

Non-detriment finding for *Encephalartos lebomboensis*

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Summary of finding

Cycads are collectively/globally the most threatened taxonomic group of organisms that have been assessed so far by the International Union for Conservation of Nature (IUCN). South Africa is one of the world centres of cycad diversity with more than 50% of the known African cycad species occurring in the country. This includes 37 species from the *Encephalartos* genus, of which 70% are threatened with extinction and 11% are presumed to be Extinct in the Wild. Targeted removals of individuals from the wild for direct use/collection and trade purposes is the primary threat to all but one of these 37 species. As such, all species of the genus are included in Appendix I to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the export of these species for commercial purposes is prohibited (Article III). However, specimens artificially propagated for commercial purposes are deemed to be specimens of species included in Appendix II (Article VII) of CITES and therefore may be traded. In terms of Article IV of the Convention, an export permit shall only be granted for an Appendix II species when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species. Furthermore, in terms of CITES Resolution Conf. 11.11 (Rev. CoP18) the parental stock that is used to produce specimens for trade must have been established in accordance with the provisions of CITES and relevant national laws and in a manner not detrimental to the survival of the species in the wild. This document details the undertaking of a non-detriment finding (NDF) for *Encephalartos lebomboensis* and is based on the best available information, current as of September 2023.

Encephalartos lebomboensis (Lebombo cycad) is a southern African species currently listed as Endangered (A2acd; B1ab(ii,iii,v)+2ab(ii,iii,v)) in the IUCN Red List. The species occurs in fewer than five locations in north-eastern KwaZulu-Natal, up along the Lebombo Mountains of Swaziland, into southern Mpumalanga and towards the boarder of Mozambique. There are less than 5 000 mature plants estimated to be remaining in the wild with only a portion of the South African population protected in one state reserve. The species has suffered an estimated 50% decline predominantly from poaching activities to supply the horticultural trade and private ornamental collections. This species has also been reportedly impacted by harvesting for traditional medicine purposes and declines in the national population are reported as ongoing. Thorough ground/arial surveys are required for a complete assessment of the species global population.

Since the 1970s, cycads in South Africa have received legislative protection under various provincial nature conservation ordinances, and more recently in terms of Government Notice No. 371 of 2012 which prohibits wild harvest (of plants and seed) excepting for conservation and enforcement purposes. Resource shortages in terms of budget and adequate staff capacity remains a key challenge in many cycad range provinces, thus rendering strict protection measures ineffective at present. In KwaZulu-Natal, on-the-ground monitoring of the species' population is improbable and never been attempted whilst semi-regular unstructured monitoring does take place within Mpumalanga. The provincial conservation authorities are inadequately equipped to protect wild populations from unsustainable harvest. No permits have ever been issued for the wild collection of *E. lebomboensis* plants in the past, but controlled seed harvest undertaken by the provincial conservation authority in Mpumalanga did take place in the 1990's as part of a joint state-community cycad nursery conservation project. Despite an exponential increase in propagated cycads and the National trade regulated in terms of the Threatened or Protected Species Regulations (TOPS), the laundering of illegally obtained wild plants into private collections and nursery operations continues, facilitated by the inconsistent and non-implementation of Government Notice No. 371 within key trading provinces.

According to the CITES trade data, more than 13 450 specimens of *E. lebomboensis* have been legally exported from South Africa between 1979 and 2020. As of 2018, a national programme to audit and monitor nurseries involved in the international trade in cycads has been established. Seven South African nurseries are registered with the CITES Secretariat in terms of CITES Resolution Conf. 9.19 (Rev. CoP15) to trade in *E. lebomboensis*. Although effective monitoring of the local trade in cycads, including the interprovincial movement is lacking, there has been some significant efforts to improve the implementation of legislative instruments such as the upskilling and training of law enforcement officials, as well as developments in technological solutions such as stable isotopes and microdots to identify and protect wild cycads, including those that have been laundered into *ex situ* collections.

As of 2014, the management and conservation of all cycad species in the country has been guided by the National Strategy and Action Plan for the Management of Cycads. Additionally, a Biodiversity Management Plan (BMP) for the 11 Critically Endangered and four Endangered cycad species, which includes *E. lebomboensis*, has been published (in terms of section 43 of the NEMBA), for implementation since 2017. The implementation of these plans, co-ordinated by a dedicated National Cycad Steering Committee, has not yet yielded the desired outcomes, mainly due to a lack of resources. The *E. lebomboensis* population is largely unprotected and wild plants remain at risk of illegal harvest. Plans are currently underway to establish viable *ex situ* populations within well protected suitable areas of the country. There are currently no incentives or conservation benefits associated with the trade in the species.

The species' biology, which is characterized by a poor dispersal ability and slow growing long-lived adults that regenerate predominantly from seed, renders *E. lebomboensis* particularly vulnerable to overutilization. This, together with the species' extremely poor conservation status, the ongoing population decline due to poaching activities, the capacity and budgetary constraints that prevent the conservation agencies from effectively managing and monitoring the species, the lack of conservation incentives, and the continuing ineffective implementation of the existing strict protection measures for

cycads at a national level, presents a scenario that is unfavourable for the survival of *E. lebomboensis* in the wild.

