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NAMIBIAN AGRONOMIC BOARD
Constituted by Act 20 of 1992

Creating a marketing environment that is conducive to growing and processing crops in Namibia

# AGRONOMY AND HORTICULTURE MARKET DEVELOPMENT DIVISION

## RESEARCH AND POLICY DEVELOPMENT SUBDIVISION

# EVALUATION OF STORAGE OPTIONS FOR SURPLUS ONION IN NAMIBIA

**2019**

NAMIBIAN
AGRONOMIC BOARD

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## EXECUTIVE SUMMARY

The Namibian Agronomic Board (NAB) has conducted an in-house study to examine the storage options for the surplus local onion to enable self-sufficiency in the supply of onion, thereby reducing imports from South Africa, which is currently at 43%. On an annual basis, Namibia experiences an oversupply of local onion during the production season (May to December) and a shortage of local supply during the off-season (January to April).

The onion storage options were analysed in terms of financial models such as storage cost per ton, net present value (NPV), payback period, and start-up cost. The study does not intend to recommend a specific storage system, but rather provided alternative scenarios as outlined below, from which potential investors may select:

- *Open ventilated system – rental cages have storage costs of N$ 2 050 per ton, NPV of N$ 11.8 million, 2,3 years pay-pack period, and a start-up cost of N$ 17,5 million.*
- *Open ventilated system – purchased cages have storage cost of N$ 2 140 per ton, NPV of N$ 15,4 million, 2,7 years pay-back period, and a start-up cost of N$ 19,9 million.*
- *Controlled environment system – bulk pilling has a storage cost of N$ 1 950 per ton, 2,6 years pay-back period, and a start-up cost of 18,4 million.*
- *Controlled environment- rental cages have storage costs of N$ 2 340 per ton, NPV of 9,6 million, 2,8 years pay-back period, and a start-up cost of N$ 19 million.*
- *Controlled environment system – purchased cages have storage costs of N$ 2 340 per ton, NPV of 12,5 million, 3,2 years of pay-back period, and a start-up cost of 21,2 million.*

## 1. INTRODUCTION

Onion is the second most consumed vegetable in Namibia, following potatoes. On a 3-year average (2015/16 to 2017/18), 43% of onion consumed annually is imported from South Africa, of which 90% of said importation occurs from January to April. Namibia, therefore, experiences an oversupply of local onion during the production season (May to December) and a shortage of local supply during the off-season (January to April). The surplus onion that is harvested during the production season is usually exported to Angola and seldomly to South Africa. There is a noticeable decline in onion production over the past three years. See the onion formal market trends in Figure 1.

There are currently four farms in Namibia with limited storage operations at Karst and Central production areas, but these are supplying minimal quantities which are insufficient to address the current supply challenges from January to April. Hence the study aimed to examine the storage options for the surplus local onion to enable self-sufficiency in the supply of onion.

Also, minimal quantities (+-300t) of onion are supplied by a few farmers in the south-central production areas by attempts of production scheduling. These farmers normally plant in July/August to harvest between January to February, though these harvested quantities are not enough to address the current supply challenges.

