

Red Sanders
An ecological boon or an
enforcement bane?
(2015)

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Mohnish Kapoor,
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the wildlife trade monitoring network



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2015

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FOREWORD

As emerging Asian economies continue to grow, rising affluence has led to, at times, unsustainable pressure on natural resources. The issue of Red Sanders, also known as “red gold”, owing to its high price, and perilous smuggling, has become a contentious socio-political issue due to the history of conflict between logging communities, smugglers on one end and the enforcement agencies on the other. Increasing international demand, both in Asia as well as in North America and Europe for timber has put severe stress on a species that is extremely limited in its geographic range, confined to a few forest patches in the erstwhile state of Andhra Pradesh and sparsely in Tamil Nadu.

TRAFFIC’s holistic report on Red Sanders trade aims to bring to the forefront, trade linkages surrounding this major issue. The emerging trend of this illicit trade can be gauged by approximately 1300 metric tonnes of Red Sanders seized between 2009-2014 and the seizures have occurred in all possible transit locations, including sea ports, air ports and roads connecting international borders. Based on seizure analysis and discussion on various associated trade parameters, the report mentions some important actionable recommendations for streamlining existing laws and regulations and support government agencies in conservation and management of this magnificent plant species, which has been indigenously used in ethno botany since, many centuries. I sincerely hope this report will serve as an important reference document for relevant government agencies, trade monitoring institutions as well as for conservation organizations to develop implementable strategies for Red Sanders research and conservation.

Ravi Singh

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EXECUTIVE SUMMARY

Red Sanders (*Pterocarpus santalinus*) is an endemic timber tree species found in the districts of Chittoor, Cuddapah, Anantpur, Kurnool, Prakasam and Nellore in the state of Andhra Pradesh and in the district of Chengalpattu in Tamil Nadu, with sporadic occurrences in Karnataka and Kerala. A variation of this species is also known to occur in East Indies. This tree species can either occur gregariously in a pure patch or along with a number of associates, e.g., *Pterocarpus marsupium*, *Chloroxylon swietenia*, *Terminalia chebula*, *Terminalia tomentosa*, *Albizia lebbek*, *Hardwickia binata*, *Anogeissus latifolia*. Red Sanders has been exploited historically for variety of uses in Japan and China, however little is known for its various uses in several other parts of the world. Domestic trade of Red Sanders within India was also not clearly known until recently when its large scale use as an ingredient of ayurvedic (traditional) medicines was revealed in a recent auction of confiscated wood conducted by the state of Andhra Pradesh. Nonetheless, its trade for Japanese musical instruments, as a beer colorant, and as hard wood for making fancy furniture and toys has been long known to the world. The earliest known history of the trade, however, is traced back to the 1960s when the demand of this timber was high for the Japanese traditional musical instrument *shamsisen*, which itself had originated from the Chinese traditional musical instrument *sanxian* which probably originated prior to the 16th century AD. However, not much is known about the drivers that pull the trade in the direction that is found today. The timber derived from the Red Sanders tree is highly priced and the price is increasing exponentially- now considered a driver of the trade.

Commercially, there are two types of Red Sanders trees- quality trees and non-quality trees. Quality trees have wavy grain structure in the wood whereas in a non-quality tree it is absent. Until a tree attains an age of 25 years, it would not be known whether the tree belongs to a quality tree or a non-quality tree category. The price determinant depends on this natural factor. Provided that the tree is a quality tree, the price escalates manifold. Usually, a smuggler will aim to get timber from a quality tree as it commands a very high price in international market. The species is, also, heavily exploited for its medicinal use as a 'cure' of vision, skin problems, and inflammation, particularly of the forehead. The powder of Red Sanders wood is also topically used in treating hemorrhage and bleeding piles. Use of Red Sanders extract is known in the treatment of skin diseases, leprosy, ulcers and mental aberrations. The wood has high tensile

strength which helps in creating sound vibrations and hence commands large demands for traditional musical instruments, e.g., *shamsisen* and *koto*. The wood is very strong and its inherent red colour makes it highly preferable for making a variety of fancy furniture, those particularly used in Chinese traditions. It is said that Red Sanders is among the three most demanded wood for making fancy furniture in China. With a steady rise in per capita income and the GDP in China, the demand for Red Sanders timber is driven upward.

This list is not complete and there appears to be other mysterious uses that might be driving Red Sanders' trade in international markets. One such use mentions Red Sanders extract as a potential absorber of nuclear radiations. Although, this particular application is not scientifically founded, arrests of Chinese nationals in their attempts of smuggling the cut pieces of Red Sanders in personal baggage through the airports at Chennai and Cochin on, at least, two separate occasions, during the year 2014, lends substantial credence to the idea of possible usages beyond our current level of understanding. New revelations are made each day with Red Sanders trade. It is clear that there is a large information gap that would be essential for taking sound policy positions on this species by the government.

Policy making is important when a species faces multifarious threats. A sound policy will have one of the most profound impacts on conservation of Red Sanders. The policy regime appears muddled at this point of time as there are conflicts of situations. One such situation warrants a review of the legal status of Red Sanders in Indian law. The Supreme Court of India had issued a directive to the Government that Red Sanders be listed as a protected species under the Wildlife (Protection) Act, 1972 (WPA 1972). The Government of India, in fact, moved the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to get permission of a one-time sale of Red Sanders for a quantity of approximately 9500 metric tonnes of wood logs from a stock of about 15000 metric tonnes, confiscated in numerous cases over the period 1995-2013. Even in the backdrop of this, in an enforcement action recently, 20 encroachers were shot by the Police while they were allegedly attempting to illicitly cut Red Sanders trees in Kurnool district of Andhra Pradesh. On another count, many states in South India encourage planting of Red Sanders trees in their private cultivable land as a possible means of boosting local economy in future. A listing in the WPA 1972 or any other Act of prohibitory law will then have to be considered with a definite foresight. The state of Andhra Pradesh has

been constantly making demands for keeping Red Sanders a free species so that the state could continue earning revenue. Nonetheless, a healthy trade regime requires a robust system of checks and balances as a pre-requisite. This will have to be followed by a national information system that has requisite information on a public domain and finally a regime of adequate information and intelligence for effective enforcement. A need of coherence in domestic policies and laws of the countries, where Red Sanders is in demand and is usually imported with the CITES and Indian laws, cannot be overemphasised. Above all, a clear and comprehensive national level policy and corresponding laws for future with current development in hindsight will be essential for a sound and sustainable regime for Red Sanders conservation - a species that sheds red - of all nature at this crucial juncture.



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1. INTRODUCTION

Red Sanders (*Pterocarpus santalinus*), a valuable timber species, is considered endemic to India and grows in the South-Eastern part of the Indian peninsula (Oldfield *et al.* 1998), particularly in the Eastern Ghats. The timber species belongs to the family Fabaceae and is found in the Southern tropical dry deciduous forests (Champion and Seth 1968), at altitudes of 150-900 meters. The species occurs naturally in the districts of Cuddapah, Chittoor, Anantpur, Prakasam, Nellore,

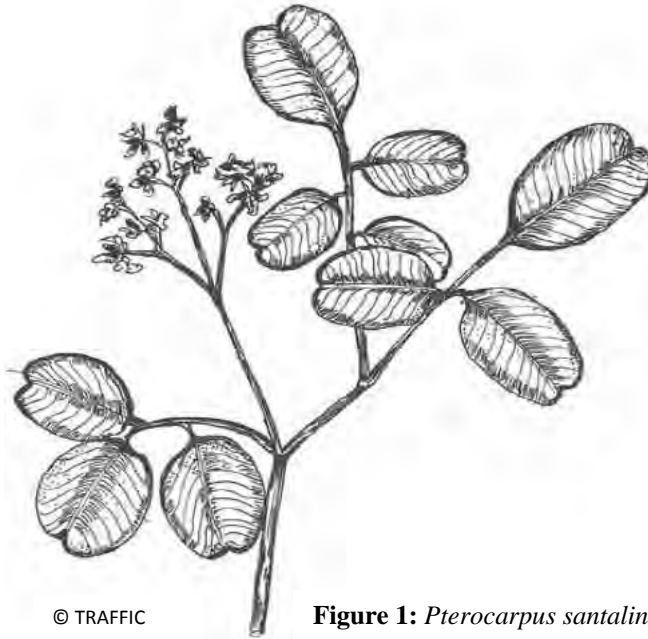


Figure 1: *Pterocarpus santalinus*

and Kurnool districts of Andhra Pradesh. The timber species also occurs in Bidar district of Karnataka and in the Arcot and Chengalpattu districts of Tamil Nadu (Niraj 2004), however, is considered of inferior quality. The geographical range of natural occurrence of this species is restricted to approximately 5500 sq.km. in the above districts. Several southern states have taken up plantations of Red Sanders in private lands or in agro forestry initiatives. In the state of Tamil Nadu, Red Sanders is planted among several species under the Tree Cultivation in Private Land (TCPL) scheme, which is a component of an eight-year Biodiversity and Greening project under a large external funding scheme. The tree species can either occur gregariously in a pure patch or with a number of associates, e.g., *Pterocarpus marsupium*, *Chloroxylon swietenia*, *Terminalia chebula*, *Terminalia tomentosa*, *Albizia lebbeck*, *Hardwickia binata*, *Anogeissus latifolia*. Red Sanders is an endangered taxon in the Eastern Ghats of India (Usha *et al.* 2013). The rotation of Red Sanders for harvest is 25-30 years, which is high. The real value of the timber will also depend upon the heart wood formation which depends upon several factors. Prior to attaining 25 years of age i.e. reaching certain girth, the quality cannot be ascertained, therefore it requires more research. Correctly made volume tables will be helpful in determining the girth and wood quality.

