

**PROJECT TO THE
Convention on International Trade in Endangered Species (CITES):
“Supporting sustainable management of endangered tree species”¹**

Submitted by: National Museums of Kenya

Endorsed by the CITES Management Authority of: Kenya

TITLE of Project: Conservation and Sustainable Management of *Osyris lanceolata*, for Economic Development in East Africa

SUMMARY (objectives, outcomes, etc.)

The East African Sandalwood, *Osyris lanceolata* is an evergreen shrub in family santalaceae, exploited for essential oils. It is threatened by anthropogenic factors, directly linked to trade and which require both national and international intervention. Listing of the species in Appendix II at CoP16 in 2013, for the populations of the Eastern African Range States, was a key step towards conservation and management of the species to ensure it does not become extinct, due to international trade. Conservation actions at the national and regional levels in the species range States are critical to the implementation of Appendix II listing. Understanding the management, ecological and exploitation status of *O. lanceolata* is vital in ensuring that, international trade and national utilisation of the species is non-detrimental to its survival in the wild/forests. East African Range States with unsustainable and illegal trade in the species are the focus of this project. The objective of this project is to: assess the current (management, ecological and exploitation) status of *Osyris lanceolata*, with the aim of ensuring that the international trade of products is not detrimental to the conservation of the resource in the wild/forests of range States. Expected outputs are: (1) the conservation status of wild populations and use of *O. lanceolata* and *look-alike* species are well assessed and documented; (2) NDF studies are undertaken and the impact of trade on the taxon in the wild is well known; (3) the capacity and skills of CITES authorities in these range states in making NDFs and identification of products are enhanced; (4) the management schemes for sustaining *O. lanceolata* as a resource for ecosystem security and economic development are developed and implemented.

EXECUTING / IMPLEMENTING AGENCY(IES): National Museums of Kenya

COLLABORATING AGENCIES: Kenya Wildlife Service (KWS), Kenya Forest Service (KFS), Tanzania Wildlife Division (TAWA)-CITES Desk, Tanzania Wildlife Research Institute (TAWIRI), Institute of Traditional Medicine-MUHAS, Tanzania Forest Services Agency (TFS), Tanzania Forest Research Institute (TAFORI) Uganda Wildlife Authority (UWA), National Forest Agency-Uganda (NFA).

DURATION (months): 24

PROPOSED START DATE: 1 February 2019

BUDGET AND PROPOSED SOURCE OF FINANCE:

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- (a) CITES Contribution (in US\$) 250,000
- (b) Government Contribution (specify both direct=\$00 and in-kind; =US\$115,076)
- (c) Other Sources Contribution (specify, in US\$) Kenya Forestry Research Institute (KEFRI) staff time=\$14,210

Banking information:

1. the name of the country	Kenya
2. the name of the implementing agency	National Museums of Kenya
3. Its address (Implementing agency)	P.O Box 40658-00100 GPO, Nairobi, Kenya
4. Its bank account details (Implementing Agency)	Account Name: National Museums of Kenya Bank: Standard Chartered Bank Kenya Ltd Branch: Westlands Account No.: 8708035107900 Swift Code : SCBLKENXXXX

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PART I: CONTEXT

This section is intended to provide background information on relevant issues related to the Project Proposal.

Origin/Background

East African Sandalwood (*Osyris lanceolata*), Hoehst (Santalaceae) is a semi parasitic evergreen tree. Osyris is a slow growing species that requires a host plant to grow to its full potential. Although it can be harvested at 15 years, it can take 40-50 years to mature. Its regeneration potential is low. In Kenya, field observations reveal very few young plants. Due to its parasitic nature, a host plant is crucial for its regeneration. Local, population sizes range from medium to sparsely spread in a limited area. The species occurs predominantly in arid and semi-arid habitats, in rocky sloppy sites in degraded areas or at forest margins. The species is thinly but widely distributed in sub-saharan Africa, from eastern to southern Africa. This plant is documented in Kenya, United Republic of Tanzania, Uganda, South Sudan, Rwanda, Burundi, Malawi, Mozambique, Ethiopia, Algeria, South Africa, Zambia, and Zimbabwe. The altitudinal range of the populations is 900-2700 m above sea level, but local populations are quite dispersed. In Kenya, the species is widely distributed in the Arid and Semi-Arid Lands (ASALs). It has been recorded in Amboseli, Baringo, Narok, Pokot, Turkana, Samburu, Kajiado, Gwasi Hills, Kitui, Chyulu hills, Kikuyu escarpment forest, Taita hills, Mt. Kulal, Marsabit, Makueni, Mbeere, Narok, Oldonyo Sabuk. In Uganda, the species is distributed in Karamoja, Kigezi, Mbale, (Elgon, Kaburorun). In Tanzania, the species has been recorded in Mbulu, Lake Manyara, Ufipa, Mbisi, and Songea.

Sandalwood is traded internationally for its fragrance (aromatic oils extracted from the heartwood and sawdust for making incense). Locally, its traded as timber for handicrafts and crude powder of roots for medicinal value. *Osyris* is the alternative source of santalum oil, referred to as false Sandalwood. Its oil has comparable properties to the true Sandalwood oil, though of different quality. However, this trade is largely unrecorded and unregulated and the countries in this region, going by their recent uncoordinated actions, for example, in Tanzania, four sandalwood processing factories were established and licensed in 2004. However, due to shortage of raw materials, three are closed down and only one in Babati, Manyara region is operational. This factory sources its raw materials from different parts of East Africa (pers. Comm. manager, Sierra Ltd, June 2012). Although trade in Sandalwood harvesting in the wild in Kenya was banned through a 2007 Presidential Decree, media reports indicate ongoing exploitation locally and in the region, indicating that sandalwood trade in Kenya is thriving in the black market. In 2011, Uganda authorized several shipments of *O. lanceolata*, some transiting through Kenya and others through United Republic of Tanzania. It is therefore not easy to assign the status of *Osyris* in this rather uncoordinated, unstructured and unregulated market. *Osyris* is a recent entrant into the santalum oil market. The destination markets include; Germany, South Africa, France, India, Middle East countries, United Kingdom, among others.

