Cape aloe harvesting and trade in South Africa

Introduction: Species, Use and Trade

The Cape (or Bitter) aloe (Aloe ferox) is a tall (up to 3m in height), single- stemmed endemic aloe of southern Africa. It is distributed across a broad range of habitats across a range of over 10 km2 in South Africa, particularly in the Eastern and Western Cape Provinces. It is common on rocky hill slopes, often in very large numbers, where it creates a stunning winter display. In the South-Western Cape it grows in grassy fynbos, and in the southern and Eastern Cape it may also be found on the edges of the Karoo semi-desert region. A. ferox has thick, fleshy leaves arranged in rosettes around the single stem. The leaves have spiny margins and (in young plants) spiny upper and lower surfaces. The plant is long-lived, up to 150 years.

For centuries, the plant has been highly valued for pharmaceutical and cosmetic purposes, and today it is South Africa's most heavily wild-harvested and commercially traded indigenous plant. It is listed in CITES Appendix II and as Least Concern in South Africa (it has not been assessed for the IUCN Red List). The main product is the yellow aloin-rich bitter juice (commonly known as sap) from the leaves; this is used to make Aloe bitters, widely considered to have laxative, antioxidant, anti-inflammatory, anti-arthritic, antimicrobial and anti-cancer properties. Other products include increasingly popular cosmetic products made of gel extracted from the white inner flesh of the leaf, which is rich in minerals, vitamins, amino acids, polysaccharides, enzymes and lipids. Most (around 95%) remains wild-harvested, with a small amount under cultivation. Levels of the active ingredient aloin vary: the Western Cape has the best quality, with aloin content of between 18% and 20%, while the Eastern Cape has about 8% aloin content.

The extraction of sap from *A. ferox* leaves is done on-site by harvesters and does not require chemical processing. Extraction of other products/derivatives may require chemical processing and specialized skills and equipment. The bulk of the harvested aloe products are exported, primarily to Europe and North America in the form of sap, lumps or powder, although some processing takes place in the country.

A. ferox harvesting occurs over a large area of the Eastern and Western Cape. Harvesters in the Eastern Cape are predominantly isiXhosa speaking middle aged women, and those in the Western Cape from communities of mixed ethnic background. In the Eastern Cape harvesting is primarily carried out by community members on communal land, with the agreement of the Chief. In the Western Cape, however, most harvesting is carried out by communities on private land belonging to others. In this case they generally pay landowners a proportion (around 1/3) of the income from the aloe product. Harvesters are typically poor and with low educational levels.

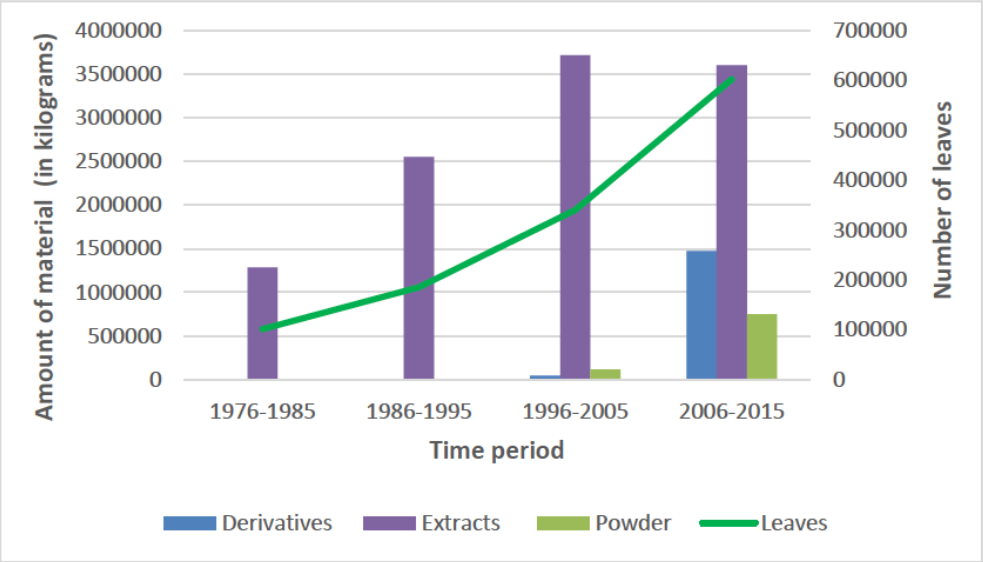

Fig 1. *Aloe ferox* material exported from South Africa from 1976 to present (CITES Trade Database, UNEP-WCMC). For calculating quantities, only trade records reported in kg/g were included. Reproduced from CITES CoP 18 Prop. 55.