Red Sanders has been classified as 'Endangered' in the IUCN Red List of Plants (Walter and Gillett 1998). Indigenously, it is mainly used as a medicinal plant and internationally, for making



Figure 2: *Shamsisen* – A Japanese musical

fancy furniture, particularly in China while the Red Sanders' sawn wood has been traditionally used in making Japanese musical instruments, such as *shamsisen*, *koto* and *erhu* (Mahammadh 2014). The wood drawn from Red Sanders tree has also been in good demand for making artifacts and furniture in the Middle East Asia and in Western markets, particularly in North America. Exploitation of this species is fuelled by demands originating in international markets as a high quality timber and an important source of dye. There is apparently huge demand for this wood in China, Japan, the Middle East, USA, Malaysia and Singapore (Mulliken and Crofton 2008).

In India, apart from limited domestic use as timber, the heartwood of the plant is used in the treatment of diabetes; the anti-diabetic constituent is 'pterostilbene'. Preparations made from the wood are used to minimise swelling, reducing pain, controlling bleeding and in treating infections (Hau 1997). It is also considered to be an astringent, tonic, diaphoretic, anti-bilious, anti-inflammatory, emetic, and febrifuge along with being extensively used in treating boils, scorpion-stings, as well as, skin diseases. During market surveys carried out by TRAFFIC, it was found that Red Sanders was traded in the markets of Delhi, Kolkata, Mumbai and Haridwar (TRAFFIC 1998).

There are several unconfirmed reports indicating that the Red Sanders wood can effectively absorb nuclear radiation and can be used as a coolant for nuclear reactors. However, through biogeochemical research (Raju and Raju 2000), traces of uranium (1.22 ppm) and thorium (0.14 ppm) were observed in Red Sanders heartwood and leaves. Although this concentration is not very high, it is still indicative for expanding research avenues for alternative nuclear fuel sources.



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Figure 3: Illegal logging of Red Sanders is a major threat to the

Commercially there are two types of Red Sanders trees - quality trees and non-quality trees. Quality trees have wavy grain structure in the wood whereas in a non-quality tree it is absent. Until a tree attains an age of 25 years, it will not be known whether the tree would belong to a quality tree or a non-quality tree category. The price determinant is based on this natural factor.

The major threat to the existing population of Red Sanders is caused by illicit logging and smuggling of wood, due to its special demand as a high quality timber, which has a characteristic red colour. Illegal trade in Red Sanders involves a complex nexus of smugglers and individuals who are allegedly involved in other forms of criminal activities. In a recent investigation into its trade, Andhra Pradesh Police Department observed that the smugglers involved in trading Red Sanders from Seshachalam hills are also active in the surreptitious trade of narcotics and other crimes (Umashanker 2015). The illicit cutters of Red Sanders invariably look for the phenotypically best trees which are also genetically superior and hence are important for the growth of population (Usha *et al.* 2013). Thus, uncontrolled or illicit felling could adversely affect the population of the tree species.



Figure 4: Trucks loaded with Red Sanders seized in Nepal

In India, the trade is regulated through various legal mechanisms such as the Andhra Pradesh Preservation of Private Forest Rules, 1978, The Andhra Pradesh Sandal Wood and Red Sanders Wood Transit Rules, 1969, Andhra Pradesh Red Sanders Wood Possession Rules, 1989 and Tamil Nadu Timber Transit Rules, 1968.

Red Sanders is listed in Appendix II of the CITES. Export and import is regulated under the EXIM policy announced by the Ministry of Commerce and Industries, Government of India. Red Sanders has been

included under Schedule II of the EXIM policy, and prior to June 2010, export of Red Sanders was permitted only in certain value added product forms, e.g., musical instruments, dyes (Ministry of Commerce 1992). The Supreme Court had issued a directive to the Central Government to include Red Sanders in Schedule VI of WPA 1972, which currently protects only six species of plants in India. Export of Red Sanders from India was prohibited by CITES in June 2010, citing irregularities in the certification of products being exported and India's failure to conduct a non-detriment finding (NDF), a study to ascertain conservation status of the species and the impact of trade on it. In year 2012, the Ministry of Environment, Forests, and Climate Change (MoEFCC) submitted an NDF report to CITES and requested for a one-time permission to export confiscated wood logs. Apart from this demand, CITES also agreed to a request of permission from the Indian Government for exporting 310 metric tonnes of Red Sanders every year from private plantations in Tamil Nadu and Andhra Pradesh. In year 2014, the Director General of Foreign Trade (DGFT) permitted the state of Andhra Pradesh to export 8584 metric tonnes of confiscated Red Sanders logs, out of which approximately 4160 metric tonnes was auctioned in December 2014 and the remaining logs were expected to be placed for auction in year 2015.

Table 1: Important parameters of Red Sanders

Abundance	Not determined
Population trend	Decreasing
Habitat	Undulating and hilly regions
Geographical distribution	Southern parts of the Eastern Ghats
Demand destination	Japan, China, Taiwan, Malaysia, USA, UAE
End use	Food colour, dye, furniture, medicines, Japanese music instruments
Estimated price (USD)	40-70 / kg (domestic), 100-200 /kg (international)
Wildlife (Protection) Act 1972	Not listed
CITES	Appendix II (1995)
IUCN category	Endangered

2. METHODS

The data on seizures was collected from TRAFFIC's database, government agencies and media reports. The data files used for analysis were considered confidential, hence not available in public domain. Red Sanders seizure data was collected from 2007-14. Wherever possible, analysis figures from a previous study on Red Sanders (Niraj *et al.* 2012) have been used to draw trend comparisons from the current study period.

The seizure data includes the date, time and place of seizure and the quantity of Red Sanders seized from various locations across the country. The data was uniformly organised and spatio-temporal maps and graphs were developed to identify existing trends pertaining to illegal trade in Red Sanders.

Apart from data available on seizures, additional desk review was conducted to compile information on Red Sanders regulations, as well as, various parameters associated with enforcement and smuggling. Many seizures of illegal consignments of Red Sanders were recorded only in terms of the numbers of logs of raw and sawn wood where the weights have not been measured and hence not expressed when recorded by the enforcement agencies. Since there were a large number of such seizure records, we have included those records in determining the frequency; however, we have not included those records in any other calculations as the weights were missing. For spatial distribution of density of Red Sanders seizures, we converted 15 years data of seizures into three block years of 1992-96, 1997-2001, and 2002-2006. We looked at the density distribution using ARCGIS 9.3 (Niraj *et al.* 2012). Dividing the data in three subsequent block years of five years each gave a clearer picture of changing spatial trends over the years.

3. RESULTS

3.1 Spatial trends in seizures

The seizures from 2007-14 are concentrated towards Western Indian coast and the mainland, indicating an inclination towards use of western routes for smuggling. Seizures were also registered in the states of Rajasthan, Gujarat, Punjab and Himachal Pradesh. The traditional port states, e.g., Maharashtra, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh also continue to be used for illegal shipments of the wood logs. The impact of international borders on smuggling of

Red Sanders wood from West Bengal and the states of the North East is also evident in the seizures made from 2009-14 (Figure 5).