The species is at a high risk from international trade. With respect to artificial propagation (source code A), CITES Resolution Conf. 11.11 (Rev. CoP18) requires that parental plants are legally acquired and not to the detriment of the wild population, but it is highly unlikely that exports in the past met these requirements. In order to ensure that international trade does not have any further detrimental impact on wild populations, only nurseries registered in accordance with the CITES Resolution Conf. 9.19 (Rev. CoP18) may export *E. lebomboensis* seedlings. Only seedlings that are (i) artificially propagated in accordance with the CITES Resolution Conf. 11.11 (Rev. CoP18), or (ii) have been grown from wild harvested seed in accordance with the conditions specified in the CITES Resolution Conf. 11.11 (Rev. CoP18) and within the framework of a Biodiversity Management Plan published in terms of section 43 of the NEMBA, may be exported.

Each nursery applying for CITES registration must be audited in accordance with the decision tree approved by the Scientific Authority, and regular follow up audits must be conducted in order to monitor seedling propagation. All parental plants must

- i. Be accompanied by TOPS possession permits and affidavits from the owner stating that the plants are not of wild origin, and
- ii. Not exhibit any characteristics typical of wild origin.

The export of large artificially propagated specimens (with a stem diameter of more than 15 cm) is prohibited (Government Notice 371, May 2012).

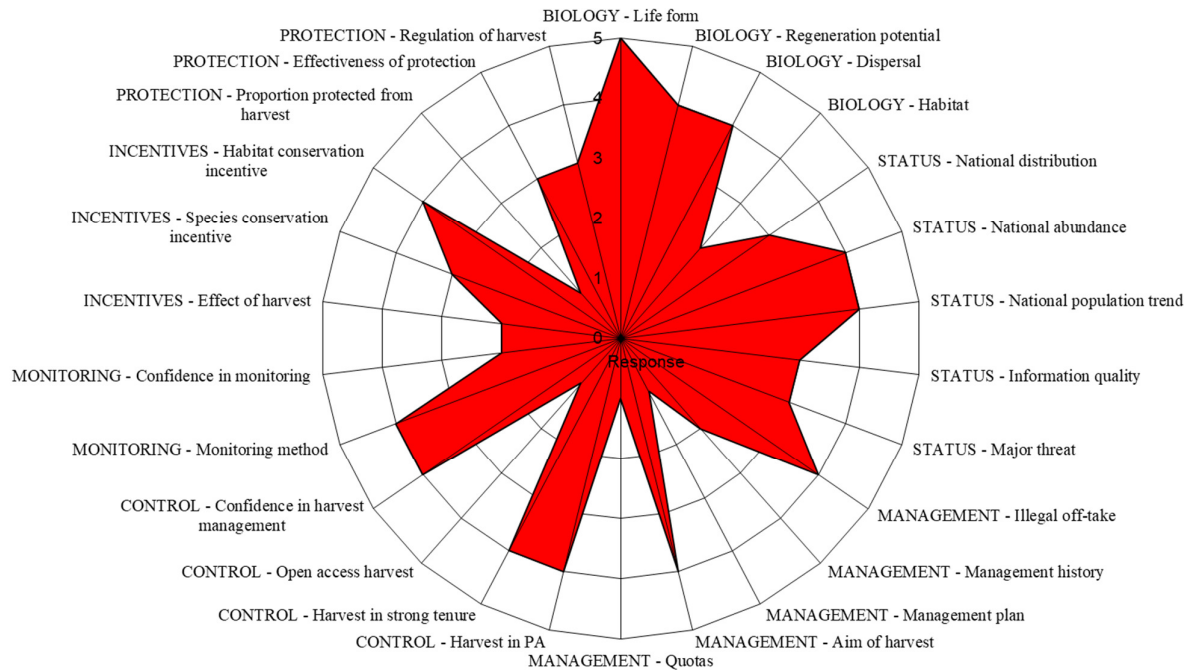


Figure 1. Radar chart summarizing the non-detriment finding assessment undertaken for *Encephalartos lebomboensis* in accordance with the CITES NDF checklist. Explanations of scores given are detailed in Table 1. Higher scores are indicative of higher risks to the species. The shaded area in the radar chart demonstrates an overall high risk to the species.

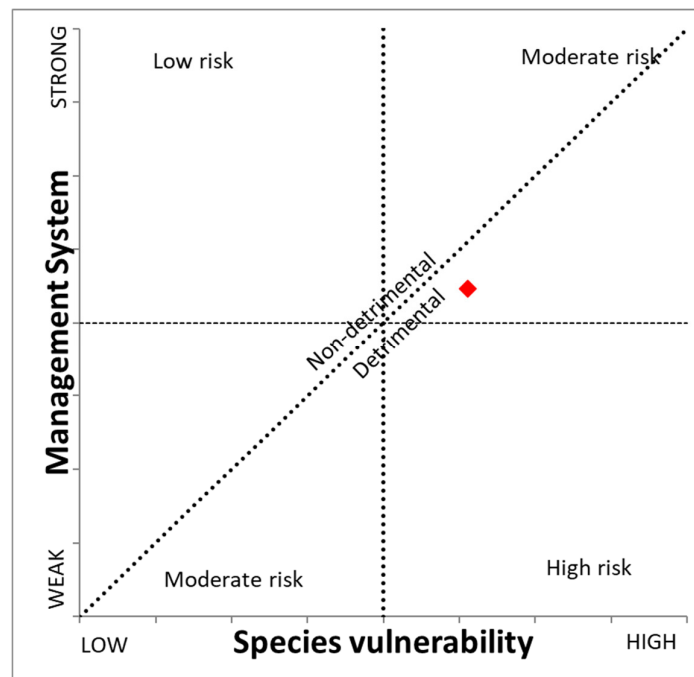


Figure 2. The risk of trading in *Encephalartos lebomboensis* as represented by the relationship between species vulnerability (biology and status) (0 = low vulnerability; 1 = high vulnerability) and the management system to which the species is subjected (management, control, monitoring, incentives and protection) (0 = weak management system; 1 = strong management system). The figure shows that the species is at a moderate to high risk and trade is detrimental.