Osyris is a priority species of concern in illegal wildlife trafficking and has been barcoded under the Google Award Barcode of Wildlife and USAID PEER funded projects.

At the 16th Meeting of the Conference of the Parties to CITES, Bangkok, Thailand, 2013, the populations of *O. lanceolata*, of the Eastern Africa countries were listed in Appendix II. The listing followed consultations among the Eastern African range States and submission by Kenya of a proposal to the CoP, to include in Appendix II the East African Sandalwood. The Conference of the Parties, alongside the species listing, adopted Decisions 16.153 & 16.154 on actions for implementation to enhance the conservation of the species across its range.

At its 22nd Meeting, Tbilisi, Georgia, the CITES Plants Committee, reviewed reports on the progress made in implementation of Decision 16.153 and 16.154 and noted that, due to funding constraints, actions outlined in Decision 16.153 could not be fully implemented prior to CoP17 and enable the Plants Committee to substantively report at CoP17. Consequently, the Plants Committee recommended that Decision 16.153 and 16.154 be renewed at CoP17 to allow for their implementation. Further, the Plants Committee noted that since CoP16, there had been emerging issues relating to *O. lanceolata* and that revision of Decision 16.153 at CoP17 to include these emerging issues would be necessary. The 17th Conference of the Parties adopted Decision 16.153 (Rev. CoP17) and Decision 16.154 (Rev. CoP17), in essence renewing the mandate under those decisions. This, *inter alia*, directs the Plants Committee and Eastern African range States of *O. lanceolata* to gather information on the conservation status, trade in and use of the species, as well as assess what data is required to develop NDFs and identify mechanisms for capacity building.

At its 23rd meeting, the Plants Committee developed a realistic work plan, with appropriate milestones designed to carry out its mandate under Decision 16.153 (Rev. CoP17) inter-sessionally. This includes, gathering further information under part a) and assessing data required under part b) of Decision 16.153 (Rev. CoP17); and providing advice to the Secretariat on the consultative meeting described in part b) of Decision 16.154 (Rev. CoP17). If supported this project will significantly contribute to the implementation of Decisions 16.153 (Rev. CoP17) and 16.154 (Rev. CoP17). In addition, it will support the development and establishment, of a reliable national and regional mechanism for sustainable utilization of the species.

The countries in the project are member states of the East African Community (EAC), a regional Intergovernmental Organization of five Republics in the region. EAC aims to widen and deepen economic, political, social and cultural integration to improve the quality of life of its people, through increased competitiveness, value added production, trade and investments. The EAC acknowledges the importance of the diverse forests in the conservation of its biodiversity, but has decried the unsustainable exploitation, which has degraded and fragmented the forests, due to inadequate collaboration in forest management among the partner states, inadequate capacity in planning and program implementation and conflicting forest policies. The EAC is committed to provide stronger leadership post 2015, as echoed in outputs 1.1-1.4 of this CITES project. The supportive structures already exist in two EAC integration pillars i.e. customs union protocol and common markets which remain instrumental in attaining the outputs of this project.

The collaborating institutions are broadly the CITES Management and Scientific authorities and Forestry research institutes of the partner states. Underlying the missions of the forest management authorities of these partner-states (Uganda-NFA, Kenya-KFS and Tanzania-TFS), is the sustainable management of forests for development of the people of the region, through formulation or updating as appropriate, policies for conservation and management of forest and tree resources including *O. lanceolata* species.

Osyris lanceolata in East Africa is categorized as wild flora-not domesticated, and is harvested chiefly from the wild, private farms or communal lands. It is additionally under the management of the respective wildlife authorities in the region. As such, CITES Management and Scientific authorities (KWS, TAWA, UWA, TAWIRI and NMK), will be keen in ensuring the delivery of outputs on 1.1-1.3 of the project and creating awareness on the role of CITES.

NMK, the project proponent is Kenya's CITES Scientific Authority. Her mandate is to promote the conservation and sustainable utilization of national heritage through generation, documentation and dissemination of research and collection management knowledge, information and innovations. Together with other research institutions including KEFRI, MUHAS, TAWIRI, they are key for outputs 1.1 and 1.4, to mainstream forest production in and contribute directly to the economic pillar in Kenya's vision 2030, a strong and competitive economy in Tanzania Development Vision 2025 and by extension the economic growth of EAC.

Therefore, the collaborating agencies will collectively contribute towards CITES Tree Species Programme outcomes in the EA region by virtue of their institutional and national mandates of sustainable natural resource management, trade regulation, policy formulation and provide their rural communities with tangible incentives to conserve the species while improving their livelihoods.