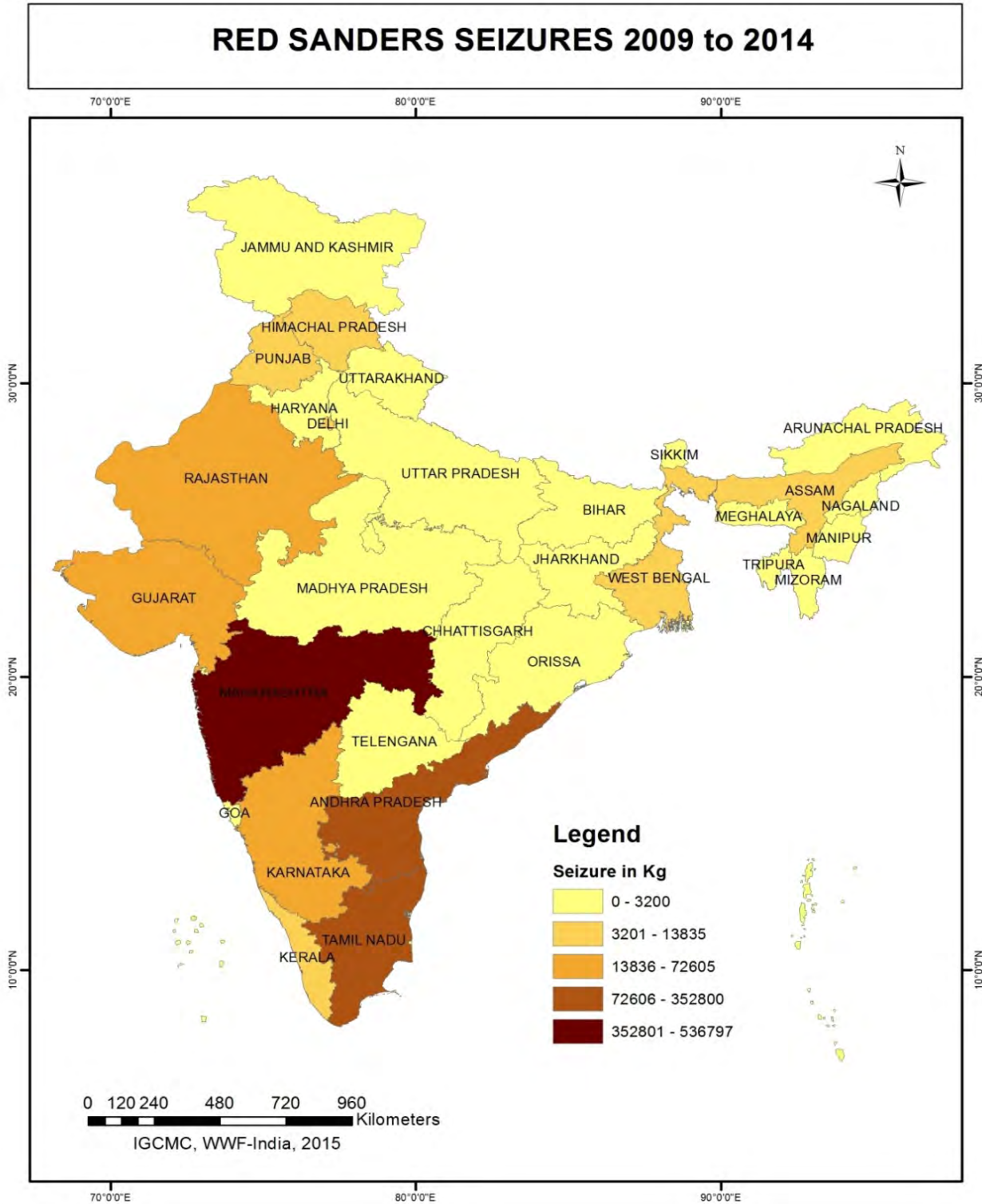


Figure 5 : Red Sanders seizure volumes in different states across India

In comparison with the current trends, Red Sanders has been seized less frequently in the years 1995-1999, primarily in mainland India (Figure 6). Seizure frequency constantly increased from 1997-2001 and during 2002-2006. The seizures in 1995 and 1996 were on the mainland while the seizures from year 2001-2006 were made at the export points or offshore indicating they were made at conduit hubs (Niraj *et al.* 2012). Between the years 1999 and 2006, the seizures mainly at the export and import points clearly established the origin of demands from outside the country, from the international markets in East and Far East, Middle East and North America (Niraj *et al.* 2012). The spatial expansion of seizures has continued as evident from the new seizure locations between the years 2007-14 (Figure 7) such as in Gujarat and Delhi, indicating rising smuggling at all major sea ports and major international airports, as well as, through road transport to Nepal from Assam and Bihar.

Between the years 1992-1997, a block of five years, seizures of Red Sanders involved chips, cut pieces, and powder, mainly for the purpose of export. In 1996, approximately 279.5 metric tonnes of Red Sanders powder was seized in the states of Andhra Pradesh and Maharashtra while being exported to Southeast Asian countries. Between the years 1997-2001, another block of five years, percentage of sawn wood export increased and the state of West Bengal figured in the list of states that registered attempted illegal export.

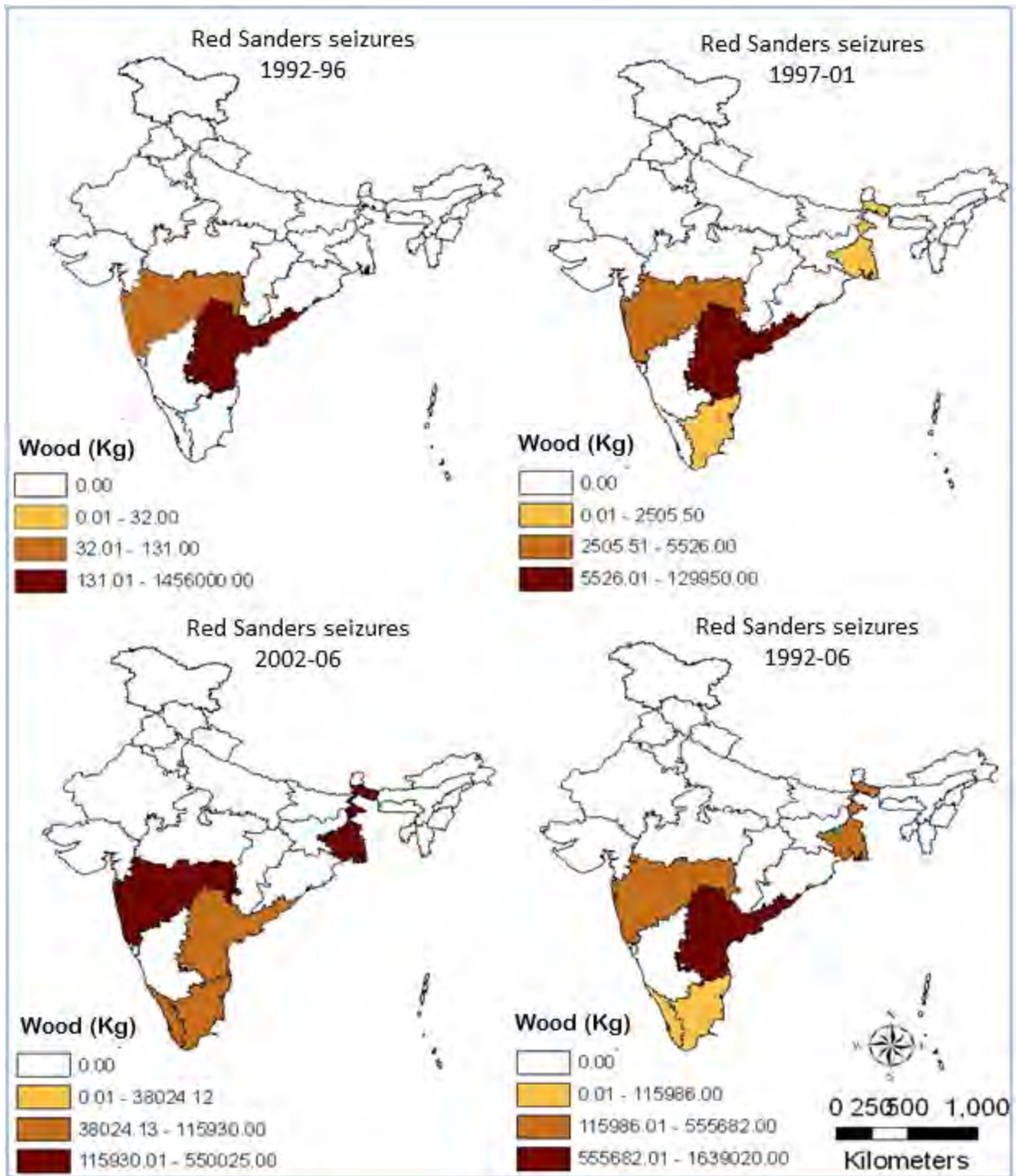


Figure 6: Red Sanders seizures between years 1992-2006 (Niraj *et al.* 2012)

Tamil Nadu registered as the state with maximum frequency (n=20) of seizures, with Andhra Pradesh (n=14) ranking second, and Maharashtra (n=12) standing at rank three among 14 states, recording seizures from 2007-14 (Figure 8). There could be several different factors that would impact the smuggling events, e.g., availability of international cargo ports, ease of trade between concerned ports and the destination markets, location of the traders dealing with Red Sanders trade, costs of transport and factors that are yet unknown. We compared the situation of the first three block years with that of an extended block year from 2007-14, since this period had only one completed block year of five years, we added the remaining years 2013 and 2014 in order to update the situation to the current level .

