Section EIGHT

Boswellia and CITES

There has been much discussion at CITES meetings recently about the genus *Boswellia* with a view to deciding whether any listing proposal should or could be submitted or is warranted to ensure the international trade is not a significant threat to species survival. This has included the establishment of an Inter-Sessional Working Group on *Boswellia* which a range of stakeholders and range states attended online.

This programme of work has taken as a starting point that if international trade is a potential or actual threat to *Boswellia* species, integration with the CITES community is important as considerable expertise in regulating unsustainable trade as well supporting the development of non-detriment findings and related protocols are very much within the remit of CITES. Considerable effort has been made in this regard, including attendance at CoP19 (Panama City) and several Plants Committee and Standing Committee meetings. This has additionally enabled discussions directly with range state CITES authorities as well as numerous additional stakeholders both within and outside the CITES community.

Predominantly, gathering as much available and generating new and relevant information has been a focus of this programme of work. This has been detailed in previous sections. From a position of considering whether CITES listing or the use of CITES protocols would be beneficial to the persistence of *Boswellia* species, there are several considerations to be made, and these are addressed below.

Section 8.1

Genus level listing on CITES Appendix II

Genera or large groups of plants have been listed on CITES Appendix II for a variety of reasons. In the case of *Boswellia*, due to the difficulty in species specific identification of the parts and derivatives in trade, a case would need to be made that one or more species were threatened in some way by international trade.

There is no doubt that resins and essential oils from nearly all species of *Boswellia* can be purchased outside their country of origin. Some of the more widespread species are clearly traded in large amounts, as evidenced by trade figures (such as they are) and import and export data. While these do not directly relate to the “standing crop” of trees on the ground as they might in the case of tropical timber species, over-harvesting and subsequent tree damage has been observed in many places with a documented link to international trade. A future reduction in harvesting capacity has been cited (Bongers *et al* 2019) and as such trade is likely to move to different locations and potentially to different species than those currently forming the bulk of trade. Given difficulties in identification of *Boswellia* resins and essential oils in trade, and a lack of detail and accuracy as to the source populations and species harvested, coupled with some documented examples of adulteration or mixed gatherings (REFS) a case can be made for listing Boswellia on Appendix II.

However, there is little evidence that more than a few species are traded in significant volumes that relates to tree and population health on the ground, and that some are either narrow range endemics that are highly unlikely to be deliberately traded or some that are not under threat from harvesting as the trees are not cut or damaged to induce resin production. Further, it is extremely difficult to relate actual harvesting amounts to whether those resins are traded

internationally or locally, and as such it is almost impossible to conclude that international trade is the sole or most significant threat (eg. even in Ethiopia, cited as the major exporter of *B. papyrifera* resins globally, it has been suggested that a large proportion of that harvest is used internally by the Ethiopian churches (Stevens, pers. comm.)). In addition, what evidence there is has often been estimated based upon assumptions that have not been empirically tested thoroughly or widely enough – in terms of both locations and different species.

On this basis, it is unlikely that a genus level Listing in CITES Appendix II would be appropriate at this time.

Section 8.2

Species level listing on CITES Appendix II

As a genus level listing seems inappropriate at this time, each species should therefore be considered separately. Despite the fact that implementation is an issue in some circumstances, each species or group of species is assessed below as to whether it meets the criteria for listing in Appendix II.

Endemic species on the Soqotra Archipelago (Yemen)

The eleven endemic *Boswellia* taxa from Soqotra are traditionally considered to be under little threat from resin harvesting as resins there are collected from natural exudates rather than by cutting the trees to initiate resin production (although some cuts have been recorded in rare circumstances). In fact, resin is often produced and subsequently collected following damage by browsing animals or extreme weather events which likely pose a more direct threat to populations currently.

However, with global interest in frankincense and the fact that resins (and live plants) of most Soqotran species can be purchased online, and given the small number of trees of each species on the island (see Madera *et al* 2024) any increase in potential markets might lead to more damaging harvesting practices as has been documented elsewhere. Marketing products from Soqotra is relatively straightforward due to the unique nature and high levels of endemism on the archipelago, and several small-scale commercial operators have indicated that it would be easy to sell any products from Soqotra albeit in small quantities due to the small standing crop. This could quickly exacerbate declines in tree population health issues that are already negatively influenced by a number of factors. While international trade is far from excessive at the moment, all these species have recently been assessed as threatened and responsible authorities should monitor very carefully any resin harvesting, sales and exports to ensure increases do not become a significant threat.

