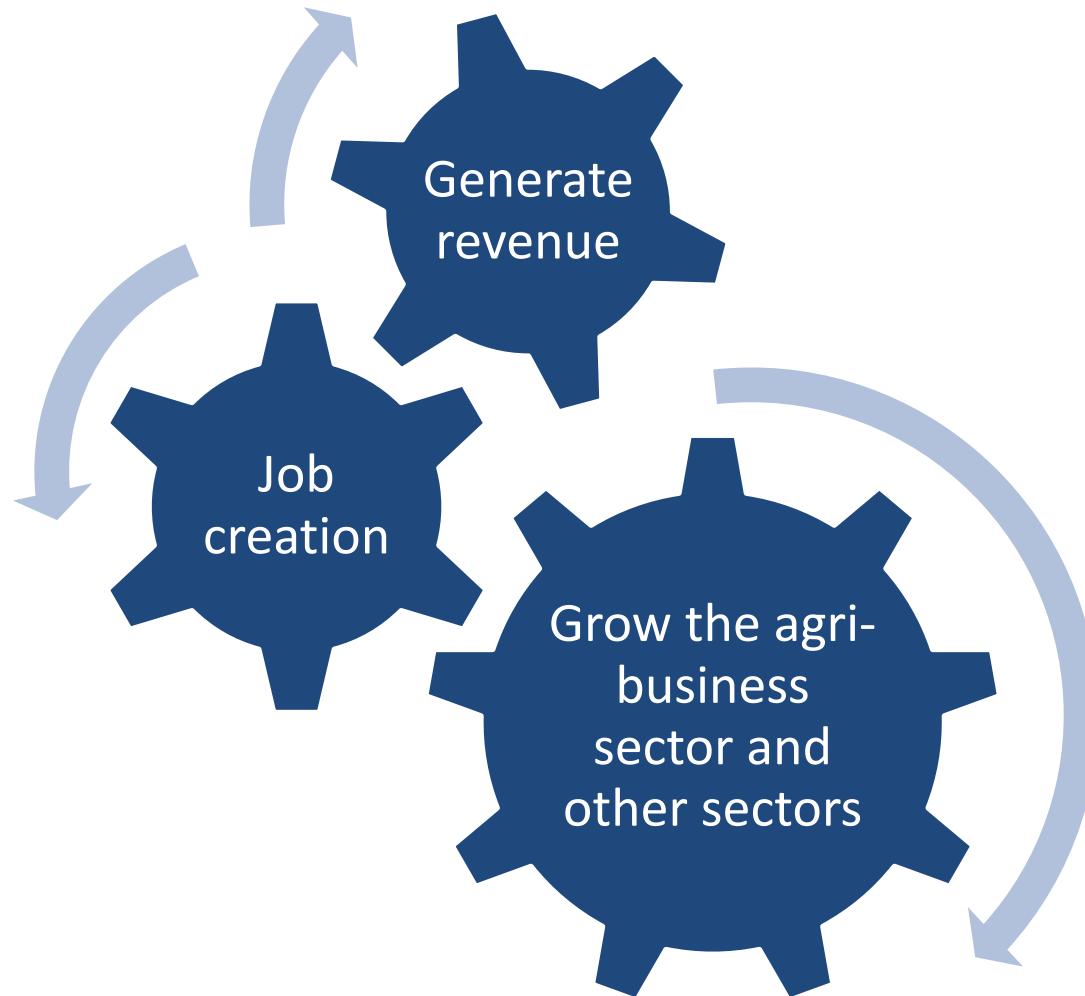
## ADVANCED AGRICULTURAL PRECINCT



# DUBE AGRIZONE – MODEL



# DUBE AGRIZONE – DRIVERS



# DUBE AGRIZONE 1



## TENANTS

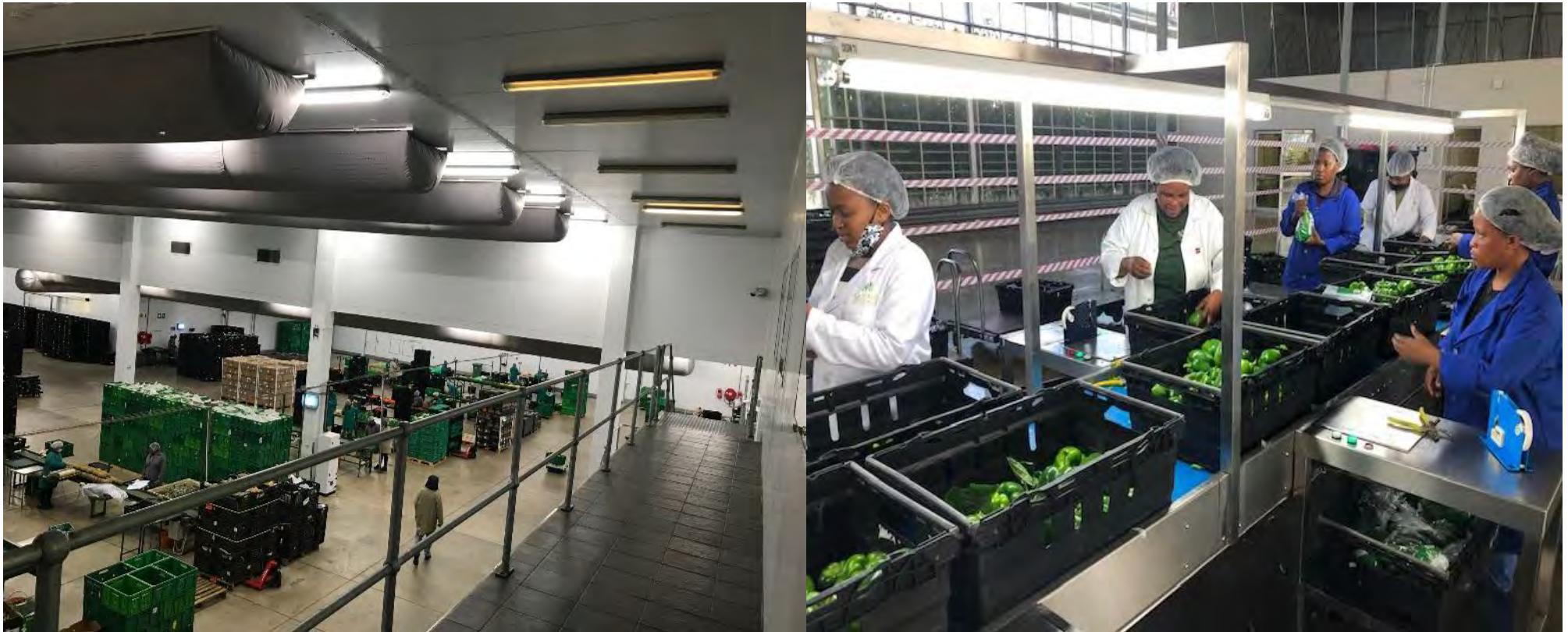
- Lebombo Cape Properties
- Baird Farming
- McFair Holdings
- Ilanga Elihle trading

Site Size	16 ha
Project Status	Completed and fully operational
Primary Uses	<ul style="list-style-type: none"><li>▪ Production: technologically advanced glass greenhouses</li><li>▪ Processing: dedicated facilities for packing, storage and distribution</li><li>▪ Dube AgriLab: Plant tissue culture laboratory and hardening facility.</li></ul>



# PACKHOUSES

- Onsite packhouse facilities for each greenhouse
- Maintain cold chain and prolong shelf life



# DUBE AGRIZONE 2



Site Size	30 ha developable
Project construction start and end dates	2021 - 2023
Status update	<ul style="list-style-type: none"><li>• Under construction @ 92%</li><li>• Bulk earthworks and civil services</li></ul>

# GREENHOUSES

- Trellis Girder type greenhouses
- Priva PCP, V-lan
- On-site weather station
- 6m high - gutter
- 4m high – trellis
- 4mm thick – toughened safety glass
- Divided into compartments of 1ha
- Designed for climbers + pot plants
- Ebb&Flood and Drip irrigation