PART II: THE PROJECT

1. Project Goal and Objectives

The goal is to ensure that international trade in *Osyris lanceolata* is consistent with its sustainable management and conservation

The specific objective is to assist the participating states (Kenya, Tanzania, Uganda) make relevant assessments for formulating NDFs of *Osyris lanceolata*

2. Justification

2.1 Problems to be addressed

Osyris lanceolata has recently entered the international market as a substitute of the traditional sandalwoods (*Santalum* spp.). The species provides high value essential aromatic oil used as fragrance and cosmetic ingredient. Wild-harvested Sandalwood is illegally poached, smuggled and exported as a substitute to the Asian Sandalwoods. The main part being exploited is the heart wood mainly from the root and the stem, for extraction of essential oil as main derivatives. All parts of the plant have uses. The heartwood is used for extraction of essential oil, the stem for timber and wood carving. Exclusive harvesting from wild sources and the growing international market with attractive prices is a threat to the species growing in the wild/forests in East Africa. Prior to entering into the international commercial market, East African Sandalwood was used locally for timber, carvings, fuelwood and for herbal medicine. Trade was first reported in Kenya in 2004, when traders were found ferrying lorry loads of 'firewood' to Tanzania through Namanga, the shared border. The massive and unsustainable exploitation that had started in pockets in south and south east Kenya, rapidly spread to the Central rift valley region. A blanket ban on harvesting and trading was imposed in Kenya in 2007 via, Legal Notice No 3176 of 2007. There are however cases of illegal trafficking and trade, as evidenced by current and frequent seizures and confiscation by the law enforcement agencies. Between 2007-2011, over 200 tonnes of Sandalwood were confiscated by Kenyan Law enforcement agencies while in transit. The latest sizeable seizure in Kenya, of such materials was on 17 October 2016, weighing 27.7 tonnes, while in 2011, 10 tonnes of illegally harvested sandalwood logs were impounded in Tanzania.

The harvesting regime is unsustainable, usually by debarking/uprooting, and the product often disguised as firewood, coupled with habitat destruction, leading to decline in populations. Furthermore, *O. lanceolata* is neither categorized as threatened nor vulnerable under IUCN RedList criteria. Kenya has reported massive uncontrolled wild harvesting, while in Tanzania, a sandalwood factory in Tanga closed due to scarcity of raw materials. There are serious law enforcement challenges with respect to *O. lanceolata* trade in the region, due to limited awareness by the Forest agencies and the Customs. Its therefore apparent that, trade in East African Sandalwood and the non existing and/or inadequate cooperation cross-border trade regulation, make the species vulnerable. The region urgently needs to put in place the requisite collective trade policy and other enablers for sustainable exploitation to improve local livelihoods as well as ensure conservation of the.

The high demand for the Sandalwood oil and restricted access to traditional sources due to diminishing populations has led to overexploitation of *O. lanceolata*, the alternative source. India, Indonesia and Australia are the main producers of Sandalwood oil while the United States and France are the two largest importers of Sandalwood oil. There are no clear records on trade of the *Osyris lanceolata* but it is estimated that 1, 000 tonnes are annually harvested from Africa, mostly from East Africa. It has been projected that, the East African Sandalwood is going

to contribute significantly to global Sandalwood oil trade in the coming 5-10 years. Currently, trade on *O. lanceolata* is exclusively harvested from the wild. The study reveals that most of the wild species population are of old generation with poor recruitment rates (Mothogoane 2011; Kavaka et al.2012; Mwangingo et al. 2007). There are no established artificial propagations in the species range States but in Kenya, KEFRI is in the process of refining technology of raising Sandalwood seedlings. The status of *Osyris lanceolata* has not been established to guide sustainable harvesting. Only recently, Kenya and Tanzania initiated species status assessment surveys. Lack of artificial propagation programmes to supplement the wild populations, inadequate data on species population status and ecological functions in ecosystems, poor recruitment rate, and unsustainable harvesting are major threat to the survival of the species in the wild, unless appropriate control measures including appropriate policies and other enablers are put in place.

Domestication of Sandalwood can reduce pressure on wild populations, provide markets with sustainable stocks, generate revenues and improve livelihoods. The species is a candidate tree for agri-business and can spur income growth from the rural areas. Kenya has developed propagation technology for production of Sandalwood seedlings through seeds and air-layering as the first step in supporting domestication of the species. Kenya and Tanzania also initiated species status surveys, with preliminary results indicating inadequate data on species population status and ecological functions in ecosystems, poor recruitment rate and unsustainable harvesting, as major threats to the survival of the species in the wild.

The listing of *Osyris lanceolata* in CITES Appendix II is a major contribution to the conservation of this species in East African countries. This act has drawn the attention of the national and international communities to the dangers of uncontrolled exploitation and export of *Osyris lanceolata*. A fundamental obligation of CITES member countries, prior to any export of a product listed in Appendix II of this Convention, is a non-detriment finding-NDF. This report must be issued by a credible scientific authority, which certifies that the export volume requested by the country is not detrimental to the conservation of this species in forests. This document requires factual information on the location, distribution, stock, growth, and ecology of the said species. This kind of information is often difficult to obtain, thus making the production of this report tedious. Another obligation is that the CITES Management Authority must certify that the volumes exported have been legally obtained; but often there are problems of technical capacity to better ensure control and monitoring.

There is therefore an urgent need to regulate the international trade in *O. lanceolata* to ensure exploitation is not detrimental to the survival of the species in the wild, and more importantly to promote its sustainable production through domestication. To achieve this, there is critical need for international cooperation within the framework of CITES.

2.2 Intended situation after Project completion

At the end of the project, it is anticipated that, protocols for sustainable management and regulated use of *O. lanceolata* and products will be developed to strengthen forest governance in the three EA range States. The proposed training will increase capacity for adaptive management based on best scientific information. Promotion of traceable wild-source and cultivation-sourced *O. lanceolata* will reduce pressure on wild populations; engender legal, traceable and fair trade, for the benefit of rural communities. Ultimately, this collaborative approach will strengthen inter-agency and cross-boundary management of trade in *O. lanceolata* and other shared bio-resources. Therefore, the expected impacts will be:

- Sustainably managed and regulated use of *O. lanceolata* and their associated ecosystems
- Increased knowledge of the status of the species in the wild, use and trade.
- Policy decisions informed by scientific information and expertise

- Enhanced traceability of products along the trade chain
- Increased revenue generation for improved livelihoods based on local bio-resources

2.3 Target beneficiaries

Beneficiaries include but are not limited to: Resource Managers; Law Enforcement Agencies; CITES, CITES SA and MA; National and County governments; Communities; Private Investors/Sector, EAC and Importing countries. The majority of the project team represent key institutions that are beneficiaries of the project outputs and who have endorsed the project. A few exceptions will be incorporated during the stakeholders' workshops.