However, currently there is little evidence of damaging international trade, and these species would not meet the criteria for Listing in CITES Appendix II.

Narrow endemic taxa in northeast Africa

There is no evidence that *B. globosa*, *B. occulta*, *B. ogadensis* and *B. pirottae* meet the criteria for Listing in Appendix II as there almost no international trade, albeit *B. occulta* is apparently harvested alongside *B. sacra* and *B. frereana* and may be included in harvesting of those widely traded species. *B. occulta* also has novel chemistry and may be at risk of increased exploitation as a result. Further monitoring is recommended for this species. There is evidence of local use of resins of *B. ogadensis* and *B. pirottae* that also requires monitoring. Virtually nothing is known about *B. globosa* and this species requires investigation as to whether it is harvested alongside more widespread species.

Boswellia microphylla, Boswellia neglecta and *Boswellia rivae*

These three taxa are not currently threatened and have been promoted to an extent as sustainable resin harvesting systems as their resin production is not initiated by cutting or otherwise damaging trees (see DeCarlo *et al* 2024 and field surveys in Section 6). As such there is no evidence that these species meet the criteria for Appendix II Listing, although surveys of some of these trees has identified other threats and in fact resin collection is likely to increase the value of these trees to local communities therefore reducing risks of damage and destruction for charcoal production, fencing and fodder.

Boswellia dalzielii

Several publications alongside recent surveys (see Section 6) suggest that in numerous locations this species is suffering declines and degradation. However, resin harvesting is likely not the biggest threat, as this species is widely harvested for its bark with unsustainable practices noted. In several range states, very little is known about this species and whether it currently faces any direct threats through international trade. The resin of *B. dalzielii* is however being actively marketed and any increase in resin harvesting activity without appropriate control or regulation could quickly result in widespread population decline. This species does not currently meet the criteria for Listing in CITES Appendix II.

Boswellia frereana

This species is recognised as a high value resin and is clearly traded is some quantity, although how this relates to the number of trees and populations on the ground is still poorly understood. However, field surveys (see Section 6) demonstrate that there are high levels of harvesting occurring, although trees in some areas are rested from harvesting for a year. Cuts are made on stems irrespective of the diameter of the stems or the size of the trees, and while this could be a worrying trend all age classes of trees based on both DBH and tree height were represented at study sites.

The Red List Assessment undertaken noted that the main reason for assessment as Vulnerable is based on the estimate of Thulin (2020) of no more than 10,000 mature individuals in the wild. This urgently requires verification, mapping and further monitoring of harvesting levels. However, at this point, it appears that this species does not currently meet the criteria for Listing in CITES Appendix II.

Boswellia ovalifoliolata

No surveys were undertaken on this species, and information is limited. It has been assessed as Vulnerable due to high levels of exploitation using damaging processes including substitution for the resin of *Commiphora wightii* and for this reason coupled with the estimated small area of occupancy and number of individuals within it this species is considered to meet the criteria for Listing in CITES Appendix II (see also CITES PC25 Inf.07). This species should undergo a detailed population, harvesting and trade assessment coupled with information gathering on the relationship with trade in *C. wightii*. This will require the use of resin chemistry technology to identify resins in trade, coupled with the use of HS 13019032 with a requirement to annotate trade with the species name.

Boswellia papyrifera

It has been well documented that there is widespread over-harvesting of this species in large areas leading to reductions in reproductive capacity evidenced by over mature age structured populations and in many areas surveyed an absence of seedlings and young trees. This

evidence comes mainly from three of the nine range states – Eritrea, Ethiopia and Sudan. It is not entirely clear whether these states represent the majority of harvested resins, or whether international trade is significantly higher than local trade and use, although Ethiopia is widely considered to be the major exporter of *B. papyrifera* globally. As such, it is considered that this species meets the criteria for Listing in CITES Appendix II.