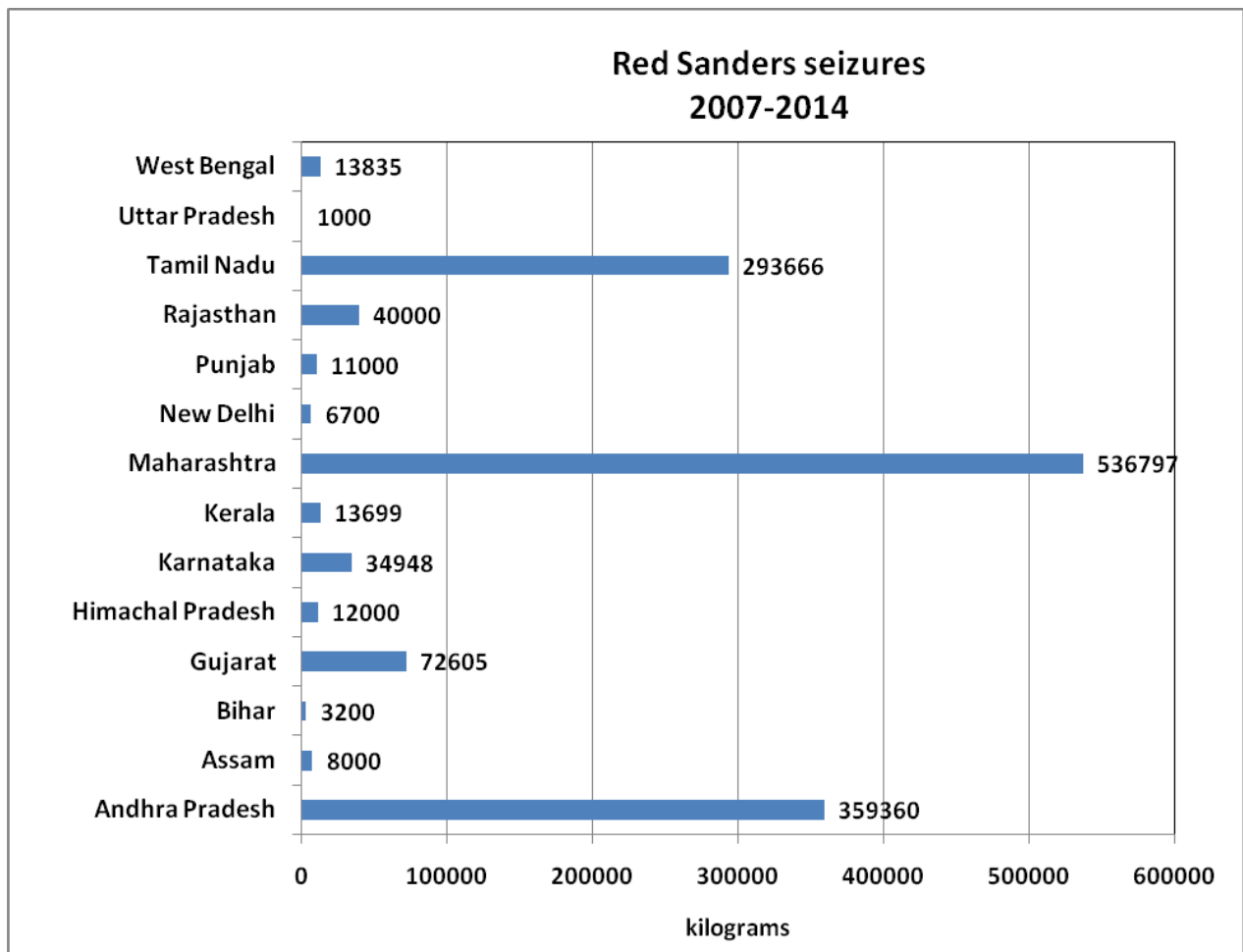


Figure 7: Total amount of Red Sanders seizures in various states of India from 2007-14. The states with major sea ports, international borders underline specific threats.

In the extended block year of 2007-14, 14 states recorded trade of Red Sanders as compared with the first block year of 1992-1997, when only two states had recorded seizures. In the block year of 1997-2001, four states had recorded seizures and in the block year 2002-2006, five states recorded seizures. A seizure of about 5000 kg of sawn wood was made in 1999 in the United States of America, however the origin of the wood in India was not known. Compared to the block years of 1992-96 and 1997-2001, in the block year of 2002-2006, the proportions of seizures of logs and sawn timber increased sharply indicating change in the nature of trade and the demand of the markets. There was a sharp increase in frequency of large quantity seizures in 2005 and 2006 indicating increasing demands from the destination markets. It is also possible that increase in seizures could be the result of greater consolidation of efforts by the enforcement agencies in India, particularly the Customs and the Directorate of Revenue Intelligence (DRI), which are specialised agencies for enforcement of export related laws. As compared with the block years, 1992-96, 1997-01 and 2002-06, in the extended block year of 2007-14, an increase in frequency of states where seizures were made and also in the annual average of seizure quantities.

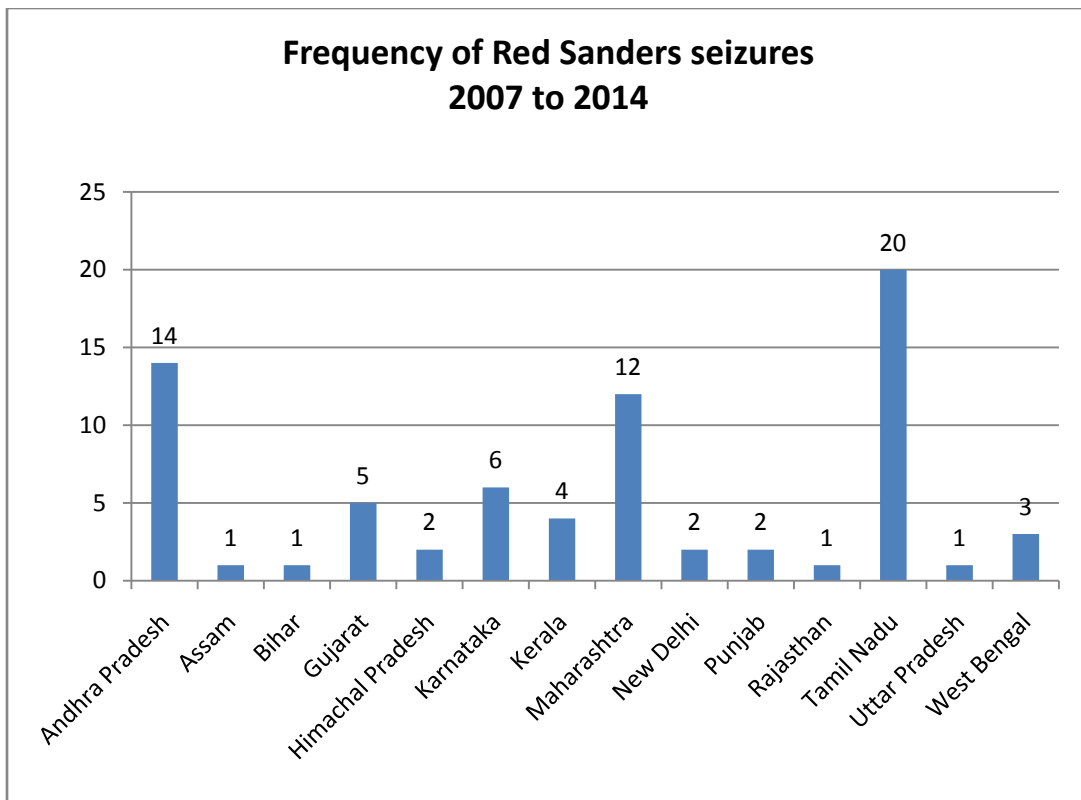


Figure 8: Tamil Nadu, Andhra Pradesh, and Maharashtra register highest frequency of Red Sanders seizures in India from 2007-14.

3.2 Temporal trends in seizures

The annual seizures between the years 2007–2014 depict a prominent peak in year 2011 (Figure 9), while exponentially increasing post 2012. The graph indicates a distinct rising trend in the volume of seizures ($R^2 = 0.500$). Since year 2012, some major seizures have been observed at locations which were traditionally not utilised for Red Sanders smuggling. The existence of non-contemporary smuggling routes in the study period indicates escalating international demand for the species and thus increasing enforcement pressures.

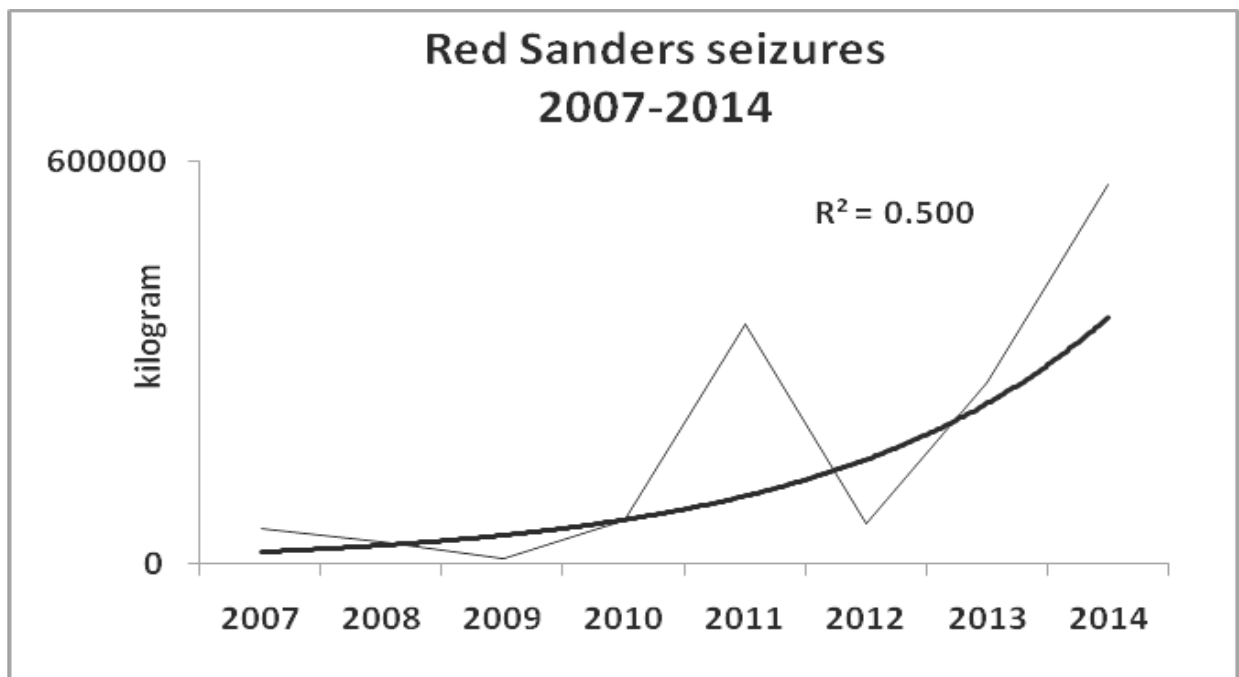


Figure 9: Red Sanders seizure volume from 2007-14.