2.4 Risks

Activity	Assumptions	Risk	Mitigation
Planning	Agreed project governance and roadmap	Lack of consensus and quorum	Consensus building, prior consultation and transparency
Activity 1.3: Drafting and Validation of the ToRs of experts;	Existence of experts	Lack of expertise and unwillingness to participate	Allow adequate time for scouting for experts
Activity 1.4: Establishment of <i>ad-hoc</i> Scientific Committee	Existence of experts	Lack of expertise and unwillingness to participate	Allow adequate time for scouting for experts
Activity 1.5: Identifying discipline specific experts;	Existence of experts	Lack of expertise and unwillingness to participate	Allow adequate time for scouting for experts
Activity 1.6: Launch <i>O. lanceolata</i> project in each country	Availability of funds, prompt procurement	Delays in procurement and travel restrictions	Allow adequate time for procurement and participant travel
Activity 2.1. Conducting a detailed account on the research activities and relevant topics related to the biology and ecology of <i>O. lanceolata</i> in each country Including	Availability of literature	Lack of relevant information	Allow adequate time for information search
Activity 2.2. Account on conservation, management-control and traceability of <i>O. lanceolata</i> in each country	Availability of literature	Lack of relevant information	Allow adequate time for information search
Activity 2.3. Developing a strategy to improve management of the species	Cooperation of resource managers and other stakeholders	Unwillingness to participate/cooperate	Consensus building, prior consultation and transparency
Activity 3.1: Conducting forest inventories, management measures, production with a view of proposing harvesting quota	Scientists and resource managers available, funds available	Political instability/interference, adverse weather conditions, delays in procurement Political instability/interference, adverse weather conditions, delays in procurement	Plan for multiple field work
Activity 3.2: Conducting a detailed study on production, harvesting, processing, transport, trade, control and monitoring of <i>O. lanceolata</i> with a view of establishing a fair tracking/control system	Availability of funds, prompt procurement Political stability/non-interference, predictable weather patterns	Political instability/interference, adverse weather conditions, delays in procurement	Plan for multiple field work, and allow adequate security and time for acquisition of baseline data

3.3. Activity Monitoring and evaluation of management parameters (continuous process) PSP	Availability of funds, prompt procurement Political stability/non-interference, predictable weather patterns	Political instability/interference, adverse weather conditions, delays in procurement	Plan for multiple field work, and allow adequate security and time for acquisition of baseline data
Activity 4.1. Identification of trainees for basic systematics from participating countries	Availability of funds Political stability in country/region Willingness of trainees to undertake training	Delays in procurement and travel restrictions, availability of trainers/trainees	Allow adequate time for procurement, trainers and participant travel.
Activity 4.2. Training for voucher collection, conventional identification and DNA analysis	Availability of funds, trainers, trainees Political stability in country/region Willingness of trainees to undertake training	Delays in procurement and travel restrictions, availability of trainers/trainees	Allow adequate time for procurement, trainers and participant travel.
Activity 4.3. Facilitate development of document-based tracking system in establishment of chain of custody for <i>O. lanceolata</i> for traceability	Existence of experts	Lack of expertise and unwillingness to participate	Allow adequate time for scouting for experts
Activity 4.4. Project Midterm Review	Agreed project progress and roadmap	Lack of consensus and quorum	Consensus building, prior consultation and transparency
Output 5: Silviculture and domestication of <i>O. lanceolata</i> well known	Available expertise, willingness to uptake the initiative Funds available	Unwillingness to participate Delays in procurement	Building trust and work with local experts and other relevant bodies
Activity 5.1. Awareness creation and sensitization about the value and ABS amongst stakeholders including rural communities	Available expertise, willingness to participate Funds available	Unwillingness to participate	Building trust and work with local experts and other relevant bodies
Activity 5.2. Identification and selection of pilot production sites	Availability of plots and funds	Lack of plots, delays in processing of funds and procurement	Allow for adequate time to identify the plots, procurement
Activity 5.3. Training of trainers in Silviculture of <i>O. lanceolata</i> including seedling production and planting	Available expertise, willingness to participate Funds available	Unwillingness to participate	Building trust and work with local experts and other relevant bodies
Activity 5.4. Develop and promote sustainable harvesting methods	Available expertise, willingness to participate Funds available	Unwillingness to participate and implement	Building trust and work with other relevant bodies
Activity 5.5. Promote/empower rural community participatory forest resource management	Available expertise, willingness to participate Funds available	Unwillingness to participate	Building trust and work with local experts and other relevant bodies
Activity 6.1. Training of trainers for NDFs and CITES tools	Availability of funds, trainers, trainees Political stability in country/region Willingness of trainees to undertake training	Delays in procurement and travel restrictions, availability of trainers/trainees	Allow adequate time for procurement, trainers and participant travel.
Activity 6.2. Based on outputs 2, 3, 4, 5; draft NDFs and a subsequent realistic	Available expertise, willingness to participate	Unwillingness to participate	Allow adequate time for scouting for experts

action plan/roadmap			
Activity 6.3. End of Project Workshop	Willingness to participate	Lack of consensus and quorum	Consensus building, prior consultation and transparency

3. Outputs

Specific Objective: To assist the participating states (Kenya, Tanzania, Uganda) make relevant assessments for formulating NDFs of *Osyris lanceolata*