Boswellia sacra

High levels of resin harvesting have been reported for this species, especially in Somaliland and Puntland. Data from recent surveys in Somaliland indicate that while resin harvesting is ongoing it is not as intense as on trees in Yemen. However, the majority of trees are in smaller size classes indicating that these populations are not over mature. Tree density, while not accurately measured, appeared much lower in Yemen. Surveys from an alternate research project are ongoing in Oman; these data may or may not be comparable with that presented in Section Six.

This species is relatively widespread in Oman, Somalia and Yemen. There is currently little evidence of long-term reproductive failure in this species compared, for example, to *B. papyrifera*. However, numerous reports suggest unsustainable levels of harvesting in Somalia affecting tree health and survival, and excessive tapping against local customary practices. Demand for its resin is high and international trade in this species, and under the name *B. carterii*, is very large and for this reason it could meet the criteria for Listing in CITES Appendix II. Additional surveys are recommended in both Yemen and in Somaliland and Puntland to be compared with data from Oman when available.

Boswellia serrata

This species is considered to be endemic to India, although historical (Sri Lanka) and recent unconfirmed (Pakistan, Iran) records suggest it may occur in other areas. In India, based upon both geo-referenced occurrences and species distribution modelling it is a widespread species with a significant standing crop for resin production. It is reported that the species is present in 17 Federal States in India and that detailed population assessments have been conducted in seven of them leading to a population estimate of in excess of 44 million trees although how these data were calculated is not apparent (see CITES PC25 Inf.7). Brendler *et al* (2018) estimate that the market demand for *B. serrata* resin exceeds that which can be sustainably harvested but the direct relationship between trade quantity and trees on the ground is difficult to estimate.

This species is extremely widespread, and in some localities, it is reported as being sustainably managed with reinforcement programmes ongoing. There is no evidence that over-harvesting is having a direct and significant impact on this species that can be directly related to international trade and as such *B. serrata* does not meet the criteria for Listing in Appendix II, although it is noted that this could change quickly if demand increases as large markets exist locally and globally. Routine monitoring and data collection to verify its status and harvesting levels more widely is recommended.

It has been noted that large numbers of individuals and communities depend on resin harvesting for a significant proportion of their income. A proposal to list any species on CITES Appendix I or II would be detrimental to these livelihoods due to the fact that current CITES trade suspensions in certain range states would effectively reduce exports and subsequently household income and as result reduce the value of frankincense trees to those communities. While such arguments are well made, the regulation of trade is designed to ensure that sustainable trade is possible in the long term rather than degrading populations in the short term for financial gain. The fact that CITES trade suspensions are currently in force for

Somalia (affecting any CITES listed taxa also in Somaliland and Puntland as these states are not recognised by the United Nations), Oman, and in Djibouti (affecting exports from Ethiopia and elsewhere as a large proportion of Ethiopian exports are routed through Djibouti) should be a temporary impediment and can be overcome by targeted partnerships with countries to work towards overturning trade suspensions, allowing for sustainable trade in natural resources in the long term. Some countries are already actively seeking to reduce their dependence on a single export route, and development of a range of port facilities is occurring, for example, at Port Sudan (Sudan), Massawa (Eritrea) and Bosaso (Puntland) amongst others. Further, a listing in Appendix III would not be subject to trade suspensions if the products remain in customs control at the exporting port (see section 8.3).

The situation with several species of frankincense is that they meet the criteria for listing in CITES Appendix II. Issues of implementation and administration can be overcome to allow CITES listing to operate in terms of capacity development in sustainable harvest and trade alongside regulation to ensure long term sustainably sourced frankincense for the benefit of local communities.

Section 8.3

Can frankincense benefit from an Appendix III listing?

Trade in Frankincense

It is almost impossible to track the trade in frankincense with any degree of accuracy, due in part to the lack of specific globally accepted HS codes, widely varying estimates of trade using an assortment of different factors, and substantial regional cross border trade and domestic use. Aggregated with other gums, resins and balsams under HS code 130190, with other resinoids under code 330130 and with other essential oils under 33012941, trade can only be estimated by identifying species likely to be included in the HS code which originate from specific countries - which is an inaccurate measure based on numerous assumptions. Without accurate data, it is difficult to establish if international trade is one of the factors driving population decline and leading to concerns over unsustainable harvesting.