To harvest (or "tap") *A. ferox*, leaves are cut by hand using a specialised cutting tool. Tapping can only be done in warm and dry conditions (when there is no wind). During drought periods, the tappers will not be able to tap as this harms the plant and threatens its survival, because the leaves hold its water reserves. Once cut, leaves are then stacked carefully in a circle with the cut ends facing inwards in order to allow the juice to drain into a plastic sheet laid between them (see Fig 3). The sap takes between 30 minutes – 5 hours to drain completely. On average each leaf produces 20-40ml sap.The plastic sheet is then drained into a drum for transport. Leaves are usually left on site to decompose. A few processors uses the inner-white "flesh" of the leaves for various products.

Harvesters may sell aloe sap directly to the processor, or carry out the initial step in processing ("cooking") in the field before sale. They will often have no knowledge of the market beyond the collectors, who aggregate the sap from the harvesters. In some places harvesters have formed cooperatives for management and control of harvest – here the cooperative generally carries out initial "cooking" stages and convert the sap into lumps (solid form) and/or powder before selling to manufacturers/distributers/exporters.

Aloes are tapped every 8 to 36 months, to allow the plant to recover between the harvesting periods.

Traditional knowledge regarding harvesting *A. ferox* is held in families involved in the harvesting and use of the species, and is passed from generation to generation, with current harvesters typically having learnt from their parents.

Women are disproportionately represented among aloe tappers, particularly in the Eastern Cape where most tappers are women.

Livelihood Benefits

The harvest of *A. ferox* for international trade supports thousands of rural South Africans, although estimates of quantity harvested and livelihood returns are very imprecise. In 2014, the Department of

Environmental Affairs reported that in the last permitting period 650,394 harvesters were issued permits, but acknowledged there may be some double counting within this figure.

Good harvesters collect an average of around 1,000 leaves, which produces a 20-25 litre bucket or drum of aloe sap in a day, although poor conditions may lead to lower production. In the Albertinia Aloe cooperative, one of the cooperatives established by harvesters, a 25 litre drum is sold for about ZAR 510 (approx. USD 35). The potential income for a full-time tapper in the Eastern Cape was estimated in 1992 at ZAR10,000 (USD 1,400 at the time), although due to many tappers being trapped in a complex debt cycle, this full amount was rarely achieved.

In 1996, Newton and Vaughan estimated that the industry yielded some 400 tonnes of dried leaf exudate (sap) per annum from the leaves of around 10 million plants, and was worth ZAR 4 million per annum to rural harvesters (at 1996 conversion rates, approx. USD 276,000). In 2007 Shackleton and Gamiza estimated that assuming some growth in the industry, the returns to small-scale rural harvesters were approximately ZAR 12 to 15 million per year (at 2007 conversion rates, approximately USD 830,000 – USD 1,034,500).

The socio-economic benefits of the *A. ferox* industry in South Africa are spread widely, including the poorest harvesters (for whom aloe tapping constitutes their only source of income), and harvesters with other part-time work in agriculture, forestry, or labouring, along with their families and communities. Tappers may be full time or use tapping as an occasional source of income. As is the case with many wild resources, access barriers are low, making it feasible for small scale, local harvesters with few resources to participate in the industry. Some entire rural communities are dependent on aloe tapping.

In one study of a tapping community in the Eastern Cape, 21/22 households involved in tapping were headed by a woman, with an average of 2.8 dependents at home. Few (2/22) had other work in forestry or labouring – other sources of income were almost entirely state welfare. A temporary ban in 2009 led to financial hardship in this community.

Income from aloe tapping is critical income in rural areas where harvesting communities frequently have low levels of education, few employment opportunities, and levels of unemployment may reach half the population. Income is used for basic household needs including school fees and school supplies.

Additionally, trade can contribute to broader livelihood and development outcomes, including building community networks, skills and capacities, and strengthening land tenure, resource access, species management and local enterprise development.

There have been concerns in the industry about inequitable benefit-sharing, with harvesters typically able to exercise little power, and sometimes becoming trapped in a debt cycle.

Establishment of co-operatives are a key way that harvesters have sought to gain a larger share of the value of the product. For example, the Albertina Aloe Tappers Agricultural Primary Co-operative was established in 2008, and is involved in *A. ferox* tapping, processing sap, and producing aloe powder and lumps for sale to an upstream aloe processor. The Co-operative is owned by community members, and the returns are distributed among them.