- Output 1. Establishment of coordination team and relevant Committees of the project;
- Output 2. Status (research, management, ecological, and exploitable, control and monitoring, including ABS) of *Osyris lanceolata* in each country well established
- Output 3: Research relevant to management such as standing stock and quota setting for some selected sites well defined
- Output 4: Mechanisms for Identification/verification and, traceability established
- Output 5: Silviculture and domestication of *O. lanceolata* well known
- Output 6: NDF report and realistic action plan well developed and implemented

4. Activities/Methodology

Output 1. Establishment of coordination team and relevant Committees of the project;

The first activity in this project is the establishment of coordination team and relevant Committees of the project

- Activity 1.1: Establishment of Regional and National Technical Committees (NTCs)
- Activity 1.2: Reviewing the project work plan;
- Activity 1.3: Drafting and Validation the ToRs of experts;
- Activity 1.4: Establishment of ad-hoc Scientific Committee
- Activity 1.5: Identifying discipline specific experts;
- Activity 1.6: Launch *O. lanceolata* project in each country

Output 2: Status (research, management, ecological, and exploitable, control and monitoring, including ABS) of *Osyris lanceolata* in each country well established

Method

The status will be established mainly through literature review (articles, thesis, reports of activities of the forest concessions, activity reports of the agencies in charge of forest management such as forestry departments, documents of management plan of forest concessions, inventories and trade reports etc..). This will be conducted on: research, forest development issues, exploitation issues, monitoring, control etc. The details of the tasks will be specified in the Terms of references (ToRs) that will be formulated for each study by the regional coordination and validated by the respective ad-hoc Scientific Committee to be settled as described here after.

- Activity 2.1. Conducting a detailed account on the research activities and relevant topics related to the biology and ecology of *O. lanceolata* in each country including
- Activity 2.2. Conducting a detailed account on conservation, management, harvesting regimes, transport, and trade regulation (control and traceability) of *O. lanceolata*.
- Activity 2.3. Developing a strategy to improve management of the species

Output 3: Research relevant to management such as standing stock and quota setting for some selected sites well defined

Method

Field Methods:

Forest inventories

Forest inventories will be conducted in selected sites based on the results of the status. (The small budget allocated cannot allow to conduct forest inventories in the whole extend area of *O. lanceolata* in each country).

Preliminary localities for the study area will be based on information in Herbaria collections and the literature such as the Flora of Tropical East Africa. The geographical context will be more refined after the inventory of the populations and target areas decided using criteria to be agreed on/developed.

Collaborating institutions specifically charged with forest research (KEFRI, TAFORI, NFA) in the region will carry out the field inventories of *O. lanceolata* and look alike species, in liaison with the CITES management and scientific authorities. Above ground biomass and standing volume are the two most important measures of assessing wood stock for subsistence and commercial production. However, direct computation of both is cumbersome. The general practice is estimating both per hectare, with the help of site-specific allometric equations based on actual dendrometric characteristics i.e. diameter and height, multiplied by the species expansion factor (pre-determined) to get volume per acre. For different populations, the total per acre volume for the different populations of *Osyris* and look alikes will be calculated by summing up the volume of each of the plot trees. Basal area is important in species density determination, but is also linked to stand volume and growth, hence important in management.

Then in parallel with these inventories, selected field research activities will be conducted (forest inventories, taxonomy, regeneration, establishment and growth, and others) as to refine management parameters. Botanical survey of *O. lanceolata* will be conducted in selected study sites to understand species distribution; natural stands, natural regeneration, and stocks, which represent a serious handicap for the forest administrations, who want to, build up strategies for the conservation of these tree species.

The information gathered in expected output 2 and output 3, with selected forest concessions evaluation of production including natural stand, processing, transport and trade of *O. lanceolata* will be evaluated to understand the trade chain process of the species.

Activity 3.1: Conducting forest inventories, management measures, production with a view of establishing harvesting quota;

Activity 3.2: Conducting a detailed study on production, harvesting, processing, transport, trade, control and monitoring of *O. lanceolata* with a view of establishing a fair tracking/control system

Output 4: Mechanisms for Identification/verification and, traceability established

Method

Herbarium voucher specimens and DNA samples of *O. lanceolata* and lookalikes will be collected for DNA analysis and bar-coding. Samples will be collected from vendors, customs, harvesters, transporters etc. These samples will be labeled and sealed in zip lock bags and taken to the DNA laboratory at the National Museums of Kenya for verification. The woody specimens will be identified with the help of wood anatomist, parataxonomists and literature. Verification will be based on the DNA reference library, wood identification manual, herbarium voucher collection, taxonomic literature.

Activity 4.1. Identification of trainees for basic systematics from participating countries

Activity 4.2. Training for voucher collection, conventional identification and DNA analysis

Activity 4.3. Facilitate development of document-based tracking system in establishment of chain of custody for *O. lanceolata* for traceability

Output 5: Silviculture and domestication of *O. lanceolata* well known

Domestication

Currently *O. lanceolata* is not one of the popular on farm tree crops, neither are its commercial benefits in the domains of local economies. For fair adoption of the planting skills by the communities, the project will sensitize its economic benefits in the light of international market and the avenues for quick financial returns. This necessitate assessment of the socio-economic dimensions including understanding, perception, attitudes, sizes of the available individual farms, land tenure, competing economic potentials, demographic factors, land management & decision making power and all other social constraints most likely to constrict fast adoption. Growing *O. lanceolata* either in monoculture or mixed stands is a skillful endeavor involving underground parasitic plant associations. Following these required skills, designated agencies such as National Tree Seed Agency, KEFRI and other research institutions with facilities and skills in seed management and plant development will be sub contracted to train ToT for long term and sustained ex-situ and in-situ establishments. The training will target managers of forest reserves, public forests, village lands and private investors. The long term and sustainable conservation of *O. lanceolata* is assured if target beneficiaries either individually or in groups are given competence in selection of quality planting materials, field establishment skills, value addition and competence in accessing the markets. Local communities residing in the areas predominantly supporting populations of *O. lanceolata* are the primary target in this project