Appendix III

A listing in Appendix III could be a potential way forward as it is a means of gathering trade data and other relevant information to determine the impact, if any, of international trade on native populations. Parties can gain global co-operation and support from other countries in monitoring trade in species that are already subject to national legislation and management regimes in that country. As well as volume of trade it can help identify trade patterns and destinations that were previously unknown. Analysis of this information can then help to determine if a species needs to be subject to stricter regulation, such as moving to Appendix I or II, if trade can be controlled without further monitoring, or whether indeed a species should remain on Appendix III to gather additional data. This analysis is of course dependent on receiving data from other Parties, which is not always forthcoming. However, the listing process is less stringent than that for Appendix I or II, the permitting requirements are easier, and it can be done unilaterally by the Party at any time, which is particularly useful when trade surges in a species of concern.

The use of Appendix III was last discussed at CoP18 when Parties adopted significant amendments to the Resolution to try to increase the understanding and the use of Appendix III. When considering using Appendix III, it is necessary to take into account both the provisions of the Convention and Resolution Conf. 9.25 (Rev. CoP18) on *Implementation of the Convention for species in Appendix III*.

Conditions for listing

The conditions for a listing are set out in Res. Conf. 9.25 (Rev. CoP18) on *Implementation of the Convention for species in Appendix III*, which notes that a Party ensure that:

i) the species is native to its country.

ii) its national regulations for the conservation of the species are adequate to prevent or restrict exploitation and to control trade, and include penalties for illegal taking, trade or possession and provisions for confiscation.

iii) its national enforcement measures are adequate to implement these regulations.

If a species is endemic to one country, it is easier for a country to place it in Appendix III and effectively enforce the listing. However, identification is key to the success of the regulation, particularly if the main products in trade are parts or derivatives of a species, such as resin or essential oil. Without identification tools the listed species could be traded under the name of a non-listed species, thereby largely invalidating the regulation.

It is possible to list a species that is native but occurs in more than one country. Paragraph 1 c) of the Resolution recommends Parties considering the inclusion of a species in Appendix III '*inform the Management Authorities of other range states, the known major importing countries, the Secretariat and the Animals Committee or the Plants Committee that it is considering the inclusion of the species in Appendix III and seek their opinion on the potential effects of such inclusion.*' However not every range State might agree to the listing and as a result illegal trade through range states that have not listed the species could occur.

Paragraph 3 also recommends that '*unless there is an urgent need for inclusion, a Party intending to include a species in, or delete a species from, Appendix III inform the Secretariat of its intention at least three months before a meeting of the Conference of the Parties, in order that the Parties are informed of the amendment in time to ensure that it enters into force on the same date as amendments to Appendices I and II adopted at the meeting;*' however, this is just a recommendation and the resolution allows for Parties to notify the Secretariat at any time.

The text of the Convention should also be consulted: Article II (3) stipulates that '*Appendix III shall include all species which any Party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation, and as needing the co-operation of other Parties in the control of trade.*' Article XVI (4) states that '*Any Party submitting a list under the provisions of paragraph 1 of this Article shall submit to the Secretariat a copy of all domestic laws and regulations applicable to the protection of such species.*'

Permit Requirements

According to Article V (2) only range states who listed their native species on Appendix III are required to issue export permits and to make legal acquisition findings (LAFs). Non detriment findings (NDFs) are not required. Annex 2 of Res. Conf. 9.25 (Rev. CoP18) sets out the permit requirements in the case of Appendix III-listing. It is important to differentiate between whether a species is included in Appendix III or only a specific population of a species to identify the permit requirements from each country – see Table 8.1.

Use of Appendix III by Parties

Appendix III is used frequently for fauna, with 372 species and 22 subspecies of mammal, reptile, bird, amphibian, fish and invertebrate currently listed (January 2025), but until recently, when South Africa listed a large number of succulent plants in 2023, it has been rarely used for plants. Currently 134 species and one variety are listed in this Appendix. Five of these

species were listed in 1975 at the request of Nepal; since an assessment carried out in 2015 for the EU Scientific Review Groups, which showed little to no trade in these species, no further trade has occurred since that date in wild collected *Magnolia liliifera var. obovata*, *Meconopsis regia* and *Tetracentron sinense* and only 3 and 5 records respectively of scientific trade in *Gnetum montanum* and *Podocarpus neriifolius*. Due to the lack of trade, an evaluation of the effectiveness of the listings may be warranted and it could be that it is appropriate to consider removing these species from Appendix III. It will be useful to review data gathered following the listing of succulent plants by South Africa when it becomes more widely available.