Conservation Impacts

At the country level, South Africa's Department of Environment, Forestry and Fisheries (DEFF) carried out a resource assessment on *A. ferox* in 2014. The assessment indicated that current harvesting levels do not seem to have impacted significantly on the occurrence of *Aloe ferox* within its predicted range. The species remains common and abundant throughout its very extensive distribution range, and occurs in some places at very high densities. Around 700,000 ha of *Aloe ferox* habitat is within protected or conserved areas (although most of its prime habitat falls outside of these areas).

However, the resource assessment also found localized damage to harvested plants and low flowering occurrences particularly in harvesting areas in close proximity to residences, indicating a need for greater sustainability safeguards to ensure continued abundant resource supply. The DEFF further conducted a non-detriment finding (NDF) in 2018, finding that the harvest and international trade in *A. ferox* is non-detrimental and poses a low to moderate risk to the population in the wild.

Sustainable harvesting of *Aloe ferox* at the individual plant level is largely related to how many leaves are left on plants during harvesting, and the time elapsed between harvests from a single plant. Plants are not killed for their leaves – a certain number of leaves are left on the plant. There are, however, concerns that in some areas, an inadequate number of leaves may be being left on plants in order to maintain current abundance of *Aloe ferox* long term. Local overharvesting may affect growth, reduce flowering, and reduce resilience to drought, although the relationship between harvest practices and long-term population trends is poorly known. DEFF has developed precautionary harvest guidelines including recommending that the top 16 leaves (4 rosettes) of the plant should be left, only 8-12 leaves should be harvested at a time, and a year be left between harvests.

DEFF has recently initiated a process to develop a Biodiversity Management Plan (BMP) for the species, which should further contribute to sustainable harvesting practices and monitoring of the resource base. However, in many areas, there is currently informal management in place which has been informed by ancient indigenous harvesting practices. These are based on knowledge that has been passed down over generations without having changed substantially.

The harvest appears to provide clear incentives for conservation of *A. ferox*. It is important to note that harvesters could take all leaves from a plant, in a context where such destructive harvest would be hard to detect or punish. However, the fact that harvesters are careful to leave leaves on the plant in general attests to the value that local people place on maintaining live aloes, despite potential overharvesting locally in some places. Farmers often select tappers with a good reputation for avoiding over-harvesting, contributing to sustainability of the harvest. Landowners maintain aloe populations on farmland due to income they can derive from aloe tapping.

Lessons Learnt for CITES Implementation: Challenges, Successes and Failures

Trade of wild *Aloe ferox* provides important livelihood benefits, particularly income and continuation of traditional knowledge and practices, to some of South Africa's poorest rural people. The livelihood benefits appear to provide incentives for sustainable use and conservation, and the harvest is not currently leading to any significant decline or threatening the species with extinction, although there is some localised depletion requiring strengthened harvest practices.

Livelihood benefits and sustainable management could both be improved by increasing the ability of communities to form co-operatives and other producer associations, in order to carry out the first stage of processing themselves and increase their bargaining power with the exporters. This requires financial support, training in processing, administration and marketing, and capacity building for harvester communities.

CITES listing of *A. ferox* in Appendix II has strengthened government oversight of harvest levels. However, within the national context CITES regulation does impose limitations on disadvantaged harvesting communities, who are frequently unable to afford permit administration fees. In this respect an amendment to Annotation #4 was submitted by South Africa to CoP18, which would exclude trade in finished products containing *A. ferox* from CITES regulation. This is aimed at facilitating the in-country processing of both primary and secondary extracts from *A. ferox* leaves, to promote sustainable and efficient use of aloe reources and enhance benefits to livelihoods and local economies. Implementation of South Africa's access and benefit-sharing framework had detrimental impacts on livelihoods of aloe tappers, leading to a moratorium on harvest.

One challenge facing trade in this species is that some countries (or businesses) place tight restrictions on import of CITES-listed species, so will not import *A. ferox* despite its conservation status and the livelihood benefits of trade. CITES listing thus places *A. ferox* at a competitive disadvantage against products made from widely-cultivated *Aloe vera*, despite the latter being highly commercialised, with no habitat retention benefits and few small-scale local benefits. Better communication from CITES regarding CITES rules and the benefits of well-managed legal trade to rural communities and species conservation could help resolve such misconceptions.

Key References

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