Activity 5.1. Awareness creation and sensitization about the value and ABS amongst stakeholders including rural communities

Activity 5.2. Identification and selection of pilot production sites

Activity 5.3. Training of trainers in silviculture of *O. lanceolata* including seedling production and planting

Activity 5.4. Develop and promote sustainable harvesting methods

Activity 5.5. Promote/empower rural community participatory forest resource management

Output 6: NDF report and realistic action plan well developed and implemented

Method

NDF is a dynamic process which will be improved over time, as the management parameters of *Osyris lanceolata* are refined (AAM, DME, DFR, ect...) based on research activities. The information gathered in Expected outputs 1& 2 will be analysed by a small Scientific Committee, which will be set up under the supervision of the CITES Scientific Authorities in each country. The tasks of the Scientific Committee will consist of (1) validation the ToRs of experts drafted by the coordination team, (2) validating the reports dressed by experts, and (3) develop the NDF document with available data.

Trade on *O. lanceolata* is a cross border business though there is no authentic regional record on the same. Participating countries will explore and generate information individually on the current status, management, local and cross boundary trade and market routes through the NDF process.

Back ground information on the socio economic footprints of *O. lanceolata* utilization in the region will be generated from the species trade data majorly illegal trade data documented over a period of time. This information will provide details of those who have been involved in specimens of the species, the respective source areas and prices offered to those supplying the materials. Impacts of the harvesting to the environment and the livelihoods of the communities in those areas will

also be determined, Illegal trade data on the species for a given period of time in this case last 5 years since the listing of the species in CITES Appendices and maintained by the wildlife authorities in Kenya, Tanzania and Uganda will be analyzed to establish geographical locations of the harvesting sites

NDF is a science-based assessment that verifies whether a proposed export is detrimental to the survival of that species or not, will be carried out by CITES scientific and management authorities. This will be done with the help of a questionnaire based on: CITES CoP 15 Doc. 16.3, CITES CoP 16.7 (Rev. CoP 17), to assess the taxonomic status, conservation concerns, biological risk, assess harvest impacts, trade impacts and management measures in place. Information will be collected from CITES SAs and MAs, communities, traders, trade officers and other relevant stakeholders. It will be collated for NDF report.

Activity 6.1. Training of trainers to undertake NDFs

Activity 6.2. Based on outputs 2, 3, 4, 5; draft preliminary NDFs and draft a realistic action plan/roadmap

Activity 6.3. End of project Workshop

5. Work Plan

(See Annex 1)

6. Sustainability of Outputs after Project Completion

The capacity enhancement of forest resource managers will equip the project partners with the necessary skills to undertake NDFs, interpret the reports and identify products sourced from *O. lanceolata*. NDF data generated will inform harvesting regimes and trade quota setting, licensing and concession areas as Sandalwood Management Units. Subsequently, it will be integrated in development of national forest and wildlife management policies, action plans, targets and performance contracts as appropriate, in collaboration with relevant stakeholders, for legitimate sustainable wild harvesting of the species. This will serve as an as an incentive in the respective participating countries through facilitation of greater public awareness on the cultural, economic and social benefits for conserving the species. Ultimately, this collaborative approach will promote coordination and cooperation among the forest sectors in the region, in respect to the management of transboundary natural resources. These include institutional biodiversity research and resource assessment departments, monitoring, evaluation, reporting (including MEAs) and law enforcement units. Institutional resources will be availed with additional funding from donors and respective national governments. It will be done within the existing institutional frameworks i.e. infrastructure and personnel with additional staffing where necessary