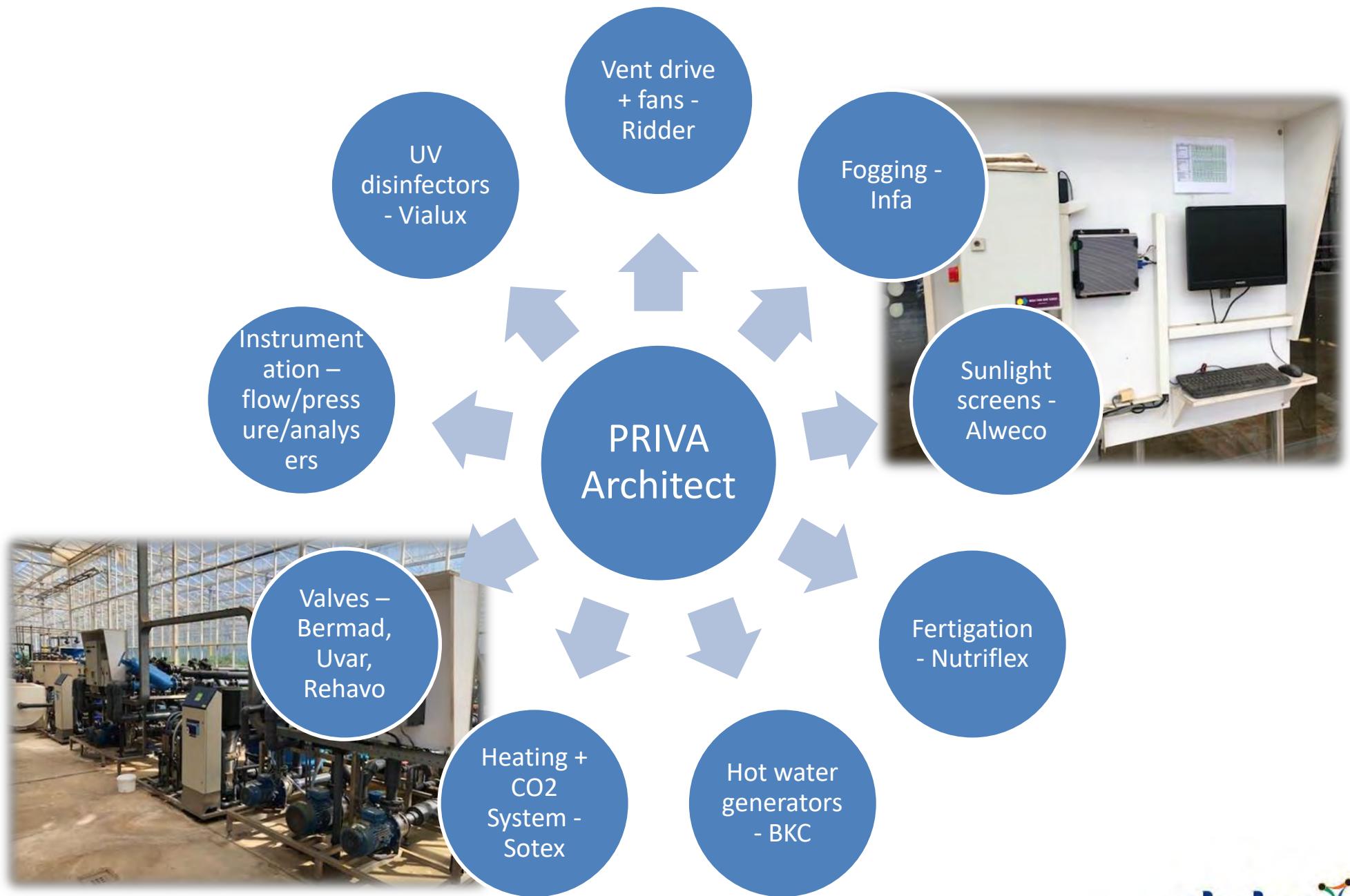


# AGRILAB GREENHOUSE

- Insect free, climate controlled hardening facility
  - Technical area, Primary Hardening (Zone 1) and Secondary hardening (Zone 2)
- Virus net
- Rolling benches
- Root heating system
- Roof and side butterfly vents for cooling
- Top and side shade screens
- Humidity control (fogging)



# GREENHOUSE MANAGEMENT SYSTEM



# WATER MANAGEMENT

- Approx. 80% to 90% is rain harvested & 10% to 20% is sourced from boreholes and airport WWTW (GLV/SLV greywater)
- The farm has approx. 65ML water storage (HDPE lined and TPO covered ponds)
- This is run through an RO water treatment – high salinity levels (250ms/m to 300ms/m) and Ecoli
- Irrigation water requirement of 2l to 7.5l per m<sup>2</sup> per day
- Approx. 1.2ML water requirement per day – 30% to 40% flush water
- Electronic water management system – pond level, flow, quality, valves and pumps



# WATER MANAGEMENT

- Onsite water quality testing laboratory
  - Weekly sampling and analysis
  - Monthly correlation testing through external lab



# WATER MANAGEMENT

- Hydroponic irrigation system waste water – recycling process:



# ENERGY MANAGEMENT

- Main feed – Eskom power via eThekweni Municipality
- Solar energy
- 250kVA stand-by generators



