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Whose responsibility is it? A call for a regional approach to South Africa's deposit return system debate

Glass packaging waste is an escalating environmental and economic challenge in South Africa, yet the regional impacts of South African beverage exports have received little attention. While a national, mandatory deposit return system (DRS) shows promise, one issue remains overlooked: the environmental fallout of South African glass exports across southern Africa, where imported bottles bypass local DRS frameworks and strain weak waste systems. Drawing on our experience and policy engagement from within the DRS debate, we argue that exported containers must be included in South Africa's DRS. A phased, regionally coordinated system could yield broad environmental, social and economic benefits. We identify key knowledge gaps – export volumes, alignment with Southern African Development Community (SADC) policy, infrastructure and informal sector roles – and argue that these must be addressed to build an inclusive, regionally harmonised DRS for southern Africa.

Significance:

This article contributes to ongoing debate in South Africa's waste management and circularity landscape: the design and implementation of a nationwide, mandatory DRS. We highlight the overlooked transboundary impacts of South African beverage exports, particularly the burden of non-returnable glass waste in neighbouring southern African countries. We argue that a comprehensive DRS should not only be mandatory but also include containers exported to regional neighbours. A phased, regionally coordinated system, we suggest, could generate environmental, social and economic benefits.

A case for a South African deposit return system

Glass waste is an increasingly urgent environmental issue in South Africa. Although glass is fully recyclable, large volumes of glass waste still end up in landfills, dumpsites and across the environment, and contribute to degradation, inefficient resource use and lost economic potential. One estimate suggests that, of the 423 000 tonnes of glass bottles sold annually, about two-thirds (or 282 000 tonnes) are not recycled.[1] In a country where many lack reliable waste services, this gap poses serious health and environmental risks, especially in rural and low-income communities.[2,3] Even where waste is collected, municipalities spend millions each year transporting and landfilling glass that could be recycled.[4] This situation is especially concerning given South Africa's relatively high recycling rates for other materials – largely thanks to its informal recycling sector.[5]

Globally, deposit return systems (DRS) – in which consumers pay a refundable deposit on beverage containers – have proven effective at boosting recycling rates and reducing litter. DRS can be mandatory or voluntary. Mandatory systems require participation by law; voluntary ones rely on industry and consumer choice. Germany's mandatory DRS achieves a 96–98% return rate for plastic, glass and aluminium.[6] In Africa, Kenya has also achieved strong glass recycling outcomes under a voluntary DRS.[7] South Africa operates a limited voluntary DRS that does not cover all containers. Initiated by the beverage sector, this DRS includes returns for refillable glass bottles sold by Coca-Cola Peninsula Beverages and selected alcoholic beverages from South African Breweries and Heineken Distell. These initiatives have seen some success but face serious limitations.[1] Coca-Cola's scheme, for instance, covers only certain bottle sizes and brands. Retailers have reportedly failed to fully refund customers or refused returns, and space constraints limit participation by spaza shops, taverns and informal vendors.[1]

Despite these limitations, South Africa's initial DRS efforts represent modest progress. But with growing volumes of glass waste polluting the environment, momentum is building for a more structured and inclusive DRS. A recent feasibility study by Grant et al.[1] indicates that a well-implemented, mandatory DRS for all refillable glass bottles could promote circular economy goals, improve waste systems and cut environmental harm. Although a national DRS may address domestic waste, what about South Africa's beverage exports? As the continent's largest economy, it exports hundreds of millions of litres of soft drinks, beer and other alcoholic drinks across southern Africa annually.[8,9] Yet few of the bottles return. Instead, countries already struggling with waste management are left to absorb this additional burden. Many lack capacity to collect, recycle or safely dispose of domestic waste – let alone imported containers. As a result, South African glass is effectively dumped throughout the region, with severe environmental consequences. This Research Letter draws on our fieldwork, regional case-study experience and policy engagement to highlight an overlooked dimension of South Africa's DRS debate. If a national DRS can improve domestic outcomes, what are its implications for exports – what responsibility does South Africa bear regionally? And if a mandatory DRS is adopted, how can it also include exported bottles?

Bottles beyond the Limpopo

South Africa has a substantial beverage export market which ships drinks to neighbouring countries such as Lesotho, Eswatini, Namibia, Botswana, Mozambique and Zimbabwe, and more distant regional partners such as Malawi and Zambia – which together account for nearly half of South Africa's beverage exports.[10] This quantity is notable given the country's large wine industry, with most wine exports bound for Europe and North America.

Besides plastic-bottled soft drinks and water, exports mainly consist of beer, wine, ciders and other alcoholic beverages, mostly packaged in glass. For example, South African Breweries, a subsidiary of AB InBev, exports millions of litres of beer across southern Africa. South Africa also imports significant quantities of beer, particularly from Namibia and Mozambique – products not covered by the current voluntary DRS.[9]

As a result, vast amounts of South African glass packaging enter the region without a defined end-of-life plan or producer responsibility mechanism. Most importing countries lack the infrastructure to manage this waste. In much of southern Africa, municipal waste collection is limited in urban areas and largely absent in rural ones, leaving households to handle their own waste.[11] Consequently, imported glass is often dumped or, where collected, landfilled. Glass waste is recognised as a problematic fraction in countries like Lesotho[10], Eswatini[12], Botswana[13], Mozambique[14] and Zimbabwe[15]. This is particularly concerning as many of these countries operate deposit systems for domestically produced beverages, ensuring local brands have a defined end-of-life plan. Imported South African brands, however, are sold in large quantities without return schemes and are far more common than domestic brands in dumpsites.