The slope of the curve indicates highest change in 2013-14 when there is a new peak. This is further supported by a high R^2 value. This situation will demand consolidation of efforts to combat the illegal trade as the present resources will not be able to match the sharp increase of demand and an increased supply to the markets.

The overall scenario which we have presented here has some complications in form of non-inclusion of some important seizures, in terms of numbers of logs of sawn or raw wood confiscated, as the enforcement did not measure the weights of the confiscated wood consignments (Table 2). However, the frequency of seizures, where we have included these

records make a definite impact on the overall scenario and place Andhra Pradesh at the second position where seizures of Red Sanders wood occur.

Table 2: Red Sanders seizures where weight was unspecified and seizure was expressed in number of logs from 2007-2014. These seizures were not considered for overall analysis except to determine frequency of seizures in states. No such seizure was recorded in 2007 and 2008.

Year	Month	State	Form of Red Sanders	No. of items	Values (USD)*
2009	Dec	Punjab			142980.00
2012	Jul	Andhra Pradesh	Log	350	354509.80
2013	Feb	West Bengal	Wood		
2013	June	Andhra Pradesh	Log	209	
2013	Oct	Andhra Pradesh	Log	160	156862.75
2013	Oct	Andhra Pradesh	Log	37	
2014	Dec	Maharashtra	Log	42	19764.71
2014	Nov	Andhra Pradesh	Log	34	
2014	May	Himachal Pradesh			705882.35
2014	Mar	Andhra Pradesh			784313.73

Note* - For conversion of seizure value from INR into USD, a factor of 1USD = INR 63.75 (current value) was used.

The declared monetary values in most of these seizures are high which also indicated changing price domains in the demand markets of Red Sanders. Those seizures will however change the overall trends substantially. Enforcement actions have also increased. Red Sanders has been seized in several states of India, whereas the species is found naturally only in Andhra Pradesh and to some extent in Tamil Nadu. However, due to lack of sufficient information on Red Sanders trade, enforcement handling of seizures has been inadequate in terms of prosecution and for further legal actions in most states. In many seizures, enforcement has not even recorded either the weight or the number of logs or sawn wood pieces seized. Non-inclusion of such data in the analysis will distort the true picture and may fail enforcement planning. The real prices of Red Sanders in international markets are much higher than the declared prices and substantial

information is lacking in this context. The demand supply and pricing information will be important for a sound policy development on Red Sanders.

Since the year 2001, trend of seizures show a deterministic change with the quantities of wood increasing in each seizures indicating growth of the destination markets. Although, there has been an overall increase in the amounts involved in most seizures meant for markets in China and South East Asia, United Arab Emirates (UAE) was recorded many times as a destination of Red Sanders wood for large quantity exports (Table 3). This information influences our premise that the main demand of Red Sanders come from the Chinese or Japanese markets. It is possible that UAE route may serve as a conduit centre possibly linking to the North American markets, where earliest record of export is in 1999 or there may be a possible detouring to the East Asian markets. However, use of UAE ports for a possible re-export to the Far Eastern markets may be less likely as it may involve substantial transport costs as compared with the route connecting to the Indian ports with the South East Asian markets used as a conduit route for Far Eastern markets. There is a substantial information gap restricting our knowledge on what happens to the Red Sanders wood when it leaves Indian shores for various destinations.

Table 3: Large seizure of Red Sanders logs each consignment weighing > 20000 kg in India from 2007-2014

Date	Location	State	Quantity (kg)	Intended destination
25/05/2007	Panpakkam	Tamil Nadu	22000	
13/05/2008	Tuticorin	Tamil Nadu	25000	Malaysia (Klang port)
17/06/2010	Jodhpur	Rajasthan	40000	
10/08/2011	Ponneri	Tamil Nadu	70000	China via Myanmar & Malaysia
16/03/2011	Kandala Port	Gujarat	30000	UAE (Dubai)
03/09/2011	JNPT, Mumbai	Maharashtra	200000	
25/02/2012	Chennai	Tamil Nadu	21750	
19/08/2013	Pollachi	Tamil Nadu	30000	
29/08/2013	Navi Mumbai	Maharashtra	42000	Indonesia/Malaysia
15/07/2013	JNPT, Mumbai	Maharashtra	133000	UAE (Dubai)

Date	Location	State	Quantity (kg)	Intended destination
17/10/2014	Thane, Mumbai	Maharashtra	90000	
05/10/2014	Sathankadu	Tamil Nadu	40000	
04/12/2014	Mumbai coast	Maharashtra	23000	UAE (Dubai)
03/12/2014	Kurnool	Andhra Pradesh	330000	

4. DISCUSSION

4.1 Smuggling trends and routes

Red Sanders smuggling involves a complex network of conduits, transport chains and middlemen (Figure 10). The growing number of seizures, both in terms of volume and trade hubs, indicates that Red Sanders is being smuggled into China and Japan through Nepal, Manipur and Mizoram, but is not restricted to these routes. It is smuggled into Malaysia and Singapore through the Eastern coast and to UAE from ports like Mumbai and Mundra coast on the Western side of India (Figure 11). Recently, Wildlife Crime Control Bureau (WCCB) has registered new smuggling routes involving the Middle East, Sri Lanka, Bhutan and Nepal. A new method of smuggling has been noticed where passengers, chiefly from China, were found carrying Red Sanders wood in different forms in their hand baggage.