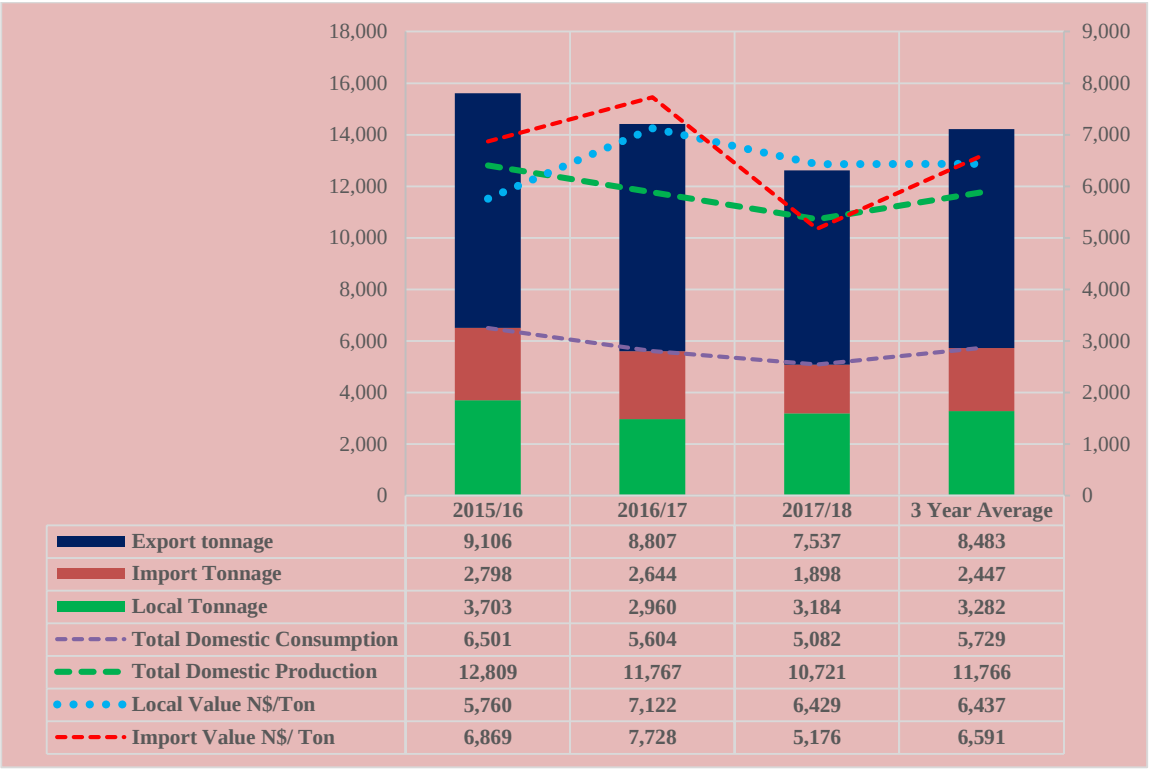
## 2. PROBLEM STATEMENT

On an annual basis, Namibia experiences an oversupply of local onion during the production season (May to December) and a shortage of local supply during the off-season (January to April).

## 3. RESEARCH OBJECTIVE

To examine the storage options for the surplus local onion to enable self-sufficiency in the supply of onion, thereby reducing imports from the current 43%.

## 4. ONIONS FORMAL MARKET TRENDS




| | 2015/16 | 2016/17 | 2017/18 | 3 Year Average |
|---|---|---|---|---|
| Export tonnage | 9,106 | 8,807 | 7,537 | 8,483 |
| Import Tonnage | 2,798 | 2,644 | 1,898 | 2,447 |
| Local Tonnage | 3,703 | 2,960 | 3,184 | 3,282 |
| Total Domestic Consumption | 6,501 | 5,604 | 5,082 | 5,729 |
| Total Domestic Production | 12,809 | 11,767 | 10,721 | 11,766 |
| Local Value N$/Ton | 5,760 | 7,122 | 6,429 | 6,437 |
| Import Value N$/ Ton | 6,869 | 7,728 | 5,176 | 6,591 |

Figure 1: **Onion Market Trends: 2015/16 to 2017/18**. ***Source:*** *Agricultural Market Information Database (2015/16- 2017/18)*

## 5. RESEARCH METHODOLOGY:

The study process involved desk top study on the formal marketed data from AMID System of 2015/16 to 2017/18 (3years), a perused report on the potato and onion trip taken to South Africa by NAB, AMTA, and POPA in 2014. The costing data were purposively collected from 4 key informant farmers that are practicing onion storage.

The study is comparative research; thus, two alternative storage systems were analysed to store surplus local onion, namely: Open Ventilated and Controlled Environment Systems. The Open Ventilated Systems included rental cages and purchased cages scenarios, and the Controlled Environment Systems included bulk pilling, rental cages, and purchased cages scenarios. The onion storage options were analysed using financial models, namely: storage cost per ton, net present value (NPV), payback period, and the start-up cost.

## 6. RESEARCH RESULTS

Table 1 illustrates a comparative analysis of onion storage systems in terms of the storage cost per ton, net present value, pay-back period, and start-up cost per ton. Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows (Firer et al 2012). It entails the value of total expected future returns (net cash flows) to the investor expressed in today's monetary value. Cash flows for ten years were projected in this exercise. The payback period is the period it takes to fully recover the anticipated cost of an investment. whereas, the start-up cost is the amount of total cash required to begin the business (Initial capital cost plus initial operational cost).