The harm is clear in our research. In Malawi, for example, we documented the risks of glass waste at Blantyre's Mzedi dumpsite, where heaps of imported bottles pose a serious hazard – frequently causing cuts and injuries – to waste workers and informal pickers[16,17] (see Figure 1). Glass at Mzedi is the most problematised waste fraction, deemed worthless and feared by workers and nearby farmers who lack protective equipment and are exposed while navigating or cultivating the site.[18] While further research is needed to quantify imported versus domestic glass in landfills, field observations suggest a stark imbalance: domestic bottles under Malawi's DRS are rarely seen, while South African imports dominate.

This challenge is also evident in protected areas and tourist destinations. At Cape Maclear, on Lake Malawi's shores, poor waste services have led to the dumping of plastics and tins, but persistent glass shards – littering paths and collecting in low-lying areas – are the most visible and harmful.[19] Glass waste is rare in most rural communities as domestic brands are included in Malawi's DRS and imports are costly. However, in Cape Maclear, imported brands are more accessible, and tourists are less sensitive to price differences. As a result, environmentally sensitive areas have become dumping grounds for South African bottles.[19,20] Some solutions have been tested, including crushing glass and using it in sustainable building materials.[21,22] Likewise, at tourist hubs like Victoria Falls, local artisans repurpose unreturnable bottles into crafts and homeware for use or sale.[23] Yet these efforts divert only a fraction of waste and largely address symptoms of a broader systemic issue.

Costs and benefits of an expanded DRS

As the costs and benefits of a nationwide DRS are debated, South Africa's exports must not be overlooked. A comprehensive mandatory DRS that includes exported bottles could deliver major environmental and economic gains for both South Africa and its regional neighbours. It would promote the return, cleaning and reuse or recycling of bottles, reducing demand for virgin glass and cutting associated emissions and energy use. A well-structured DRS could also drive job creation in waste and recycling sectors, supporting employment across urban and rural areas. Informal waste pickers – vital to the region's recycling systems – could benefit from a more stable and predictable, incentivised return system. For neighbouring countries, a regional DRS could help address persistent recycling challenges. Many lack the infrastructure to manage large volumes of glass waste. Linking their efforts with South Africa's system could enable cross-border returns and processing via an organised mechanism, improving recycling rates and easing financial pressure on countries developing their own systems.

However, several barriers must be addressed. Coordinating returns across borders is logistically complex, and requires alignment between governments, producers, retailers and waste managers on deposit values, return points and tracking. Fraud is another concern – international DRS examples show issues like multiple refunds or entry of non-deposit bottles.[24] South Africa would need verification tools such as barcoding or digital tracking. A regional framework covering exports could mitigate these risks through processing in South Africa or future harmonised systems. Finally, consumer participation is essential. Public education and easy access to return points are key to high uptake. In countries where returns are not the norm, targeted campaigns and incentives will be crucial for adoption.

Towards a regional DRS?

Taken together, these observations point to the need for a coordinated regional approach. Implementing a nationwide mandatory DRS in South Africa is complex – and extending it regionally adds further challenges. As national discussions progress, we must also consider what a regional DRS could entail and which questions require urgent investigation:

- **What are the impacts of glass exports on trade partners?** While anecdotal evidence highlights harm in countries like Malawi, the scale remains unquantified. What types of harm occur, and to whom?
- **What can South Africa learn from global DRS models?** Which design features are best suited to its social, economic and institutional context?

Figure 1: A pile of empty South African beer bottles at Mzedi dumpsite in Blantyre, Malawi.

- **What legal and regulatory changes are needed** to mandate national DRS participation, and how can this align with provincial structures and policy on extended producer responsibility?
- **What infrastructure exists, what is lacking,** and how can the informal sector be integrated without displacement or exclusion?
- **What digital technologies are viable** for container tracking and fraud prevention in a South African and regional context?
- **How do southern Africans view DRS,** and what incentives or messaging would drive participation?
- **How can South Africa collaborate with SADC (Southern African Development Community) partners** to align DRS policies and infrastructure? What is the role of regional bodies?
- **How can DRS reinforce existing recycling systems** and contribute to broader circular economy goals for other materials – both domestically and regionally?

Including exports in a national DRS will require a phased collaborative approach involving government, industry and regional partners. Despite difficulties, a regional DRS could improve waste management, create jobs and reduce environmental harm. With the right strategy, South Africa can lead a regional shift toward circularity – in which glass is recovered, reused and recycled rather than dumped, and waste becomes a shared resource rather than a cross-border burden.

Data availability

There are no data pertaining to this article.

Declarations

We have no competing interests to declare. We have no AI or LLM use to declare.

Authors' contributions

M.K.: Conceptualisation, visualisation, writing – original draft, writing – review and editing. C.S.: project administration, writing – original draft, writing – review and editing. Both authors read and approved the final manuscript.

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