# WASTE MANAGEMENT

- All waste is managed by DTPC
- Central waste facility for general waste
- Organic waste – fruits/veges and old plants approx. 9 tons per day
- Organic waste - composting and landfill



# TISSUE CULTURE FACILITY (DUBE AGRILAB)

dube agriLAB

# 5

**MILLION** HIGH-QUALITY,  
VIRUS-FREE PLANTLETS ANNUALLY



— THE ONLY —  
**COMMERCIAL**  
TISSUE CULTURE LAB

**IN KWAZULU-NATAL**

PREDICTABLE YIELD PRODUCED



**PER PLANTLET**

BRINGING THE

**SCIENCE**

OF FARMING TO YOU

**IDEALLY POSITIONED**   
WITHIN DUBE AGRIZONE,  
ADJACENT TO KING SHAKA  
INTERNATIONAL AIRPORT



# TISSUE CULTURE FACILITY - Key Components

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- Research & Development
  - Existing protocols under Plant Breeder Rights
  - New protocols to develop own IP
- Lab Production
  - Clean Room Environment Level 6
  - HEPA filters & positive air pressure
  - Separate grow rooms and propagation rooms
- Hardening Facility
  - Primary and secondary hardening of TC produced plantlets

- Contract agreement with South African Sugarcane Research Institute (SASRI)
- SASRI gazette varieties propagated through tissue culture (Dube AgriLab supplies NovaCane®) supplied to growers
- Provision of hardening facilities for SASRI newly released N varieties
- Supply growers (identified by SASRI) with disease-free material, independently verified to be true-to-type



# SUGARCANE PRODUCTION PROCESS FLOW:STAGE 0

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## STAGE 0:MOTHER STOCK MAINTENANCE

**Tissue Culture: Science of growing any plant part taken from the mother plant on a nutrient medium under controlled, aseptic conditions**

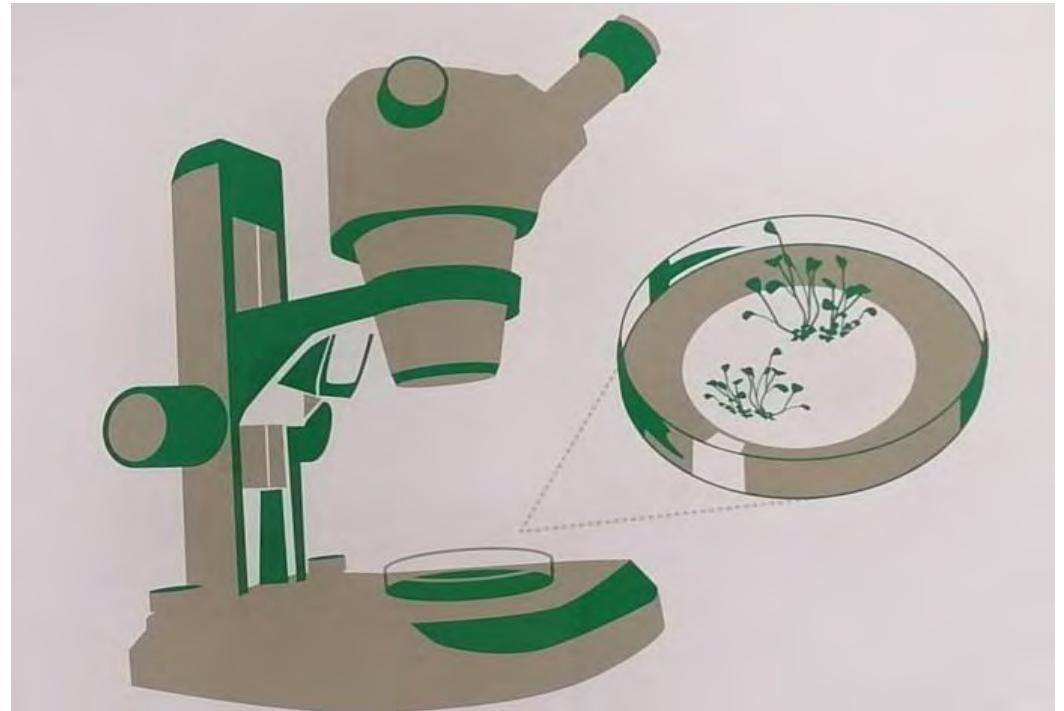
**SASRI NovaCane® FIELD**

# PROCESS FLOW: STAGE I

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## STAGE I: INITIATION/ESTABLISHMENT

Disease and virus  
elimination by meristem  
culture (SASRI)