Table 1. Non-detriment finding assessment for *Encephalartos lebomboensis* undertaken in accordance with the CITES NDF checklist. Scores assigned to each question are indicated (bold text and shaded blocks) along with detailed explanations/justifications where relevant. Higher scores are indicative of higher risks to the species.

Biological characteristics		
1. Life form: What is the life form of the species?	Annual	1
	Biennial	2
	Perennials (herbs)	3
	Shrub and small trees (max. 12m.)	4
	Trees	5
<i>Encephalartos</i> (African cycads) is a genus of ancient plants characterised by their unique woody trunks, attractive crown of evergreen leaves, and large cones that appear at maturity. Although they differ in their life-history strategies, all species are generally long-lived, surviving for many decades and even centuries with adult plants playing an important role in population persistence (Golding and Hurter 2003; Raimondo and Donaldson 2003). <i>Encephalartos lebomboensis</i> is one of the larger indigenous species with stems of mature plants reaching up to 4 m in height and 25-30 cm in diameter. Plants grow completely above ground and are generally unbranched, but suckers arising at the base may develop into mature trunks (Osborne 1988). The tendency to produce several trunks is assumed to increase longevity (as new suckers replace old moribund stems).		
		
Figure 3: <i>Encephalartos lebomboensis</i> pictured in habitat. Photo by Tommie Steyn.		
2. Regeneration potential: What is the regenerative potential of the species concerned?	Fast vegetatively	1
	Slow vegetatively	2
	Fast from seeds	3
	Slow or irregular from seeds or spores	4
	Uncertain	5
The cycad life history is characterized by long-lived (dioecious) adults that reproduce predominantly from seed. Coning is typically infrequent and erratic, with many species exhibiting mast-seeding		

(Cousins and Witkowski 2017). Plants do produce suckers, but they generally play a limited role in the regeneration of cycad populations. Suckers, however, may aid in species persistence, particularly where they remain behind after the main stem has died or has been harvested. Furthermore, cycads have very specialised (insect) pollinators, so reproduction is also determined by the presence and efficiency of species-specific pollinators (Donaldson 2004). *Encephalartos lebomboensis* plants produce between one and three cones once every three years on average (Dyer 1965; Giddy 1974; Goode 1989; Konings 2016). Cones of the species in habitat, appear to have a high pollination success rate with tested seed resulting in pollination rates of more than 70%. (n=226).

Cycad seeds are relatively short-lived without any period of dormancy. Fertilized embryos develop slowly but continuously until germination which typically occurs a few months after dispersal. Usually only a few seeds will survive post dispersal, with others prone to desiccation and/or predation. Both seedlings and young plants have been observed in the wild population of *E. lebomboensis*, indicative of good recruitment. Seedlings occur in abundance (close to parent plants), but young plants between 5 cm and 15 cm in diameter are rare. The absence of young plants could be due to a number of factors including frequent fires, excessive grazing, and/or illegal collection. Overall, recruitment by seed is typically limited and population turnover gradual in most cases. In general, viable seed production in *Encephalartos* populations tends to decline with decreasing population size (Donaldson 1993).

3. Dispersal efficiency: How efficient is the species' dispersal mechanism?	Very good	1
	Good	2
	Medium	3
	Poor	4
	Uncertain	5

The dispersal abilities of cycads are not well understood but are generally regarded as poor. Cycads have large seeds with fleshy and brightly coloured outer coats or sarcotesta, which attract animals such as birds and small mammals that act as dispersal agents. The distance that seeds disperse is limited by how far animals can carry the large seeds (which is typically within a radius of less than 20 m around the core population). According to provincial reports, baboons play a very active role in the dispersal of *E. lebomboensis* within the Mpumalanga Province whilst vervet monkeys, squirrels, hyraxes, as well as crowned hornbills have also been observed to disperse seed. Recent observations from the field however, indicate that dispersal of seed appears to be very limited with majority of seedlings located within 1 m of adult plants and no disperser species detected at the time. Even if seed were dispersed to new sites, the concomitant dispersal of species-specific pollinators would be highly unlikely. Colonization of new sites is furthermore unlikely due to several reproductive limitations, such as limited seed production or non-viable seeds, irregular coning, infrequent recruitment, and male plant biases in populations. There has been no observed change/expansion in the distribution of any cycad species and *E. lebomboensis* has a restricted distribution.

4. Habitat: What is the habitat preference of the species?	Disturbed open	1
	Undisturbed open	2
	Pioneer	3
	Disturbed forest	4
	Climax	5

Encephalartos lebomboensis plants occur in grassland and savanna-type vegetation where they grow in open areas and on steep cliffs in rocky ravines. There are reportedly two forms of *E. lebomboensis*, a northern form which grows on the plateau escarpment of the Lebombo mountain range, and a southern form centred around the Pongola River Valley. The species prefers large open rocky outcrops with sparse shrubs and trees, where plants grow in full / direct sun light. The species has a preference

for deep, fertile soils but is less dependent on vegetation cover. Rates of vegetation loss in grasslands and in savannas are nevertheless amongst the highest in the country (Skowno *et al.* 2021). One of the species major habitat types, the Lebombo Summit Sourveld, is listed on the National list of Terrestrial Ecosystems that are Threatened and in need of protection owing to its narrow distribution and high rates of habitat loss over the past three decades (Skowno *et al.* 2019).