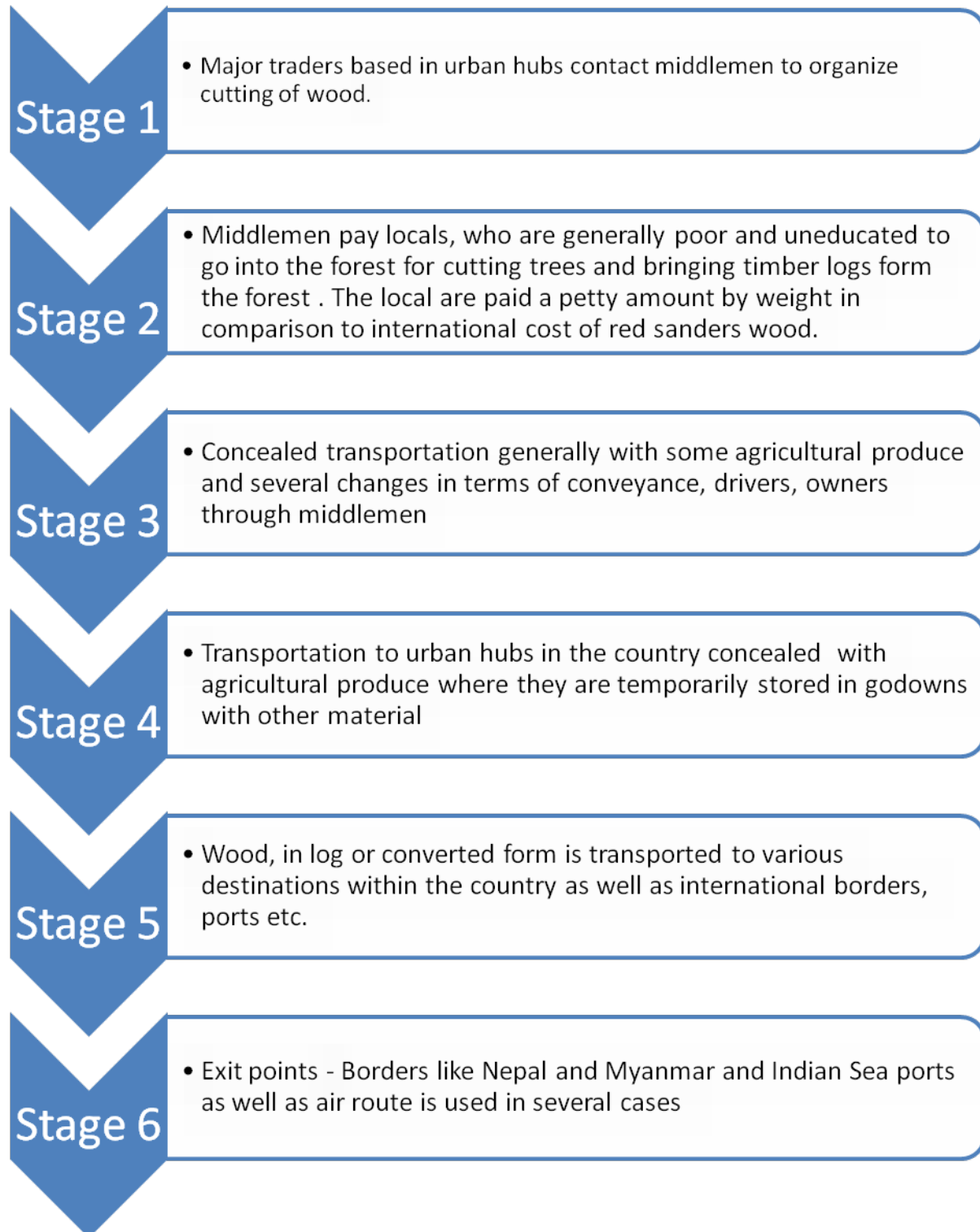
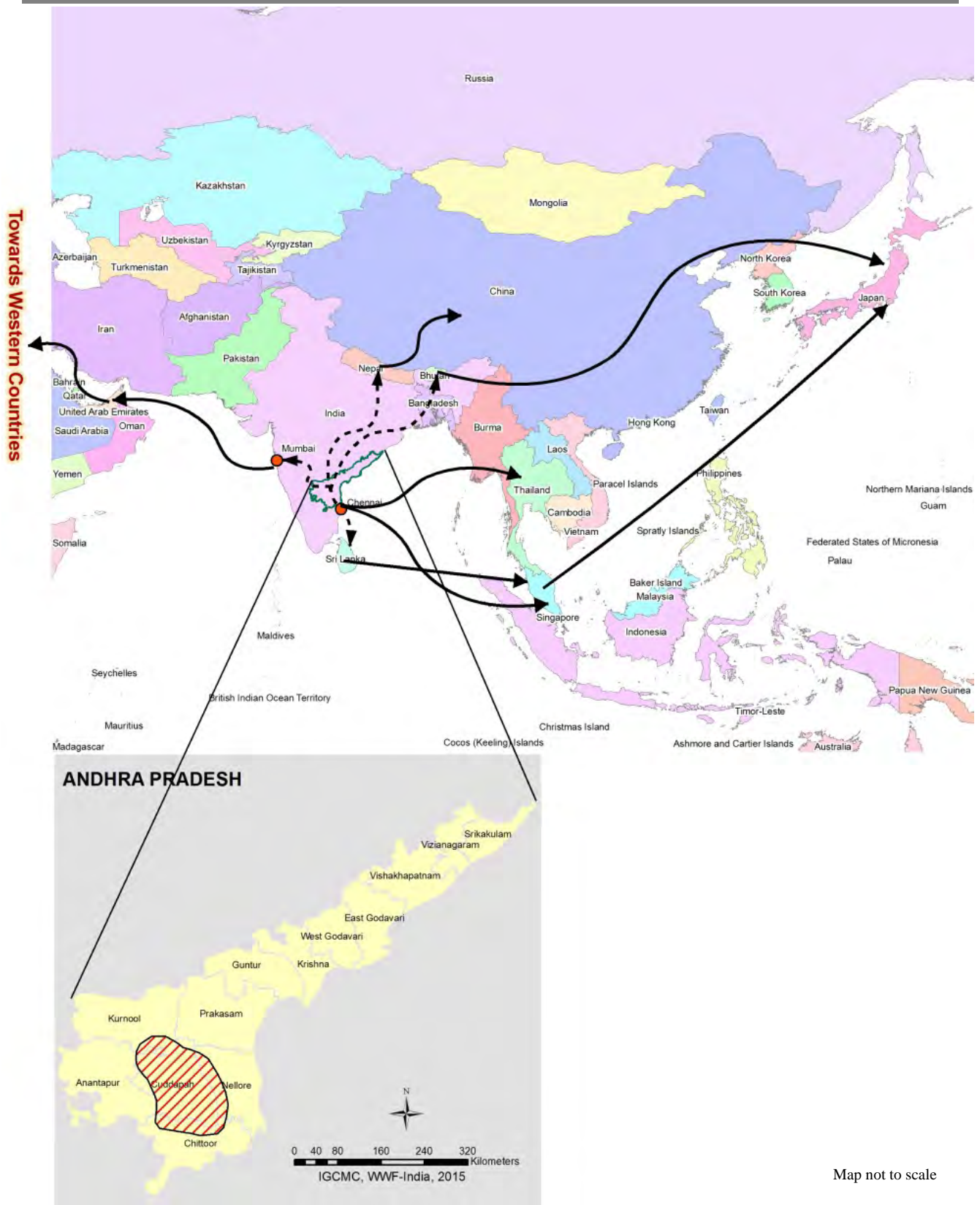


Figure 10 : Stages involved in smuggling of Red Sanders from India. (Source: Adapted from WCCB, TRAFFIC, Mahammadh 2014).



Map not to scale

Figure 11: Red Sanders trade route map (Source – TRAFFIC database)

In the years 2000-2004, Singapore was one of the major destinations for the Red Sanders logs. Singapore has been a conduit destination for numerous wildlife products (Niraj *et al.* 2012). In a major seizure of 50 metric tonnes of Red Sanders logs in 2004 at Mumbai port, a linkage was detected between Singapore and North America, invariably via the Middle Eastern ports of Dubai and Sharjah. There is no existing information on use of Red Sanders in North America despite several instances of seizures of Red Sanders consignments from India destined to the ports in USA.

4.2 Enforcement issues

Enforcement agencies, in India and internationally have, apparently, missing links despite availability of some initial leads on Red Sanders trade emanating from India. Lack of coordination between the border agencies, mainly the DRI and the Customs, and the CITES implementing agencies could be primarily the reason for failing in establishing the missing links in illegal international trade.

There is a constant friction between the enforcement agencies and logging communities which has led to many losses of life on both sides (Table 4). The standing stock of timber in six districts of Andhra Pradesh is also equally threatened as more efforts are being spent on illicit felling and smuggling. This has also given rise to friction between the forest departments and the illicit loggers and forest dwellers in Andhra Pradesh. In a bid to control Red Sanders smuggling, and due to inadequate enforcement support system in terms of manpower and weaponry, several forest officials have also lost their lives during various enforcement operations. Several human right groups and political parties have criticised enforcement agencies in Andhra Pradesh for conducting drastic actions, which have lead to killing of illicit loggers and tree cutters by enforcement personnel. In the new trends, the tree cutters and smugglers have been found armed with modern guns and ammunitions when they go for cutting Red Sanders.

Table 4: Incidences of violence in Red Sanders illegal logging cases from 2011-15 in India

Date	Number of persons killed	Location
12 th July 2011	One forest officer	Panguru near Chittoor in Andhra Pradesh.
3 rd December 2012	One illegal logger was killed	Pulibonu in Chamala valley, Andhra Pradesh
16 th December 2012	Two forest officers killed while three were injured	Seshachalam forests in Andhra Pradesh
29 th May 2014	Three smugglers were killed while five police officials were injured	Nagapatla valley in the down reaches of Tirumala Hills, Andhra Pradesh
17 April 2015	Twenty illegal loggers were killed	Seshachalam forests in Andhra Pradesh.

(Source – Compilation from media reports)

The government has to spend large amounts of resources for protecting stockpiled logs of Red Sanders in Andhra Pradesh and under the custody of the Customs and Central Excise in various places in India. Between year 1990 and 2014, approximately 15000 metric tonnes of Red Sanders have been confiscated and stockpiled in godowns. Due to increasing threats of smuggling, the wood stocks have become more vulnerable in recent times. Many of the godowns under the custody of forest departments do not have adequate protection infrastructure, e.g., protection walls. First comprehensive report on Red Sanders illegal trade was made by the first author while officiating as the Regional Deputy Director of Wildlife Preservation and a CITES Assistant Management Authority for the Western Region of India at Mumbai. Mumbai was then detected as a prime export point from where Red Sanders was smuggled out of the country on a very large scale. Shift of smuggling hub from South India to Mumbai and Pune was driven by two factors. First was that the Customs and Central Excise had tightened their checks and detection of the consignments which likely had Red Sanders logs. Secondly, the ports in Western regions were much bigger and hence smuggling was relatively easy, given that the Customs and Central Excise officials were not familiar with the species and various *modus operandi* used in

illegal trade. Many irregularities were committed in conducting illegal transportation of Red Sanders consignments between South India and Maharashtra. In many instances, transit passes were not endorsed by various check posts along the way, and in some two different hammer marks were found on the same logs. These deficiencies implied that the procurement of the logs was not legal. Invariably Red Sanders logs were transported. The DRI was instrumental for leading in a large number of seizures in Chennai and Mumbai regions.