# PROCESS FLOW: STAGE II

## STAGE II: MULTIPLICATION

Division of plants  
under sterile  
conditions  
+/- 8 months

Mother stock sourced  
from SASRI



# PROCESS FLOW: STAGE II

## STAGE II: MULTIPLICATION



# PROCESS FLOW: STAGES III

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## STAGE III: MULTIPLICATION AND ELONGATION

Shoots transferred to  
elongation medium  
4 weeks



# PROCESS FLOW: STAGE III

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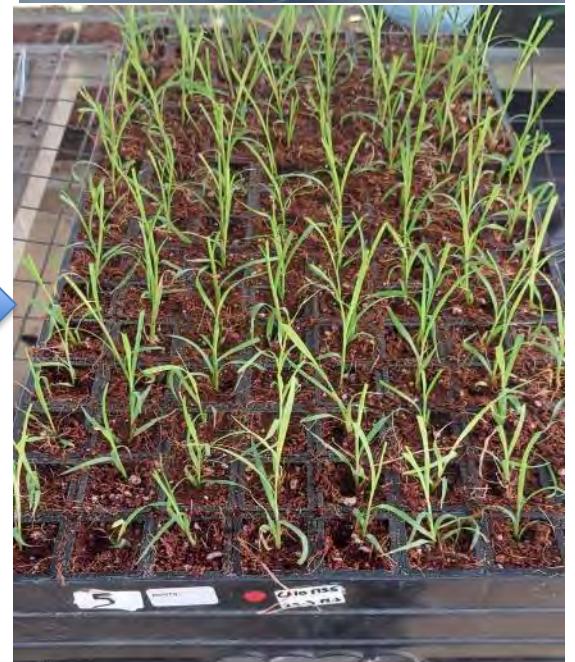
## STAGE III: ROOTING

Shoots transferred to  
rooting medium  
4 weeks



# PROCESS FLOW: STAGE IV

## STAGE IV: HARDENING IN ZONE 1 (PRIMARY)



# PROCESS FLOW: STAGE IV

## STAGE IV: HARDENING IN ZONE 2 (SECONDARY)



# PROCESS FLOW: TESTING

## TRUENESS TO TYPE (DNA FINGERPRINTING) Viruses:

## DISEASE INDEXING Viruses



South African Sugarcane Research Institute is a division of the South African Sugar Association



South African Sugarcane Research Institute is a division of the South African Sugar Association

### SASRI SERVICE ADVISORY REPORT AS PER AGREEMENT BETWEEN DUBE TRADEPORT CORPORATION AND SASRI (YOUR REF. NO. 5/6/7 – DTP01296/01)

#### GENOTYPING REPORT

SAMPLES RECEIVED: 25 August 2022  
DATE TESTED AND FINGERPRINTED: 30 August 2022  
REPORT DATE: 7 September 2022

Sixteen sugarcane leaf samples were received for genotype verification (Table 1.) The sixteen samples were randomly selected from the submitted group of samples. Four microsatellite primer pairs were used for genotype verification. The genotypic fingerprints of the samples in question were compared to the relevant fingerprints from the SASRI Reference Fingerprint Database (SRFD) to ascertain their type status.

#### 1. FINGERPRINTING RESULTS

All samples fingerprinted matched their respective reference fingerprints from the SRFD and were identified as being true to type (Table 1).

TABLE 1  
Sample list and identification of genotypes

Sample No.	Variety name	Description	Colour coding	Fingerprinted	True-to-Type (Compared to the database reference of Var. N55)
2022.001	N55	1-N55-GH-T1	Blue and green	T1	Yes
2022.004	N55	4-N55-GH-T4	Blue and green	T4	Yes
2022.005	N55	5-N55-GH-T5	Blue and green	T5	Yes
2022.008	N55	8-N55-GH-T8	Blue and green	T8	Yes
2022.010	N55	10-N55-GH-T10	Blue and green	T10	Yes
2022.011	N55	11-N55-GH-T11	Blue and green	T11	Yes
2022.013	N55	13-N55-GH-T13	Blue and green	T13	Yes
2022.016	N55	16-N55-GH-T16	Blue and green	T16	Yes
2022.019	N55	19-N55-GH-T19	Blue and green	T19	Yes
2022.022	N55	22-N55-GH-T22	Blue and green	T22	Yes
2022.023	N55	23-N55-GH-T23	Blue and green	T23	Yes
2022.025	N55	25-N55-GH-T25	Blue and green	T25	Yes
2022.026	N55	26-N55-GH-T26	Blue and green	T26	Yes
2022.028	N55	28-N55-GH-T28	Blue and green	T28	Yes
2022.030	N55	30-N55-GH-T30	Blue and green	T30	Yes
2022.031	N55	31-N55-GH-T31	Blue and green	T31	Yes

All supporting ABI3500 genetic analyser data files and electropherograms are available upon request.