| Storage Option | Average Storage Cost/ Ton N$ | Ranking | NPV N$ (10 Years @ 10,5% PVIF) | Ranking | Payback Period | Ranking | Capital Cost | Operational Cost N$ | Total Start-up Cost N$ | Ranking |
|---|---|---|---|---|---|---|---|---|---|---|
| *a) Open Ventilated System - Rental Cages* | 2 050,00 | 2 | 11, 795, 451 | 4 | 2 year, 3 months & 18 days | 1 | 5, 772, 808 | 11, 755, 287 | 17, 528, 094 | 1 |
| b) *Open Ventilated System - Purchased Cages* | 2 140,00 | 3 | 15, 367, 402 | 1 | 2 years, 8 months &12 days | 3 | 9, 564, 808 | 10, 425, 323 | 19, 990, 131 | 4 |
| *c) Controlled Environment System- Bulk Pilling* | 1 950,00 | 1 | 12, 314, 600 | 3 | 2 year, 7 moths & 6 days | 2 | 7, 315, 650 | 11, 041, 626 | 18, 357, 276 | 2 |
| *d) Controlled Environment System- Rental Cages* | 2 340,00 | 4 | 9, 625, 004 | 5 | 2 year, 9 months & 128days | 4 | 7, 315, 650 | 11, 696, 025 | 19, 011, 675 | 3 |
| *e) Controlled Environment System - Purchased Cages* | 2 340,00 | 4 | 12, 493, 819 | 2 | 3 years, 2 months & 12 days | 5 | 10, 826, 390 | 10, 438, 390 | 21, 264, 800 | 5 |

Each Storage System is based on the capacity of 2000 tons plus the percentage of storage losses. The 14% loss is accounted for storage losses under Open Ventilated Systems, whereas, 8% loss is accounted for storage losses under Controlled Environment Systems. Sun and rain may exacerbate the percentage loss of up to 30% on the open ventilated system. When making decisions from the table below, investors must take note that a project with low storage cost is

ideal, a project with a higher net present value (NPV) is ideal, a project with a lower pay-back period is ideal, whereas, a project with a lower start-up cost is ideal.

***NB:*** Ranking is done in numerical order (1 =Best and 5 = Worst)

## 7. CONCLUSIONS AND RECOMMENDATIONS

Although the study was undertaken to comparatively analyse the viability of the storage systems, it does not intend to recommend a specific storage system, but rather provide alternative scenarios from which potential investors may select. All of the systems below are ideal for an individual operator at the farm level or a centralised location where a collective of farm participates. It is in this regard that the following conclusions are made:

***The Open Ventilated System - Rental Cages*** has the lowest start-up cost, which is ideal for an investor that has limited access to financing. It is also a scenario with the shortest pay-back period, which makes it a considerable investment for an investor that may want quicker cost recovery but not necessarily best returns. The storage cost per ton for this onion storage option is the 2nd lowest, which reflects the cost advantage. However, the system has the 4th lowest NPV among the 5 systems analysed by the study, it entails fewer returns to the investor in today's monetary value.

***Open Ventilated System- Purchased Cages*** has the highest NPV and 2nd shortest pay-back period, which entails the greatest returns to the investor in today's monetary value and short recovery of the invested finances. However, the system does not have much cost advantage, being the 3rd lowest storage cost per ton. The system may also not be ideal for an investor that has limited access to financing because it is the 4th highest start-up cost requirement.

***Controlled Environment System– Bulk Pilling*** has the lowest storage cost per ton, shortest payback period, and 2nd lowest start-up cost. The lowest storage cost entails a cost advantage to the investor, whereas, shortest payback period entails the quickest recovery of invested cash. The system is the 2nd lowest start-up cost requirement makes it ideal for the investor with limited access to financing. Being the system with 3rd highest NPV, it entails a fair return to the investor in today's monetary value.

***Controlled Environment System– Rental Cages*** has the lowest payback period, which entails the quickest cost recovery. The start-up requirement of the system is not highly ideal for investors with limited access to finances, being the system with 3rd lowest stat-up cost. The system does not have a cost advantage, it having the highest storage cost per ton. The system has the least NPV, which entails the least returns to the investor in today's monetary value.

Controlled Environment System– Purchased Cages has the 2nd highest NPV, which entails a fair return to the investor in today's monetary value. The start-up cost and storage cost for the system are the highest, whereas, the payback period is the longest. High start-up costs are not good for investors with limited access to financing, high storage cost disadvantages the investor

on profitability, whereas, longer payback period denies an investor a quicker recovery of the invested cash.

Besides the above recommendations, there is a possibility to harvest onion from January to February, by scheduling the production at the south-central production area. This may only work with a careful selection of cultivars, the timing of planting, harvesting techniques, etc, hence it would require a detailed study.

## 8. ACKNOWLEDGMENTS

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