4.3 Policy gaps

The Supreme Court of India in year 1995 had recommended to the Union Government to consider listing of Red Sanders as a protected species in WPA 1972 by an amendment. There has been apparently no change in the protection status of the species despite the Supreme Court's directive to the Central Government to include Red Sanders in Schedule VI of WPA 1972. Except for banning the Red Sanders trade from the wild, the NDF report submitted to CITES did not recommend any action for the confiscated wood seized by various enforcement agencies, as well as, for the sale of wood from private plantations. Red Sanders is listed in the Appendix II of the CITES with zero quota allotment barring on four occasions when the quota was allocated and executed in 2006, 2008, 2014 and 2015. On an approach by the CITES Management Authority of India, CITES allocated a quota for sale of approximately 9400 metric tonnes of Red Sanders logs from stock of approximately 14000 metric tonnes held by various law enforcement agencies in India. Subsequently, notifications were issued by the Director General of Foreign Trade (DGFT) under the Export Import Control Orders of the Government of India.

Despite, Red Sanders being a slow growing species, necessary steps and research should be undertaken to promote cultivation of species that might support any future modifications in the existing trade regulations in the country. A system of strong checks and balances and an effective and workable surveillance system will have to be put in place before a policy decision could be taken on a free trade policy on Red Sanders. Prior to the CITES listing of Red Sanders in Appendix II and the listing in the prohibited list of Export Import Control Orders, Red Sanders was permitted for export in certain forms, but not in the log form and as finished products. At that time the species was mainly exported by misdeclaration using the exemption clauses of the regulations. In some instances Red Sanders logs were declared as steel pipes and in some others as grains by the smugglers. The pressure of trade is high and in one instance when the act of

smuggling was established, the contraband had already reached half way between India and Singapore, meant for the markets in USA, in a cargo ship. The ship was recalled mid way and confiscated by Indian Customs at Mumbai. In 2004, seven metric tonnes of wood, misdeclared as beauty cream, was seized at the Mumbai port (in all possible ways of smuggling the wood under various disguises, desperate ways signifying a strong demand for the species in international timber trade). As the demands of the wood increased for making fancy furniture in China and Taiwan, the price of the wood shot up sharply thus triggering a spate of international trade. In 2004, the price of a medium grade wood in India was about INR 750-1000/kg (USD 15-20 approx.), which in 2014 had crossed INR 2500-3000 (USD 40-55 approx.). An international price could be 8-10 times more than this price creating a large incentive for investments in illegal trade.

There has been no major conviction in Red Sanders cases in any courts. Legal provisions for prosecutions in Red Sanders cases are weak except the cases under the Customs Act 1962. The species is not included in the WPA 1972 and not listed in other major forest laws in India. Except for CITES regulation, control of Red Sanders in international trade, cutting and trade within the country is attempted to be controlled under Indian Forest Act only, therefore, it has no teeth. Since independence, efforts have been made to promulgate laws but protection staff is minuscule in comparison to people indulging in tree cutting that is backed by univocal support of traders and smugglers.

4.4 Research and bridging information gaps

Several information gaps such as complete profiling of end usage, extent of demand and projection, price that the users are willing to pay, legal framework in the destination countries, *modus operandi* and use of transit countries, exist in the Red Sanders trade in India and globally. These information gaps work as stumbling blocks in formation of robust policies, which could be vital missing links in a long term conservation planning of the species. Knowledge on the supply side of Red Sanders trade is also incomplete. The usages also have changed over the years 1990s-2000s, as manifested by the *modus operandi* used in the smuggling and transportation. There is also little information on the modes of value changes occurring across the networks when Red Sanders changes hands in the smuggling chains. Similarly, information on real end uses at the destinations is incomplete. Information on community involvements in Red Sanders

trade is also inconsistent. These gaps in information and no simultaneous efforts in filling these gaps have already become bottlenecks in the development of robust policy and conservation measures and hence, a long term sustainability of Red Sanders in India is questionable.

Developing a robust plan for combating illegal trade in Red Sanders could be very challenging in the present circumstances when the trade is turning violent with an increasing frequency of incidences of use of arms and ammunitions. The challenge will be further compounded when legal trade of the timber sourced from the government's confiscated stocks and that from the private plantations, once some of the current plantations reach harvest age, is permitted regularly. Laundering is commonly seen in wild animal trade and could be a threat for Red Sanders trade, as it would be very difficult to distinguish between timber derived from a wild occurring tree and that from the cultivated sources. However, the genetic variability among individuals of the Red Sanders has been examined by using Random Amplified Polymorphic DNA (RAPD) from nursery grown and forest grown plants successfully (Usha *et al.* 2013.). Even a relationship between the plants growing in two different regions has also been established using the above techniques. Ordinary method of identifying the timber species can be carried out at few research institutes including the Institute of Wood Science and Technology, Bangalore, however, the turn over time is long creating stumbling blocks in investigations in a seizure. Challenge of investigations becomes intricate when the species is used in formulations or presented as powder.

5. RECOMMENDATIONS

5.1 Research on international demand profile

There is a clear indication that the Red Sanders entails serious security hazards in India in the current scenarios, given the amount of illicit felling that is driven by a demand in illegal international trade. It is important to find the current legal positions on Red Sanders in the countries of destination. Illegal trade in Red Sanders can have severe implications on survival of this species in the wild, which has a limited geographic range. Trans-border cooperation with countries e.g., China, Nepal, Sri Lanka, Bhutan and Myanmar for information sharing as well as for joint enforcement action is necessary to understand trade dynamics and for identifying drivers of trade, market linkages and end use patterns.

5.2 Tools and technology



Figure 12: Sniffer dogs serve as an important tool in wildlife crime detection

Current situation warrants use of modern tools and technology for curbing illegal logging and detecting logs in transit. As in the case of wildlife sniffer dogs, timber detector dogs can support detection and prevention of smuggling of Red Sanders wood, especially at transit points and ports. As a part of feasibility study conducted by WWF Germany, two spaniels were successfully trained to detect specific timber species e.g., Mahogany, *Swietenia macrophylla*. Thus, in combination with tools such as stable isotopes and DNA fingerprinting techniques, timber detector

dogs can be trained to detect specific timber species (Braun 2013). The forest department should be supported with adequate timber monitoring technology and gap tools to prevent illegal logging of this precious species. Recently, police department in the state of Andhra Pradesh launched software known as Red Sanders Accused Information System. This software maintains

new and old records of smuggling, information pertaining to the accused as well as seized stocks of Red Sanders logs, including their quality parameters, vehicles seized and monitoring of the cases in various courts. Along with this, two internet based applications, known as ‘Mee-Beat’ and ‘Patrolling’ are also being used for information support. Logging of silicon chips randomly fixed on confiscated Red Sanders logs could be considered for tracking illegal transport and in case of pilferage.

5.3 Streamlining policy framework

A national and state level policy regime based on a pertinent stakeholder dialogue on this high-demand species is urgently required to address the legal and illegal trade of Red Sanders in India. The policy should clearly clarify national export controls for the species, including wild as well as cultivated and seized stocks (Mulliken and Crofton 2008). Any future recommendation on the species should be based only after scientific and systematic assessment of the Red Sanders in the wild and analysis of the impact of trade on the natural Red Sanders forests. Apart from the conservation of species, the social impact of Red Sanders has been huge as evident from growing encounters between the smugglers, illicit wood cutters and enforcement officials. Thus, the policy should be inclusive enough to accommodate socio-economic linkages and building a sustainable business model that follows a scientific standard for achieving both sound economic and ecological outcomes from the trade in species. The situation needs to be addressed through firm coordination and strategy between state and central government as well as various central departments such as DRI, Ministry of Commerce and Industry, Ministry of Environment, Forest and Climate Change, security and investigative agencies.

The policy makers, law enforcers, and investigative agencies hold views that it is the poor people who are involved in illicit felling of Red Sanders trees and in illegal transportation of the timber. These views blur the investigative visions and cause repressive impacts on the processes. Use of poor labourers and transporters in the illegal trade is strategic and opportunistic; the trade is far deeper. At present, the Ministry of Commerce controls the trade, but a strategy to combat smuggling and illegal trade is missing.

5.4 Information management and capacity Building

There is a need to develop an information system for regularly monitoring Red Sanders trade in India. Skill development on combating Red Sanders trade and in enhancing knowledge and awareness on Red Sanders along with other medicinal and aromatic plants (MAP) and timber must be addressed through enforcement capacity building programmes that can be conducted with joint collaboration of conservation NGOs, enforcement experts, scientific organizations etc. Also, there is an urgent need to undertake long term monitoring of trade of Red Sanders to understand spatial and temporal trends, trade dynamics across the demand-supply chain and this will continue to provide inputs for better policy formulations to protect this species from illegal trade.

Value of Red Sanders in the international market is very high. Classification in terms of size, e.g., musical instrument, furniture etc. will help in knowing the country of smuggling which will also help taking up the matter with IUCN, CITES and the Indian government authorities to bring it into the fold of stricter laws.