National status

5. National distribution: How is the species distributed nationally?	Widespread, contiguous in country	1
	Widespread, fragmented in country	2
	Restricted and fragmented	3
	Localized	4
	Uncertain	5

The species exists as fragmented subpopulations in the KwaZulu-Natal and Mpumalanga provinces. *Encephalartos lebomboensis* also occurs marginally in the neighbouring countries of Eswatini and Mozambique with a total estimated Extent of Occurrence (EOO) of ~3 900 km² and an Area of Occupancy (AOO) of ~200 km².

6. National abundance: What is the abundance nationally?	Very abundant	1
	Common	2
	Uncommon	3
	Rare	4
	Uncertain	5

Rough estimates suggest that there are around 5 000 individual plants remaining in the wild, although no comprehensive surveys have been conducted in Mpumalanga or KwaZulu-Natal. The most recent aerial surveys conducted in KwaZulu-Natal (2022), produced a count of 807 individuals in one subpopulation, although this is regarded as an underestimate and the number of plants growing along the steep cliffs and narrow gorges in the province is more likely to be greater than 1 000. The largest subpopulation in Mpumalanga is thought to number between 1 000 and 3 000 plants. *Encephalartos lebomboensis* is currently listed in the IUCN Red List category of Endangered (A2acd; B1ab(ii,iii,v)+2ab(ii,iii,v) (Bösenberg 2022)).

7. National population trend: What is the recent national population trend?	Increasing	1
	Stable	2
	Reduced, but stable	3
	Reduced and still decreasing	4
	Uncertain	5

This is a popular species amongst collectors and the population has declined by at least 50% in the past 90 years. There are fewer than five locations remaining and populations in both KwaZulu-Natal and Mpumalanga have been affected by collecting for both horticultural/ornamental and medicinal purposes. The largest subpopulation numbered between 4 000 and 5 000 plants (in 1984) but has experienced an ongoing steady decline since then with current estimates of between 1 000 and 3 000 plants. Cycads that used to historically occur at the foothills of mountains have disappeared and it is suspected that follow-up visits to impacted subpopulations will reveal further losses. Declines are reportedly ongoing.

8. Quality of information: What type of information is available to describe abundance and trend in the national population?	Quantitative data, recent	1
	Good local knowledge	2
	Quantitative data, outdated	3
	Anecdotal information	4

	None	5
There is good local knowledge around this species in the Mpumalanga Province where officials have frequently visited the populations, but monitoring of the species in KwaZulu-Natal remains a challenge and national population estimates are outdated.		
9. Major threats: What major threat is the species facing (underline following: <u>overuse</u> / habitat loss and alteration/ invasive species/ other:) and how severe is it?	None	1
	Limited/Reversible	2
	Substantial	3
	Severe/Irreversible	4
	Uncertain	5
<i>Encephalartos lebomboensis</i> is threatened by poaching for horticultural/ornamental and traditional medicine purposes. This species is often found in private gardens across the country and is favoured by landscapers – particularly large and striking specimens. Owing to the longevity of the species, plants have been collected from the wild given the limited number of large specimens once available in the retail sector. The subpopulations in KwaZulu-Natal have previously been impacted by poaching and the population in eastern Mpumalanga remains at risk to the ongoing harvest of wild plants. Within South Africa, cycads are regarded as a culturally important plant group (Cousins and Witkowski 2017) and all species remain at risk to harvest for traditional medicine and spiritual purposes. Harvesters and healers do not distinguish between the various species. Accessibility of the plants is the key factor determining whether a species is vulnerable to harvesting. Whilst the largest subpopulation within KwaZulu-Natal is regarded as secure (occurring in remote, difficult to access terrain in and around a State protected area, away from roads and homesteads), the subpopulations in Mpumalanga are unprotected, and field patrols along the mountains that used to take place have stopped. Overall, the national population has declined by more than 50% due to over collecting. In general, the mortality rates of cycads removed from the wild is likely to be quite high depending on several factors such as the size of specimens harvested, the quality of aftercare, and the effects of frequent transplantation. It is thus very likely that many wild origin specimens have been and will continue to be lost over time from private collections. Expanding agricultural activities also threatens the species habitat while invasion by alien plant species such as <i>Lantana camara</i> (Lantana) and <i>Chromolaena odorata</i> (Triffid Weed) is an additional threat in some areas. Apart from being invasive plant species, they also pose an additional fire hazard threat (by accumulating unnatural amounts of dead plant material) that could destroy or badly damage the habitat and population.		
Harvest management		
10. Illegal off-take or trade: How significant is the national problem of illegal or unmanaged off-take or trade?	None	1
	Small	2
	Medium	3
	Large	4
	Uncertain	5
The trade in this popular species has been prolific and many wild-origin specimens have been seen in collections, including in private gardens in areas of the Mpumalanga province. Owing to its fast-growing nature (propagated specimens can reach >40 cm in ten years depending on nutrients supplied) it is possible to get large <i>E. lebomboensis</i> plants in cultivation, but the unusual shapes and forms are limited to the wild populations. Accessible populations have been heavily exploited by illegal collectors, perpetuated by an inconsistent, and often limited presence of field/law enforcement officers in and around areas where the species occurs. There were once hundreds of plants confiscated in numerous		

consignments and cases have previously been opened in some provinces for the possession and/or transportation of plants without the necessary permits. Many years ago, as part of a cycad nursery project, Mpumalanga Tourism and Parks Agency (MTPA) contributed around 180 000 seedlings into the market for about 9 years. Today, there are thousands and thousands of seedlings and even numerous big plants available on the market. Nevertheless, offtake from the wild is thought to be ongoing with several holes (from which plants had been removed) noted during recent surveys of one of the subpopulations. At least three wild origin plants (i.e., specimens exhibiting two or more wild characteristics) have been observed at one cycad nursery during audits for CITES registrations. The species also suffers pressure from medicinal plant harvesters and fragments of *E. lebomboensis* have previously been positively identified (through DNA barcoding analyses) for sale at the Faraday traditional medicine market in Gauteng (Williamson *et al.* 2016).