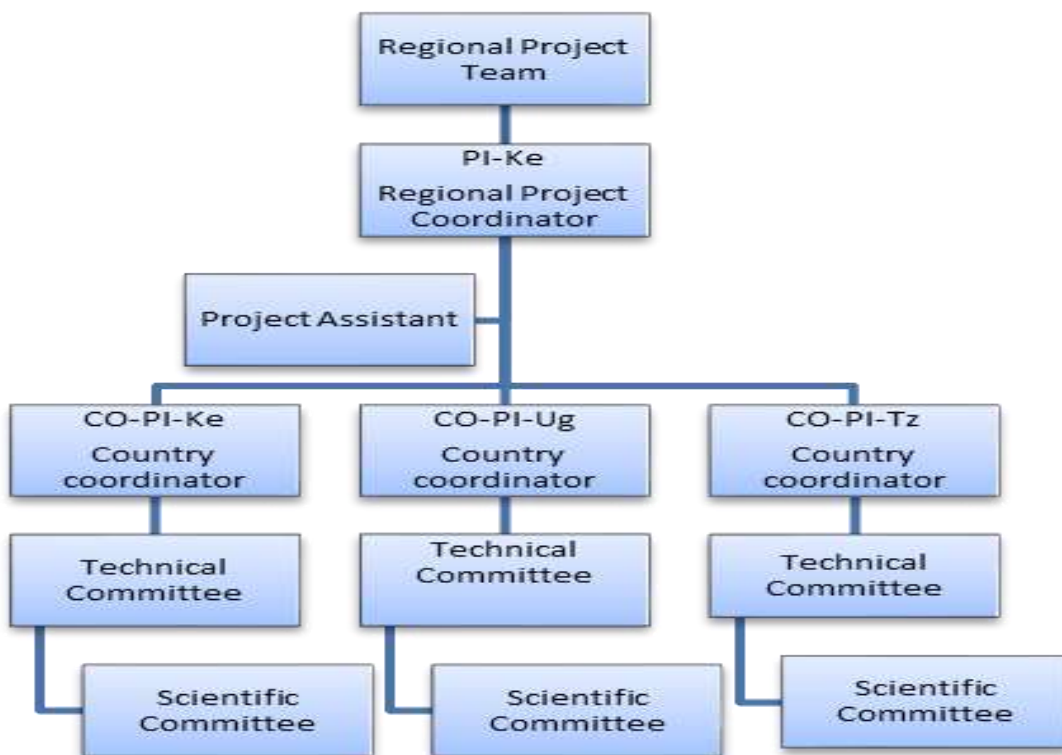
PART III: OPERATIONAL ARRANGEMENTS

1. Management Structure

The project will be implemented by the National Museums of Kenya (NMK) in collaboration with KWS, KFS, TAWA-CITES Desk, TAWIRI, MUHAS, TFS, UWA, TAFORI and NFA. NMK is a multidisciplinary Government Research Institution that plays a key role in biodiversity conservation in the region. NMK has structures in place to receive and implement grants through its accounting and procurement procedures. The Coordination team, led by an

experienced and competent scientist, will be based in Nairobi, Kenya, but will implement the project in the field in collaboration with research scientists, and resource managers from the three countries. A Regional Project Team (RPT) will be established to oversee the execution of the project in each country. The RPT will provide guidance on technical matters and ensure that the activities are carried out according to the Work Plan. The members of the RPT will comprise staff from the CITES Scientific Authority, CITES Management Authority, the private sector, the University/research institutions (Figure 1).

Figure 1: Organogram



Some activities will be running through experts, and others such as implementation of management plans and silvicultural operations will be directly conducted by the relevant agencies as indicated in Table 1.

The proposed institutions have relevant and specific mandates in research, mobilization facilitation and regulation. Research institutions including ITM-MUHAS, TAFORI and NMK will assess and document the conservation status of wild populations, carry out NDF studies and the impact of trade on the species. The same research institutions will generate data on socio-economic variables most likely to affect the implementation. The information gathered will guide all actors including TFS, TAWA, KWS, KFS to oversee development and implementation of the management schemes for sustaining *O. lanceolata* as a resource for ecosystem security and

economic development. KFS, NFA and TFS will determine the extent and population of the species, pilot propagation of *Osyris* within forest reserves, work with farmers interested in planting *Osyris* on their farms, participate in sensitization of local communities where *Osyris* occurs, and develop mechanism of registering farmers growing *Osyris* and the production-chain of custody.

KEFRI and TAFORI will provide technical information on propagation including participation in training of farmers on propagation, work with KFS/KWS/UWA on the production-custody chain and participate in inventory of populations and extent of occurrence.

In the same line the information will build capacity and skills of CITES authorities such as NMK, KWS and TAWA, in range states in making NDFs and identification of products and resources. Some institutions have dual mandates in research and field implementation. For example, the ITM-MUHAS and NMK have active linkage with traditional healers' associations and private investors in medicinal plant conservation and at the same time has own sites all over the country in Tanzania for experimental cultivation and for actual production. Likewise, most regulatory institutions including TFS, TAWA, KWS, KFS have legal mandates to manage wildlife by involving communities adjacent to the Natural resources

Local communities around the *O. lanceolata* hotspots are the witness of the ongoing depletion of wild populations of the species. In principal the proposed project targets already conscious communities not only in depletion of the species around them but also on finances accruing from the trade. Some members of these communities constitute active positions in the market chain. The proposed project target to invest on this latent potential through advocacy, capacity building and institutional linkages with relevant partners on sustainable conservation of *O. lanceolata*. Among the strategies is to acknowledge roles of local institutions and governance in decision making. Cultural packets and traditional healers will be sensitized to incorporate this important medicinal species among their priority species for planting. Private people will be supported to plant the species in wider scale, organized social groups and school pupils will be encouraged to plant *O. lanceolata* on their set aside land areas. Market value of *O. lanceolata* cannot be emphasized; local private entrepreneurs will be encouraged to venture on this new investment especially in marginal land not suitable for agriculture any more. The local communities therefore will be involved in the implementation of activities such as sensitisation on the importance of conservation of the species and its propagation. In particular, community groups will be trained on its propagation and husbandry working through or closely with the Community Forest Associations (CFAs) where available. The CFAs or community groups will be identified during implementation.

Communities with established species populations that could be considered for sustainable and regulated harvesting, will be trained on standards for sustainable harvesting of the species and carting out of NDFs including risk assessments and harvesting quota setting.

Kenya Forest Service has a provision of registering individuals with private forests. This approach could be adapted/extended to also farmers with *Osyris* on their land. In addition, KFS and KEFRI will work together to develop a clear production and chain of custody procedure so as to ensure only on-farm grown *Osyris* can be traded.

Ultimately, the region needs a common stand on governance of trade on shared restricted resources to the international markets. At the end of the project, policy briefs will be developed to facilitate amendments of some sections in principal country legislations to support enforcement, seizure and repatriation of smuggled resources, including possible harmonization of wildlife management policies across East African region for the species.