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### SASRI SERVICE ADVISORY REPORT AS PER AGREEMENT BETWEEN DUBE TRADEPORT CORPORATION AND SASRI (YOUR REF. NO. 5/6/7 – DTP01296/01)

#### DISEASE DIAGNOSTIC REPORT

SAMPLES RECEIVED: 25 August 2022  
DATES TESTED AND ANALYSED: 26 August – 08 September 2022  
REPORT DATE: 07 September 2022

#### 1. PROCEDURE

Thirty-one sugarcane leaf samples were received for disease indexing (Table 1). Each sample consisted of five 4 cm leaf sections per tray. The plants selected from each tray were labelled. Pooled samples consisted of 10 leaves by combining leaves from two trays. RNA was extracted from 100 mg of homogenous ground leaf material. Molecular Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) tests for *Sugarcane yellow leaf virus* (SCYLV) and *Sugarcane mosaic virus* (SCMV) were conducted.

#### 2. RESULTS

All samples tested negative for SCYLV and SCMV (Table 1) and can therefore be exported to Zimbabwe.

TABLE 1  
Sample list and disease diagnostic results

Sample No.	Sample name	Sugarcane yellow leaf virus (SCYLV)	Sugarcane Mosaic virus (SCMV)	Comments
1	1-N55-GH-T1; 2-N55-GH-T2	Negative	Negative	Export
2	3-N55-GH-T3; 4-N55-GH-T4	Negative	Negative	Export
3	5-N55-GH-T5; 6-N55-GH-T6	Negative	Negative	Export
4	7-N55-GH-T7; 8-N55-GH-T8	Negative	Negative	Export
5	9-N55-GH-T9; 10-N55-GH-T10	Negative	Negative	Export
6	11-N55-GH-T11; 12-N55-GH-T12	Negative	Negative	Export
7	13-N55-GH-T13; 14-N55-GH-T14	Negative	Negative	Export
8	15-N55-GH-T15; 16-N55-GH-T16	Negative	Negative	Export
9	17-N55-GH-T17; 18-N55-GH-T18	Negative	Negative	Export
10	19-N55-GH-T19; 20-N55-GH-T20	Negative	Negative	Export
11	21-N55-GH-T21; 22-N55-GH-T22	Negative	Negative	Export
12	23-N55-GH-T23; 24-N55-GH-T24	Negative	Negative	Export
13	25-N55-GH-T25; 26-N55-GH-T26	Negative	Negative	Export
14	27-N55-GH-T27; 28-N55-GH-T28	Negative	Negative	Export
15	29-N55-GH-T29; 30-N55-GH-T30	Negative	Negative	Export
16	31-N55-GH-T31	Negative	Negative	Export

All supporting gel electrophoresis images are available upon request.

# PROCESS FLOW: PACKING

Plants are packed  
for  
collection/shipping  
Min. 1hour



# PROCESS FLOW: COLLECTION/SHIPPING

Plants are transported via air or road to growers (local and SADC regions)

Export documents:  
Phytosanitary certificates



# PROCESS FLOW: PLANTING

Plants are  
planted into farm  
land



N79 : Image created  
by a SASRI grower



N70: Images created by DTPC (Kakira Sugar:  
Uganda)

# PROCESS FLOW: PLANTING



# DTPC INDUSTRY INTERACTIONS



# DTPC INDUSTRY INTERACTIONS



# CONCLUSION

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Plant tissue culture provides a promising lead toward:

- Servicing the horticultural and agricultural industries' plant propagation needs, locally and internationally
- Production of good quality planting materials
- Distribution of improved varieties
- Ultimately contribute in poverty alleviation

# ACKNOWLEDGEMENTS

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- Dube TradePort Corporation
- Economic Development, Tourism and Environmental Affairs (EDTEA)
- Dube AgriLab Team
  - R&D: Ms Melissa Timothy
  - Lab Production: Ms Silindile Mabaso
  - AgriLab Plant Propagators (lab and greenhouse)
  - Greenhouse: Mr Lindani Nzimande

# FOR MORE INFORMATION:

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# THANK YOU



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COMMERCIAL & RETAIL

**KING SHAKA INT. AIRPORT**  
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