11. Management history: What is the history of harvest?	Managed harvest: ongoing with adaptive framework	1
	Managed harvest: ongoing but informal	2
	Managed harvest: new	3
	Unmanaged harvest: ongoing or new	4
	Uncertain	5

Illegal harvesting of wild cycads has been occurring in South Africa for the past 50 years, becoming more prevalent from the 1990s onwards despite various legislative interventions. Since the 1970s all cycad species have been protected in provincial nature conservation ordinances, with the harvest of any plants or seed requiring a permit (in addition to other activities such as possessing, conveying, selling, etc.). Reportedly, no permits have ever been issued for the wild harvest of *E. lebomboensis* plants or seed. Plants may however have been harvested from the wild prior to the enactment of provincial legislation or obtained from the Hartebeesthoek nursery which operated in the former Transvaal province between 1975 and 1998. During the late 1990's, conservation authorities in the Mpumalanga province facilitated the collection of *E. lebomboensis* seed and subsequent propagation and commercial sale of seedlings as part of a joint state-community cycad nursery project. The project enjoyed considerable success but was stopped shortly before its tenth year of running. No-one from the public has been allowed to harvest any seed from the wild since then but some seed is still legally collected by MTPA for conservation purposes. In general, there has been an exponential increase in *ex situ* cultivated cycads, which are currently regulated by provincial conservation ordinances/Acts and the National Environmental Management: Biodiversity Act (NEMBA): Threatened or Protected Species Regulations (TOPS). In February 2007 the harvest of cycads from the wild was prohibited nationally in terms of Regulation 25 of the Threatened or Protected Species Regulations, but this was withdrawn and replaced by Government Notice No. 371 in May 2012 which prohibited the wild collection of cycads and all restricted activities for wild origin cycads excepting for possession of plants that had TOPS permits prior to the notice coming into effect. Whilst the regulatory responses to the harvest of wild plants have been strengthened since 2012, the illegal removal of cycads from the wild continues.

12. Management plan or equivalent: Is there a management plan related to the harvest of the species?	Approved and co-ordinated local and national management plans	1
	Approved national/state/provincial management plan(s)	2
	Approved local management plan	3
	No approved plan: informal unplanned management	4
	Uncertain	5

As of 2014, the management and conservation of all cycad species in the country has been guided by a National Strategy and Action Plan for the Management of Cycads. Additionally, a Biodiversity Management Plan (BMP) for the 11 Critically Endangered and four Endangered cycad species has been published (in terms of section 43 of the NEMBA), for implementation since 2017. The aim of the

BMP-S is to ensure the long-term survival in nature of the most threatened *Encephalartos* species. This entails halting the decline of the *in situ* populations and thereafter attaining a population growth rate. A Cycad Steering Committee/ National Cycad Task Team (consisting of representatives from local, provincial, and national conservation agencies, NGOs, and the private sector) has been established to implement the National Strategy and Action Plan as well as the BMP through a process of ongoing, co-ordinated collaboration and monitoring.

Prior to the National BMP, outdated (>30-year-old) conservation plans did exist for all of Mpumalanga's cycad species. These plans were all very similar, having been based on the same template, and addressed propagation and restoration but not harvest. Some components of these plans have collapsed altogether (e.g. *ex situ* propagation at the Hartebeesthoek nursery) but several activities have been revised and carried over into the national BMP. No such plans existed at a provincial level in KwaZulu-Natal.

13. Aim of harvest regime in management planning: What is harvest aiming to achieve?	Generate conservation benefit	1
	Population management/control	2
	Maximize economic yield	3
	Opportunistic, unselective harvest, or none	4
	Uncertain	5

The harvest of wild cycads is prohibited throughout South Africa, except for conservation and enforcement purposes. Any offtake at present is illegal, opportunistic and for the personal benefit of the harvester.

14. Quotas: Is the harvest based on a system of quotas?	Ongoing national quota: based on biologically derived local quotas	1
	Ongoing quotas: "cautious" national or local	2
	Untried quota: recent and based on biologically derived local quotas	3
	Market-driven quota(s), arbitrary quota(s), or no quotas	4
	Uncertain	5

There are currently zero-offtake quotas in place for all South African cycad species. Harvesting of wild plants (and seed) is prohibited under Government Notice No. 371 (published May 2012) excepting for conservation and enforcement purposes.

Control of harvest

15. Harvesting in Protected Areas: What percentage of the legal national harvest occurs in State-controlled Protected Areas?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5

The harvest of wild cycads (including seed) is controlled by provincial nature conservation legislation and, excepting for conservation or enforcement purposes, is prohibited nationally in terms of Government Notice No. 371 of 2012. Part of the *E. lebomboensis* population is partially secured in a state protected area within the KwaZulu-Natal province, but harvesting of the species for conservation or enforcement purposes is not taking place in this area at present.

