

Potato waste: Quantity, value, and causes

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Potatoes are the dominant vegetable-based, starch-rich staple food in South Africa, accounting for approximately 10% of consumer spending on starch-rich staples. They are valued for their versatility and nutritional benefits.

In a world with limited and decreasing natural resources for food production, food losses/waste are growing concerns, highlighted in the United Nations' *Sustainable Development Goal 12*, which aims to "ensure sustainable consumption and production patterns". According to the World Wildlife Fund for Nature, roughly a third of all food in South Africa is wasted, with the most

waste occurring in the fruits and vegetables category.

In South Africa, little is known about losses or waste in the potato value chain. As part of the Technology Innovation Agency (TIA) funded project of Potatoes SA titled the "Feasibility study of a new value chain for lower grade potatoes in the agro-processing industry", the Bureau for Food and Agricultural Policy (BFAP) explored the nature, quantity and monetary value of potatoes that are wasted, lost, or downgraded at various levels in the South African potato value chain. This study focussed on primary producers, fresh produce markets, processors and retailers.

In collaboration with Potatoes SA, questionnaires were developed for the various value chain nodes and completed through a combination of self-completion (via an online platform) and one-on-one facilitated interviews. The sample of value chain role-players represented approximately 16% of total potato tonnes at producer level, including all major production regions, market agents in Pretoria and Cape Town, two major retailers, and a processor.

Definition of losses/waste

Potato losses/waste are generally considered to be those potatoes deemed unsuitable for their intended purpose within the value chain. More specifically, these losses/waste can be divided according to role-players in the value chain:

- **Primary producers:** Potatoes that do not meet formal market standards, typically with a quality grading above three.
- **Fresh produce markets (FPMs):** Potatoes that cannot be sold on the market floor due to quality issues.
- **Processors:** Potatoes with internal or external defects, as well as processing losses.
- **Retailers:** Potatoes that are not sold to consumers before the sell-by date.

Table 1: Causes of potato losses/waste.

	Weather (especially excessive heat and rain before harvesting).
	Insects or pests.
	Plant diseases.
	Mechanical damage (especially during harvesting, but also post-harvest).
	Delays in the movement of potatoes through the value chain, including an extensive amount of time at FPMs and on retail floors before being sold.

Table 2: Potato losses/waste among producers, market agents and retailers in South Africa. (Source: Survey results)

	Producers	Market agents	Retailers
Waste %	5%	0.75%	1%
Waste % range	Typically ranging from 4 to 8%	Typically ranging from 0.50 to 1%, but 10% also mentioned	0.03 to 2%
Average annual waste quantity in South Africa	Approximately 140 000 tonnes	Approximately 8 700 tonnes	Approximately 3 400 tonnes
Estimated annual value of waste potatoes in South Africa*	Approximately R759 million (valued @ FPM prices)	Approximately R47.2 million (valued @ FPM prices)	Approximately R71.7 million (valued @ FPM prices)

*The estimated annual value of waste potatoes refers to losses/waste not suitable for the original intended market and does not take into account the value of repurposed volumes mentioned in this article.



Table 3: Losses or waste within the overall potato value chain.

<p>Around 40% of waste potatoes are allocated to human consumption through donations or sales, especially among retailers.</p> 	<p>Around 60% of waste potatoes are allocated to animal feed, followed (sadly) by discarding as refuse, especially among producers, followed by market agents.</p> 
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Quantifying losses/waste

To quantify and cost potato losses/waste across various value chain nodes for 2023, the following calculations were made: Volumes produced or handled per value chain node and prices (FPMs and retail prices for April 2024) were applied to the loss/waste percentages reported by the respondents to develop estimations.

Among producers, market agents and retailers, producers were the largest contributors to potato waste, generating around 140 000 tonnes, valued at R759 million in 2023. Market agents followed with 8 700 tonnes valued at R47.2 million and retailers with around 3 400 tonnes valued at R71.7 million. *Table 2* presents the survey results quantifying potato losses/waste among market agents and retailers. It is important to note that the estimated annual value of 'waste potatoes' refers to losses/waste not suitable for the original intended market and does not consider the value of repurposed volumes mentioned in this article.

The survey included only one processor who was willing to participate, reporting a waste percentage of approximately 4%. However, data from a larger and more representative sample will be needed to draw conclusions regarding potato losses/waste among processors. Potato waste/loss during processing can be significant at the processor level, primarily due to stringent grading processes aimed at meeting food safety standards. These grading processes typically involve identifying and removing potatoes with internal and external defects, among other quality criteria.

Provincial losses/waste

At the primary production level, the Western Free State and Mpumalanga

reported the highest share of potatoes lost or wasted (8%), followed by KwaZulu-Natal (7%). In terms of total quantities of waste potatoes, the following regions dominated:

- Western Free State: 28%.
- Eastern Free State: 14%.
- Limpopo: 13%.
- Sandveld: 10%.
- KwaZulu-Natal: 8%.

The nature of potato losses/waste

Seasonality: Potato losses or waste tend to peak during the warmer months of the year, from spring (September or October) to early autumn (March or April). There are some variances within these warmer months between production regions due to climatic variability. For example, the seasonal window for the most potato losses/waste is:

- Limpopo producers: October to December.
- Western Free State producers: March to August.
- Sandveld producers: October to February.
- Retailers: January to April.

Cultivars: Potato losses/waste also vary among cultivars, the highest losses having been observed in Mondial, Lanorma, Panamera, Valor, and Sifra.

Size: Larger potatoes tend to suffer more losses than smaller ones.

Uptake practices

Surprisingly, not all discarded potatoes go to waste. Many are repurposed, either donated or sold at lower prices for animal feed, or donated or sold for human consumption such as the informal trade.


At the primary producer level, the following practices occur most in the various regions:

- Sale (e.g. to 'bakkie traders'): Sandveld, Western Free State, Limpopo.
- Fed to livestock: Sandveld, Limpopo, Eastern Free State.
- Donated as animal feed: Sandveld, Limpopo, Western Free State.
- Donated for human consumption: Western Free State, Sandveld, Eastern Free State.
- Throw away or discard: Western Free State, Sandveld, Eastern Free State.

At FPMs, the major uptake practices for these potatoes include donation (for human or animal consumption), selling into the informal market, and discarding. Interestingly, some cases were observed where bags of rotten potatoes were opened, sorted, and repacked to salvage the good quality potatoes for the market.

Challenges and recommendations

The study faced challenges during data collection, with many stakeholders reluctant to participate and share data. Moving forward, researchers suggest expanding the study to include more market agents in various geographical locations and retailers, processors, and role-players in the informal trade.

The informal sector plays a significant yet largely unquantified role in the country's potato industry. Specific role-players of interest could include informal traders purchasing both market quality and lower quality potatoes at the fresh produce markets, informal bakkie traders buying loads of low-quality potatoes directly from producers, and street vendors selling potatoes. This could present a clearer picture of how potatoes move through the less formal parts of South Africa's agricultural landscape. 

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