Table 1. Blocks of work

Activity	Responsible Team	Lead institution
1. Establishment of coordination team and relevant Committees of the project	NMK, KFS, ITM-MUHAS, Forest Sector Support Department/Ministry of Water and Environment (FSSD/MWE)	NMK
2. Status (research, management, ecological, and exploitable, control and monitoring, including ABS) of <i>Osyris lanceolata</i> in each country well established	KWS, NMK, KFS, KEFRI, ITM-MUHAS, TAWIRI, TAWA, FSSD/MWE, UWA, TAFORI, TFS, NFA, NaFORRI, MUK	KFS, FSSD/MWE, TFS
3: Research relevant to management such as standing stock and quota setting for some selected sites well defined	KWS, KEFRI, NMK and KFS, ITM-MUHAS, TAWA TAWIRI, UWA, TAFORI, TFS, NFA, NaFORRI, MUK, FSSD/MWE -(scientists/experts)	KFS, TFS, FSSD/MWE
4: Mechanisms for Identification/verification and, traceability established	KWS, KEFRI, NMK and KFS, ITM-MUHAS, TAWIRI, UWA, TAFORI, TFS, NFA, NaFORRI, MUK, FSSD/MWE -(scientists/experts)	NMK, ITM-MUHAS, KFS, FSSD/MWE
5: Silviculture and domestication of <i>O. lanceolata</i> well known	KFS, KEFRI, KWS ITM-MUHAS, TAWIRI, TAWA, MUK, TAFORI, TFS, FSSD/MWE, NaFORRI, UWA, NFA-(Managers)	KEFRI, TAFORI, NaFORRI, NFA
6: NDF report and realistic action plan well developed and implemented	KFS, KEFRI, KWS, NMK ITM-MUHAS, TAWIRI, TAWA, MUK, TAFORI, TFS, FSSD/MWE, Ministry of Tourism Wildlife and Antiquities (MTWA), NaFORRI, UWA, NFA-(Managers)	NMK, KWS, TFS, FSSD/MWE

Monitoring, Reporting, and Evaluation

The progress of the project will be monitored by the Regional Project Team. Monthly progress reports based on the achievements of outputs/ activities of the Work Plan and a final completion report will be prepared within 2 months of the project completion for submission to the regional Coordinator of the programme.

The project will be carried out over a period of 24 months according to the Work Plan as shown in

annex1.

References

- Kamondo, B., Gitehi, G., Chahilu, O., Machua, J. Kagunyu, L., Wafula, L., Bala, P., Njuguna, J., Wakori, S., Maingi, F., and Nyingi, K. 2014. Growing East African Sandalwood Guidelines for Tree Growers; KEFRI, Nairobi.
- Kamondo, B., Chahilu, O., Gitehi, G., and Kariuki, J. 2012. Collection, Handling and Germination of *Osyris lanceolata* Seeds. Guidelines for use by Farmers, Extension officers, Foresters and Nursery Practitioners.

Annex 1

WORK PLAN

OUTPUTS/ACTIVITIES	RESPONSIBLE PARTY	SCHEDULE (in months)																							
		Year 1												Year 2											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Output 1. Establishment of coordination team and relevant Committees of the project;																									
Activity 1.1: Establishment of Regional and National Technical Committees (NTCs)	RC/NTC																								
Activity 1.2: Reviewing the project work plan;	RT																								
Activity 1.3: Drafting and Validation of the ToRs of experts;	RT																								
Activity 1.4: Establishment of <i>ad-hoc</i> Scientific Committee	NTC/NC																								
Activity 1.5: Identifying discipline specific experts;	NTC/NC																								
Activity 1.6: Launch <i>O. lanceolata</i> project in each country	NC/RC																								
Output 2. Status (research, management, ecological, and exploitable, control and monitoring, including ABS) of <i>Osyris lanceolata</i> in each country well established																									
Activity 2.1. Conducting a detailed account on the research activities and relevant topics related to the biology and ecology of <i>O.lanceolata</i> in each country Including	Experts/NC																								
Activity 2.2. Conducting a detailed account on conservation, management,	Experts/NC																								

harvesting regimes, transport, and trade regulation (control and traceability) of <i>O. lanceolata</i> .																				
Activity 2.3. Developing a strategy to improve management of the species	Expert/NTC																			
Output 3: Research relevant to management such as standing stock and quota setting for some selected sites well defined																				
Activity 3.1: Conducting forest inventories, management measures, production with a view of proposing harvesting quota	Experts/NC																			
Activity 3.2: Conducting a detailed study on production, harvesting, processing, transport, trade, control and monitoring of <i>O. lanceolata</i> with a view of establishing a fair tracking/control system	Experts/NC																			
3.3. Activity Monitoring and evaluation of management parameters (continuous process) PSP	Experts/Technical staff																			
Output 4: Mechanisms for Identification/verification and, traceability established																				
Activity 4.1. Identification of trainees for basic systematics from participating countries	NC																			
Activity 4.2. Training for voucher collection, conventional identification and DNA analysis	RC/Experts																			
Activity 4.3. Facilitate development of document-based tracking system in establishment of chain of custody for <i>O. lanceolata</i> for traceability	NC/Experts																			
Activity 4.4 project midterm review	RC/NTC																			
Output 5: silviculture and domestication of <i>O. lanceolata</i> well known																				
Activity 5.1. Awareness creation and	NC/Experts																			

sensitization about the value and ABS amongst stakeholders including rural communities																					
Activity 5.2. Identification and selection of pilot production sites	NC																				
Activity 5.3. Training of trainers in Silviculture of <i>O. lanceolata</i> including seedling production and planting	NC/Experts																				
Activity 5.4. Develop and promote sustainable harvesting methods	NC/Experts																				
Activity 5.5. Promote/empower rural community participatory forest resource management	NC/Experts																				
Output 6: NDF report and realistic action plan well developed and implemented																					
Activity 6.1. Training of trainers for NDFs and CITES tools	RC/Experts																				
Activity 6.2. Based on outputs 2, 3, 4, 5; draft NDFs and a subsequent realistic action plan/roadmap	SC/NC																				
Activity 6.3 End of project workshop																					