16. Harvesting in areas with strong resource tenure or	High	1
	Medium	2

ownership: What percentage of the legal national harvest occurs outside Protected Areas, in areas with strong local control over resource use?	Low	3
	None	4
	Uncertain	5
The harvest of wild cycads (including seed) is controlled by provincial nature conservation legislation and, excepting for conservation or enforcement purposes, is prohibited nationally in terms of Government Notice No. 371 of 2012. Subpopulations of <i>E. lebomboensis</i> do occur in areas where local control over resource use is generally regarded as strong, but harvesting of this species for conservation or enforcement purposes is not taking place at present. Strict control over harvest in areas outside of protected areas is however challenging.		
17. Harvesting in areas with open access: What percentage of the legal national harvest occurs in areas where there is no strong local control, giving <i>de facto</i> or actual open access?	None	1
	Low	2
	Medium	3
	High	4
	Uncertain	5
There are no open access areas in South Africa on which cycads occur.		
18. Confidence in harvest management: Do budgetary and other factors allow effective implementation of management plan(s) and harvest controls?	High confidence	1
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5
Monitoring and enforcement activities for cycads, and more particularly for rare species, require dedicated capacity and budget. The provincial conservation authorities that are mandated to conserve cycads and monitor trade continue to face severe resource constraints, both in terms of human resource capacity and budget. National funds afforded to the biodiversity sector are becoming increasingly insufficient (in relation to the scale of the challenges faced), making it difficult to effectively (and consistently) implement the strong regulatory and management frameworks needed to protect cycads. The provincial conservation authorities in Mpumalanga and KwaZulu-Natal that are mandated to protect wild cycad populations from illegal harvesting are currently facing high levels of staff vacancies and a particular shortfall in scientific and enforcement capacity.		
Table 2.1: Regulatory and management interventions in place for the conservation and protection of South Africa's cycads		
Management intervention/harvest control	Effectiveness of implementation	
CITES Appendix I listing (1977)	Somewhat successful	
Provincial legislations	Ineffective	
Threatened or Protected Species Regulations (2007)	Ineffective	
Government Gazette Notice No. 371 on the Prohibition of trade in certain <i>Encephalartos</i> (cycad) species (2012)	Ineffective due to inconsistent implementation among provinces	
National Response Strategy and Action Plan (2014) and the National Biodiversity Management Plan (2017)	Ineffective due to limited progress in undertaking activities and lack of resources for implementation	

The non-compliance with and lack of implementation of Government Notice No. 371 in relation to the prohibition of trade in wild origin specimens in key provinces such as Gauteng undermines the intended harvest controls, whilst implementation of management plans and monitoring activities (both *in situ* and *ex situ*) is hampered by inadequate resources. Only part of the *E. lebomboensis* population falls within a state protected area. No active monitoring or management of the national population is currently taking place, although at least one subpopulation is visited semi-regularly. As part of the objectives set out in the national BMP, MTPA together with South African National Parks (SANParks) are trialling the planting of seeds within secure habitats (*ex situ*) (Bezuidenhout *et al.* 2018).

Table 2.2: Implementation of actions pertaining to *Encephalartos lebomboensis* set out in the National cycad Biodiversity Management Plan (of 2017)

Actions	Intended timeframe for completion	Progress on actions
Conduct ground-based surveys of <i>E. lebomboensis</i>	Within two years of the publication of the BMP	None
Collaborate with Working on Fire (WoF), Working for Water (WfW) and/or Expanded Public Works Programme (EPWP) on the removal of alien invasive plants from the species range	Within five years of the publication of the BMP	None
Conduct extensive surveys for <i>E. lebomboensis</i> in SANParks formally protected areas	Within five years of the publication of the BMP	None
Plant a total of 3000 <i>E. lebomboensis</i> seed at various ranger outposts and secure historical sites in the Mpumalanga province	Within five years of the publication of the BMP	Initiated

Monitoring of harvest

19. Methods used to monitor the harvest: What is the principal method used to monitor the effects of the harvest?	Direct population estimates	1
	Quantitative indices	2
	Qualitative indices	3
	National monitoring of exports	4
	No monitoring or uncertain	5

Exports of *E. lebomboensis* from South Africa (extracted from the CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK) are monitored by the South African National Biodiversity Institute (SANBI) on behalf of South Africa's Scientific Authority. A total of 13 452 specimens of *E. lebomboensis* (estimated total value of between R1 – R6.73 million) have been exported between 1979 and 2020 (Fig. 4). The average annual value of *E. lebomboensis* exports is conservatively estimated at around R26 000 (assuming exports of 3-year-old seedlings at 2021/22 prices).