Type of Appendix-III listing	Exporting or re-exporting State	Permitting requirements	Provision of the Convention
1. A species is included in Appendix III wherever it occurs	1.1. Export from any State which has included the species in Appendix III	Prior grant and presentation of a CITES export permit issued by the Management Authority of the State of export.	Article V, paragraph 2
	1.2. Export from any State other than the State which has included the species in Appendix III	CITES certificate of origin issued by the Management Authority of the State of export.	Article V, paragraph 3
	1.3. Re-export from any State of specimens of species included in Appendix III	CITES re-export certificate issued by the Management Authority of the State of re-export.	Article V, paragraph 4
2. Only a national population of a species is included in Appendix III	2.1. Export from any State which has included its population in Appendix III	Prior grant and presentation of a CITES export permit issued by the Management Authority of the State of export.	Article V, paragraph 2
	2.2. Re-export of specimens that originated in a population that is included in Appendix III	CITES re-export certificate issued by the Management Authority of the State of re-export.	Article V, paragraph 4
	2.3. Export or re-export of specimens that originated from a population that is **not** included in Appendix III	No CITES document is required.	N/A

Table 8.1. Decision table on permitting requirements for Appendix III listings.

Appendix III for Parties subject to a recommendation to suspend trade

If a Party is subject to a recommendation to suspend trade, it will depend on the exact wording of the recommendation whether other Parties can accept trade in the Appendix III listed species from the Party concerned. In most cases, the Standing Committee would have recommended *a suspension of trade in specimens of CITES-listed species [for commercial purposes].* This means that trade in species included in Appendix III which requires a CITES

document (an export permit, a re-export certificate or a certificate of origin etc.), would be covered by the recommendation to suspend trade and therefore trade in the listed species should not be accepted by other Parties (depending on the annotation).

Article VII of the Convention sets out *Exemptions and other special provisions relating to trade*, where the provisions of Articles III, IV and V do not apply. These include exemptions for personal and household effects (which may be implemented differently, if at all, by Parties), for artificially propagated specimens, and for specimens in transit or transhipment, through or in the territory of a Party while the specimens remain in Customs control. This means that exports from country A through country B (which is subject to a trade suspension) to country C is possible as long as the shipment remains in customs control in country B.

Appendix III for frankincense species

The key condition of an Appendix III listing that will affect range states of *Boswellia* species is that the species has to be already subject to existing national legislation, such as national forest policies or area-based conservation measures, as the listing will only serve to reinforce or support such legislation. This legislation should also include penalties for illegal trade and provision for confiscation, as well as effective enforcement measures. No specific active legislation can be found related to the management and trade in *Boswellia* species, only that which relates to forest management and conservation. Kenya has recent legislation - The Forest Gums and Resins Rules (2021) (under the Forest Conservation and Management Act, 2016) - which sets out the conditions for sustainable production and utilization of gums and resins, but at the time of writing this has not come into force as it is yet to be gazetted. It includes the requirement for a licence and makes it an offence to trade in illegally obtained specimens, but the penalties are inadequate and only involve a revocation of the licence. The lack of such legislation means that the criteria for listing on Appendix III are not met.

The transit and transhipment exemption implies that it may be possible for Ethiopia to trade *B. papyrifera* through Djibouti if the product remains in control of customs. However, it is likely that the poor governance, weak enforcement and porous borders that exist in these countries renders this exemption almost impossible to implement.

It is therefore considered unlikely that an Appendix III listing is a realistic option for range States of *Boswellia* species at this time. However, the benefits of such a listing are obvious, and development of appropriate legislation coupled with work towards lifting trade bans in range states and exporting partners is strongly recommended.

Section 8.4

Species level listing on CITES Appendix III

Endemic species on the Soqotra Archipelago (Yemen)

As noted above, there is currently little trade in frankincense resins from Soqotra endemic species. However, a rapid increase in demand is plausible, alongside the extremely limited number of trees and also the illegal export of seeds and living plants from Yemen – species described as recently as 2020 and numbering no more than a few hundred individuals globally can already be purchased online as seedlings in Europe.