The issues surrounding Red Sanders need holistic management approach and political will to reduce the conflict and ascertain social, economic and ecological success. Although, in reality such an ideal scenario and the balance is difficult to achieve, but we suggest that a comprehensive management approach will involve the following:

- Develop clear and comprehensible policy on conservation and sustainable use of Red Sanders
- Complete profiling on demand and supply
- International cooperation in controlling illegal trade
- Capacity building of the enforcement officials and skill development in identifying species and specimen
- Strong checks and balances on Red Sanders protection and transportation
- Produce scientific and technical protocols and tools in identifying species from wild and cultivated sources and age of wood
- Training and utilization of timber detector dogs in ports and transit locations
- Identifying and developing smart technology solutions for prevention and detection of illegal logging of high value timber species

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APPENDIX 1: Salient features of Red Sanders regulations

<p>EXIM POLICIES</p>	<ul style="list-style-type: none"> ▪ According to the EXIM Policy, Column 5 against S.No.154(b) of Chapter 44 in Table B of Schedule 2 of the Book Titled “ITC(HS) Classifications of Export and Import Items” (2004-2009) — <i>Now amended to S.No 188(b) of “ITC(HS) Classifications of Export and Import Items” (2012),</i>— Red Sanders trade is restricted but permitted only in the following forms: Value added products of Red Sanders wood such as extracts, dyes, musical instruments and parts of Musical Instruments, made from Red Sanders wood, procured from legal sources. Any other form of Red Sanders raw or otherwise, processed or unprocessed, other than the aforementioned, is prohibited to be traded, in accordance with S.No 154(a) (Now S.No 188(a)) of Chapter 44. ▪ Additionally Chapter 44, S.No 143(Now S.No 177) prohibits strictly the export of “Wood and wood products in the form of logs, timber, stumps, roots, bark, chips, powder, flakes, dust, and charcoal other than saigon timber made exclusively out of imported logs/timber”.
<p>INTERNATIONAL REGULATIONS</p>	<ul style="list-style-type: none"> ▪ Regulation by CITES, CITES national export quotas for 2014 states: “India will authorize the export of specimens of any type, from 310 metric tones of wood per year from artificially propagated source (Source "A") and a one-time export of specimens of any type, from 11,507 metric tonnes of wood from confiscated or seized source (Source "I")].” ▪ Thus CITES permitted in 2012 a one-time only exemption to the regulation on export of Red Sanders in log form, which the Andhra Pradesh Govt. has extended to 2013,2014 and now 2015, according to the CITES national export quota for 2015. It held its first e-auction in December 2014 where it sold an estimated 4000 metric

	<p>tonnes and is intending to hold auctions to sell the remaining in the year 2015, mid May-June, engaging the M/s MSTC Ltd. a Government of India, enterprise, for conducting sale of Red Sanders through e-tender cum e-auction and by appointing the Andhra Pradesh Forest Development Corporation Ltd. (APFDC Ltd) as export agency and sale proceed realization agency for disposal of Red Sanders respectively</p>
DOMESTIC LAWS	<ul style="list-style-type: none"> ▪ Kerala Forest (Amendment) Act, 2010 – Chapter 6A entitled "Provisions relating to sandalwood" which regulates cutting and possession of sandalwood. Section 47A provides that no individual shall cut, uproot, remove or sell any sandalwood tree without previous permission in writing from the forest officer. There is also absolute prohibition on transport and possession of sandalwood or sandalwood oil in excess of one kilogramme or 100 ml respectively without a license from the forest officer under Section 47C of the Act. Section 47F imposes restrictions on purchase and sale of sandalwood from any person other than government or authorised officer. A provision is also there for seizure of sandalwood and its oil under Section 47H and penalty for offences can be imposed. Act also provides for imprisonment for three years, extendable upto seven years and fine not less than INR10000/- extendable upto INR 25,000/-. ▪ Tamil Nadu Forest Act, 1882 -- Section 40G of the Act provides that teak, blackwood, ebony, sandalwood and also ivory and teeth of elephants, either grown or found on government land or private property are royalties and no trade shall be carried on in them unless they have been duly obtained from the government. Section 40G(2) places restrictions on felling of trees by any person without the permission of the Chief Conservator of Forest or any other person authorised by him. The state of Tamil Nadu has also enacted the Tamil Nadu Sandalwood Possession Rules, 1970 and

also **Tamil Nadu Sandalwood Transit Rules, 1967**, and the Act also provides for imposing penalties and imprisonment.

- **Karnataka Forest Act, 1963 and the Rules** made thereunder have removed the restrictions on growing sandalwood trees in private lands. Section 83 of the Act provides that where a person is an owner of sandalwood trees before the commencement of 2001 Amendment Act, he shall not fell or sell such sandalwood tree or convert or dress sandalwood obtained from such tree or possess or store or transport or sell the sandalwood except in accordance with the provisions of the Act. The Act also provides for imposition of penalty and imprisonment.
- State of Maharashtra has also enacted **the Felling of Trees (Regulation) Act, 1964, The Bombay Forest Rules 1942** – Which regulate the cutting and selling of specific species of trees as well as enlist strict regulations for the transit and conversion of wood from one area to another and one type to another.
- **Andhra Pradesh** – The Red Sanders trade in Andhra Pradesh is mainly governed by the two following sets of Rules, provided for under and validated by the Andhra Pradesh Forest Act, 1967. The legislations are Andhra Pradesh Sandalwood and Red-Sander wood transit Rules, 1969 and the Andhra Pradesh Red-sander Wood Possession Rules, 1989. These rules read together provide the aforementioned requirements of any trader or business for the possession and trade of red sanders, such as the certificates to be produced upon examination as well as the forms to be submitted to the government upon registration of a business dealing in red sanders. These rules also require strict control of the transit of the species to be exerted by the AP government and other authorities empowered by it. There are also specifications regarding the maintenance of lands (Patta lands) on which Red Sanders and other protected species are being grown. The rules go one step further

	<p>and oversee the procedure of the judicial system and the manner in which all cases filed under the abovementioned Rules are to be processed.</p> <ul style="list-style-type: none">▪ The confiscation, seizure and imposition of penalties in cases of export is also handled by the Customs Act, 1962, namely Section 113 and 114.▪ Finally there is the COFEPOSA Act, 1974, or the Conservation of Foreign Exchange and Prevention of Smuggling Activities Act, 1974, which deals with the confiscation of all items involved in a smuggling offence as well as preventive detention (subject to Article 22 of the Constitution) of persons believed to be associated with smuggling.
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APPENDIX 2: Requirements for legal trade of Red Sanders wood (To be obtained and processed in this order), including DGFT notifications:

- Certificate of Origin from the Principal Chief Conservator of Forests dealing with the legality of the material (in accordance with Forest Act/Forest Transit Rules)
- Recommendation/Clearance from the Ministry of Environment and Forests (Policy issues concerning Forest Produce and CITES).
- ETC License (Export Trade Control License) (Policy level issues of export trade control).
- Shipping list/ Checklist by Customs (in accordance with the Customs Act).
- CITES Export Permit (In accordance with terms and regulations of CITES) by Assistant Management Authority.
- Pre-shipment examination and export endorsement on the CITES Permit (in accordance with terms and regulations of CITES) by the Wildlife Inspector of the Wildlife Regional Office.
- Issue of Let Export Order (in accordance with the Customs Act).
 - Each requirement is mandated under a specialised and specific act
 - Each requirement is absolutely necessary for the export of Red Sanders
 - Each requirement is not essentially conditional to the next. That is, a certificate of origin must be obtained, but does not necessarily guarantee the granting of an ETC License.
 - Each specialist examining the individual processes must thus both ensure the previous stages requirements have been carried out as well as present his own examination findings about the current stage.

DGFT Notifications

- First one, dated June 5, 2007, File No. 01/91/180/968/AM06/PC-III, provided a relaxation from the strict prohibition of Red Sanders export, from Chapter 44, S No 154(a) (2004 -2009), granting one month for restricted export, from the date of issuing the export license, to exporters who apply for grant of licenses and have “obtained their wood in the form of log through auction from the Government of Andhra Pradesh”. It specified that such exports were to be made specifically to traders, M/s.Kyoei Trading Company, Japan or M/s.Radeep Services, Singapore only.

- Second one, dated October 24, 2013, File No. 01/91/180/1380/AM12/Export Cell, with reference to the ITC(HS) Classification of Import and Export Items (2012), Chapter 44, S.No 188, made an amendment to permit the Government of Andhra Pradesh and the Directorate of Revenue Intelligence (DRI) to export a total of “9784.1363 metric tonnes (MT) of Red Sanders wood, in the form of log obtained out of confiscated/seized stock”, either by themselves or through entities they have authorised to do so. It divides the amount, permitting the Government of Andhra Pradesh to export 8584.1363 MT, and the DRI to export 1200. This notification was brought about by request of the Andhra Pradesh Government that was in possession of nearly 14,800 metric tonnes of Red sandalwood, as reported in July 2014.

TRAFFIC, the wildlife trade monitoring network, is the leading non-governmental organisation working globally on trade in wild animals and plants in the context of both biodiversity conservation and sustainable development.

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