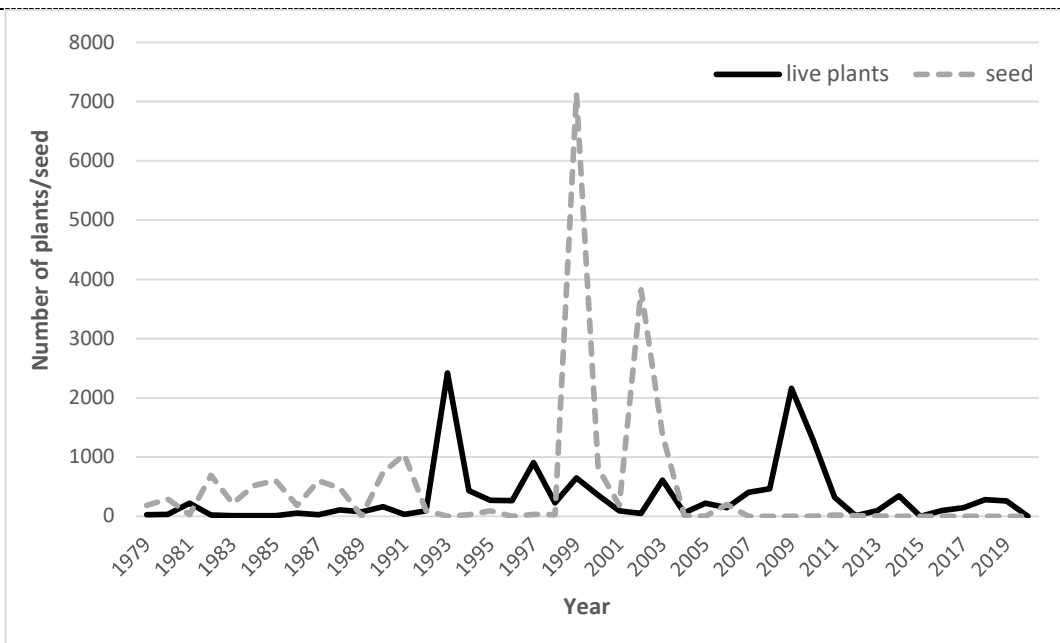


Figure 4: Gross (legal) exports of *Encephalartos lebomboensis* plants and seed from South Africa since the inception of CITES in 1975 (CITES trade statistics derived from the CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK).

As of 2018, a national programme to audit and monitor nurseries involved in the international trade in cycads has been established. Only those facilities that are fully compliant with CITES Resolution Conf. 11.11 (Rev. CoP18) (Regulation of trade in plants) are allowed to export small plants and seeds. At present, seven South African nurseries are registered with the CITES Secretariat in terms of CITES Resolution Conf. 9.19 (Rev. CoP15) to trade in *E. lebomboensis*.

There is no comprehensive population data for the species. The *E. lebomboensis* population in KwaZulu-Natal was previously monitored on a regular basis by means of aerial surveys, whilst in Mpumalanga, the main subpopulation is visited on a semi-regular basis to monitor for illegal activities and conduct research (although detailed population level data are not formally collected).

20. Confidence in harvest monitoring: Do budgetary and other factors allow effective harvest monitoring?	High confidence	1
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5

The quality of the CITES trade data is not always as accurate as it should be owing to errors and inconsistencies in reporting by both exporting and importing countries. Historically, a lack of monitoring across local nursery facilities has also facilitated the illegal collection and laundering of wild plants, particularly as parental stock, of this and other species, but the national programme established in 2018 to audit and monitor cycad nurseries should improve this situation. Local trade in cycads, including the interprovincial movement of plants, is ineffectively monitored at present.

Incentives and benefits from harvesting

21. Utilization compared to other threats: What is the effect of the harvest when taken together with	Beneficial	1
	Neutral	2
	Harmful	3

the major threat that has been identified for this species?	Highly negative	4
	Uncertain	5
In the early 90's Mpumalanga Parks Board had funds to set up a cycad nursery operation that involved the collection of seed from the mountains <i>in situ</i> that were then nurtured and grown into seedlings for sale to the public. The aim of the operation was to increase the supply of <i>E. lebomboensis</i> plants into the market in order to decrease the pressure on wild populations. In addition, confiscated plants of this species were also brought to the nursery for <i>ex situ</i> conservation as well as to serve as potential sources of more seed. The idea was then expanded to involve the local community by allowing them to have plants in their gardens for traditional and cultural purposes as well as to earn an income from the sale of seedlings. The operation had some success in increasing the availability of, and access to, propagated specimens with artificially propagated plants still seen in local community gardens around the population today. The operation continued for approximately 10 years but later collapsed due to governance and leadership challenges. There have since been requests from the community to restart the programme so that they can have easy access to sustainably sourced plant material once more. There is currently no legal harvest of cycad species within the country and thus no incentives and/or benefits to the species accrued from utilisation at present. Historically, the controlled harvest of seed took place quite successfully and although several benefits of the project have been noted, direct/overall impacts of seed harvest on the population (as well as the impact on the market) have not been measured and a score of neutral is deemed appropriate in this case.		
22. Incentives for species conservation: At the national level, how much conservation benefit to this species accrues from harvesting?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5
Historically, the harvest of seed took place quite successfully and although several benefits of the project have been noted, direct/overall impacts of seed harvest on the population (as well as the impact on the market) have not been measured and a score of low is deemed appropriate. Anecdotal evidence suggests that the community were incentivised to care for the wild population. Whilst no legal harvest of <i>E. lebomboensis</i> is currently taking place, wild seed harvested in the past decade have been used in a project attempting to establish a viable <i>ex situ</i> population of the species in a protected area. The outcome of this project is still to be evaluated.		
23. Incentives for habitat conservation: At the national level, how much habitat conservation benefit is derived from harvesting?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5
Protection from harvest		
24. Proportion strictly protected: What percentage of the species' natural range or population is legally excluded from harvest?	>15%	1
	5-15%	2
	<5%	3
	None	4
	Uncertain	5
Government Notice No. 371 published in May 2012 in terms of section 57(2) of the National Environmental Management: Biodiversity Act (NEMBA) of 2004 prohibits the harvest (and trade) of wild		

cycads throughout South Africa, unless required for conservation or enforcement purposes. (This law pertains to the wild origin specimens currently in *ex situ* collections as well). All South African cycad species are also included in Appendix I to CITES, and thus commercial international trade in wild sourced plants is not allowed.