Listing endemic Soqotra species in Appendix III would be beneficial as it would allow for targeted training in Yemen and on Soqotra – already a objective for the Environment Protection Authority of Yemen – and collection of information on even limited harvest and trade that could quickly threaten population levels if not regulated.

Narrow endemic taxa in northeast Africa

These narrow range species are not traded in significant amounts and there is no evidence that international trade poses a direct threat to persistence. Additional factors are likely a more significant threat. However, *B. occulta* is known to be included in harvesting on other widely traded taxa, and such a Listing in CITES Appendix III would be beneficial and would target identification of this species in mixed collections. In addition, this would enable targeted education for harvesting communities and extensive surveying of *B. occulta* populations to determine threat levels directly before decision making on conservation actions.

B. microphylla, B. neglecta and *B. rivae*

As noted above, harvesting resins from these three species is not damaging to the trees directly, and as such the amount of resin collected is smaller. Although trade is increasing in *B. neglecta* and *B. rivae*, this trade is naturally limited by the low level of resin exuded naturally although these widespread species could still form a large proportion of trade. As this trade would not be a direct threat to trees it is unlikely a Listing in CITES Appendix III would be useful. Additional threats such as use for fencing, fodder and charcoal production are likely more significant, and in fact resin harvesting and sales have the potential to reduce other threats by adding value to the trees.

B. dalzielii

It would be beneficial to include this species in CITES Appendix III to monitor trade increases, alongside local surveys and licensing systems to gather a more complete picture of use, harvesting and trade in this species. *B. dalzielii* is native in at least ten countries and the potential for a co-ordinated approach is high. It is also noted that an increase in the monetary value of trade may attract the attention of insurgent groups requiring additional funds, as has been the case in the tropical timber trade in some areas.

B. frereana

The resin from this species is highly prized and is traded internationally. However, it is difficult to assess how this trade affects trees directly and what proportion of harvesting is for local use. Any significant trade has the potential to damage the entire population as it grows in a restricted area and has been estimated to harbour a relatively small number of individuals. This means that any increase in trade could have rapid and devastating effects. Listing in CITES Appendix III and additional surveys and monitoring locally would allow estimation of the level of threat and enable monitoring of changes in trade amounts, but with the caveat that this would involve legislation and implementation in the autonomous States of Somaliland and Puntland.

B. papyrifera

This species meets the criteria for listing in CITES Appendix II. However, if such a proposal was rejected, consideration should be given to Listing in Appendix III by some range States. This is especially true in states about which little is currently known about distribution, levels of harvesting or trade but recognising that significant trade occurs on other countries and could expand as demand increases and opportunities for trade in different locations becomes desirable. If production is indeed under threat due to over exploitation in the three range States previously studied this could easily move to other range States in a relatively short time to meet increasing demand.

Section 8.5

Sustainable trade in gums and resins

It is plausible that the way in which international trade in gums and resins is regulated to benefit long-term persistence for community benefits and conservation purposes may require different approaches, of which *Boswellia* is a case study. Similar arguments apply to taxa such as *Commiphora* (myrrh), *Senegalia* spp. (gum Arabic), *Dracaena* (Dragon's Blood) and even aloes, the latter often being destructively sampled and hence listed in Appendix I and II but sharing some of the issues with frankincense such as identification in trade and a dearth of information on wild harvested populations. This is because methods of monitoring are different, for example, to species that are removed for timber or are harvested destructively such as salep orchids.

All resins and gums have the potential to be harvested sustainably, but also over-harvesting has the potential – and has been demonstrated - to damage populations long term which eventually will lead to local extinction and a reduction in benefits to those communities that rely on them. Identification of gums and resins in trade is also a complicating factor as current systems are not accurate and could not be used in legal proceedings where illegal export, import or adulteration are suspected.

This programme of work has taken the frankincense trade and demonstrated methods for identification of traded goods, identification and monitoring in the field, and stated which species meet the criteria for CITES listing in order to implement CITES protocols and methodologies in ensuring sustainably harvested and traded products. These methods should be examined in detail and discussed by the CITES Secretariat and community as it relates to trade in all gums and resins globally.

It is recommended that the CITES Plants Committee set up a Working Group on trade in gums and resins.

Section 8.6

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