The subpopulation in the KwaZulu-Natal Province falls partially within a state protected area.

25. Effectiveness of strict protection measures: Do budgetary and other factors give confidence in the effectiveness of measures taken to afford strict protection?	High confidence	1
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5

The nature conservation legislation pertaining to cycads has firmly improved over the past two decades, with strict protection currently afforded to wild cycads (including *ex situ* cycads of wild origin) under Government Notice No. 371 on the prohibition of trade in certain *Encephalartos* (cycad) species. The Threatened or Protected Species Regulations (TOPS) further provides for a solid legal framework to promote and support the sustainable trade in artificially propagated plants. The cycad trade is however quite complex, and substantial resources are required to monitor all the legal and illegal activities related to this trade and ultimately to enforce the prohibition. Unfortunately, resource capacity deficiencies in terms of budget and staff remains a key challenge in many provinces, thus rendering strict protection measures ineffective at present. The under-resourced provincial conservation authorities in both Mpumalanga and KwaZulu-Natal are inadequately equipped to protect all wild cycad populations from illegal harvest. The laundering of illegally obtained wild plants into private collections and nursery operations has not been curbed due to the inconsistent or non-implementation of Government Notice No. 371 within key provinces such as Gauteng, where most of the cycad trade is centred. There has been some efforts to improve the implementation of legislative instruments, such as the development of guidelines to assist law enforcers with distinguishing wild cycads from artificially propagated specimens, as well as training sessions to educate and upskill (e.g. in relation to identifying species, see [IDentifyIt Cycads](#) app) those involved in investigations and prosecutions (including South African Police Service (SAPS) officials). Nevertheless, the illegal harvesting and movement of illegally harvested cycads across the country, and particularly into and around Gauteng, remains an ongoing problem with seemingly limited effort to address the scourge on a national level.

All species of South African cycads have been included in Appendix I to CITES since 1977, thereby ensuring that international trade in cycad specimens is subject to strict regulation. However, the CITES listing has had little impact on preventing the removal of plants from the wild. Some parental stock for the propagation of seedlings for both the domestic and international trade has been sourced from the wild to the detriment of the survival of a number of cycad species including *E. lebomboensis*. This is primarily due to poor application of the CITES provisions by the relevant state agencies, particularly in respect of the definition of artificial propagation (source code A) as per CITES Resolution Conf. 11.11 (Rev. CoP18). Interventions to improve compliance of exporting facilities with the CITES provisions have been put in place (as of 2018), and only CITES registered facilities that meet the strict requirements for international trade are now allowed to export juvenile cycads and cycad seedlings. A total of 29 artificially propagated mother plants of the species have been recorded during the national audit programme across cycad nurseries, including 25 plants within the seven registered facilities.

Only a proportion of the *E. lebomboensis* population falls within a state protected area and is inaccessible. Security around the largest subpopulation is severely lacking. Additional *in situ* measures of protection, including the micro-chipping of several wild populations of *E. lebomboensis* have also

been implemented, albeit with a low success rate in preventing the continued harvest and trade of wild plants. Presently, several technological solutions are being employed to aid in efforts to curb the illegal trade in wild cycads, including novel marking/tracking techniques (Williamson *et al.* 2016; Zondi 2023) and strontium isotopes (Retief *et al.* 2014), which will provide the scientific evidence needed to prove wild origin in a court of law. Law enforcement agencies have yet to take full advantage of these modern innovations in prosecuting cycad-related offences.

The measures put in place to protect wild cycads and prevent unsustainable use have not yet yielded the desired outcomes, primarily due to a continued lack of resources in the provinces that are increasingly operating under ballooning mandates.

26. Regulation of harvest effort: How effective are any restrictions on harvesting (such as age or size, season or equipment) for preventing overuse?	Very effective	1
	Effective	2
	Ineffective	3
	None	4
	Uncertain	5

Regulatory measures are ineffective at present. Despite an exponential increase in *ex situ* propagated cycads, coupled with focused efforts in the regulatory and management space to curb the unsustainable harvest and trade of South African cycad species, wild plants continue to be illegally obtained and laundered into private collections and nursery operations.

Encephalartos lebomboensis is listed as Specially Protected in the Mpumalanga Nature Conservation Act (No. 10 of 1998) and in the KwaZulu-Natal Nature Conservation Ordinance (No. 15 of 1974), such that no person would have been able to 'possess, pick, sell, purchase, donate or receive as a donation, import into or convey within the Provinces, export or remove from the Provinces any indigenous cycad, unless he was the holder of a permit or license that would have authorised him to do so'. South African *Encephalartos* species are also protected in several other provinces under the respective provisional ordinances, however, most of these conservation legislations are outdated and have been inconsistently enforced. Past restrictions on harvest of this species (prior to harvest being prohibited) were quite successful in the Mpumalanga Province where the Mpumalanga Parks Board made provisions for the collection of seed from the wild and this was carried out strictly by officials and under the supervision of the conservation authority. There is currently no legal harvest of cycads taking place in South Africa at present.

The Threatened or Protected Species (TOPS) Regulations of 2007 provided an improved national legal framework to govern the use of all indigenous cycads. As with several other regulatory interventions, compliance with and enforcement of the TOPS regulations has been met with some challenges over the years. A revision of the TOPS regulations has attempted to address some of the implementation challenges, but this has been a long and arduous process stretching across a decade, and it will require some time to assess the effectiveness of the revised regulations once they come into effect.

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