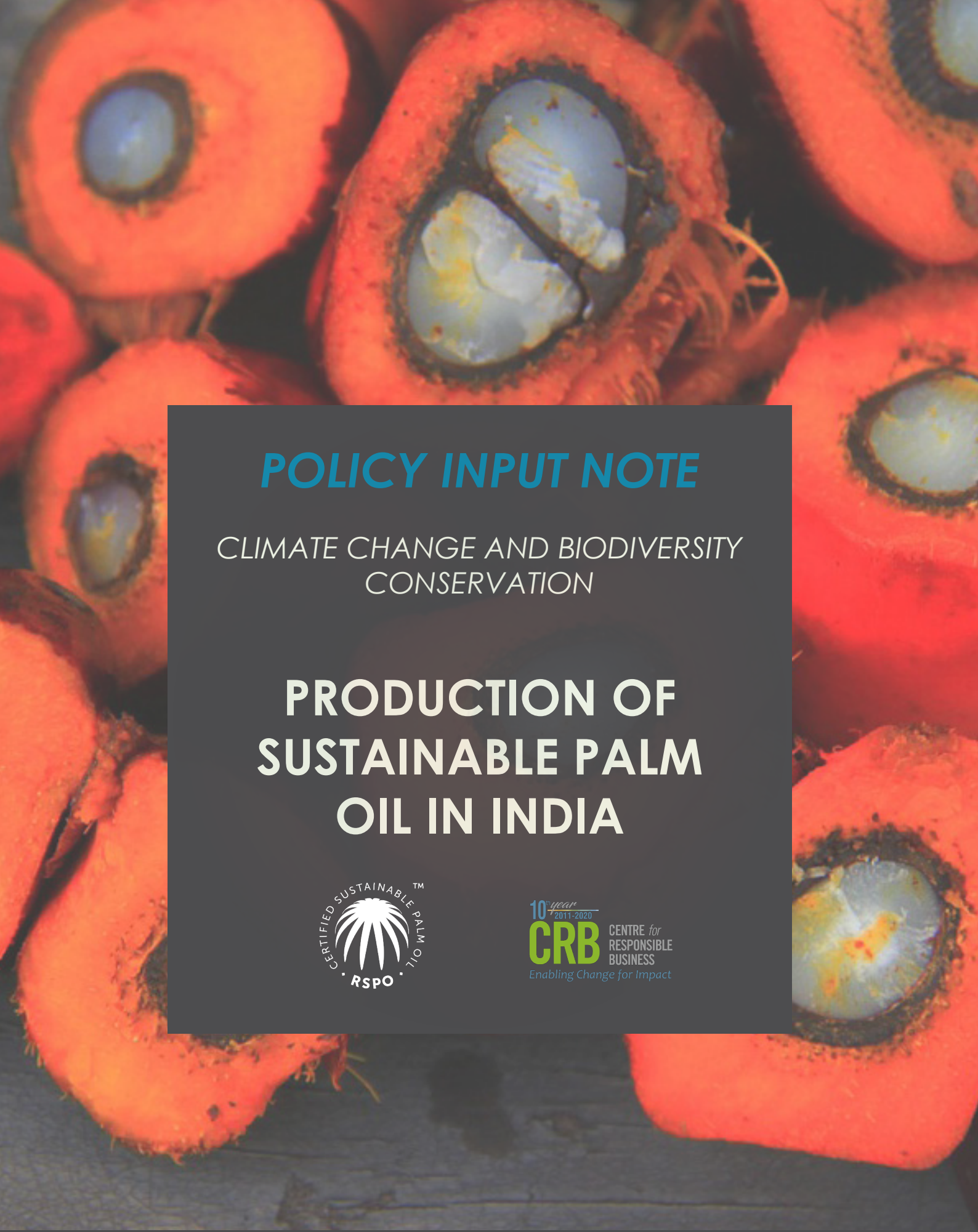

POLICY INPUT NOTE

CLIMATE CHANGE AND BIODIVERSITY CONSERVATION

PRODUCTION OF SUSTAINABLE PALM OIL IN INDIA

CERTIFIED SUSTAINABLE PALM OIL ™
RSPO

10th year 2011-2020
CRB CENTRE for RESPONSIBLE BUSINESS
Enabling Change for Impact

DECEMBER 2022

ABOUT ROUNDTABLE ON SUSTAINABLE PALM OIL

The Roundtable on Sustainable Palm Oil (RSPO) was formed in 2004 with the objective of promoting the growth and use of sustainable oil palm products through credible global standards and engagement of stakeholders. RSPO is a not-for-profit, international, membership organisation that unites stakeholders from the different sectors of the palm oil industry including oil palm producers, palm oil processors or traders, consumer goods manufacturers, retailers, banks and investors, environmental or nature conservation NGOs, and social or developmental NGOs.

This multi-stakeholder representation is mirrored in the governance structure of RSPO such that seats in the Board of Governors, Steering Committees and Working Groups are fairly allocated to each sector. In this way, RSPO lives out the philosophy of the "roundtable" by giving equal rights to each stakeholder group, facilitating traditionally adversarial stakeholders in working together to reach decisions by consensus, and achieving RSPO's shared vision of making sustainable palm oil the norm.

The seat of the association is in Zurich, Switzerland, while the secretariat is currently based in Kuala Lumpur with satellite offices in Jakarta, London, Zoetermeer, Beijing, Bogotá and New York.

ABOUT CENTRE FOR RESPONSIBLE BUSINESS

Since 2018, the Centre for Responsible Business (CRB) has been working in partnership with the Roundtable for Sustainable Palm Oil (RSPO) to promote the uptake of certified sustainable palm oil (CSPO). Through the partnership, CRB has been able to promote awareness amongst relevant stakeholders including businesses, downstream players, associations, international organizations, policy actors, media and youth. CRB has also worked on generating awareness and increasing capacity and knowledge on the topic, supporting multistakeholder platform and dialogues related to uptake and opportunities and facilitating increased commitment and uptake of CSPO in India.

Centre for Responsible Business (CRB) was established in 2011 as think-tank to pursue its vision,'businesses integrate sustainability into their core business practices'. Given that sustainability is a multidimensional problem especially in the context of India and other emerging economies, CRB has adopted a model of engaging multiple stakeholders to develop action plans for promoting sustainable/ responsible business, across various sectors in India.

This Policy Input Note has been developed as part of a CRB-RSPO partnership executed over the period 2021-22 entitled, "Raising the Ambition on Sustainable Palm Oil in the Indian market post COVID19.' This Policy Input Note will be used to recommend key policy pointers to the respective Ministries/public agencies.

EXECUTIVE SUMMARY

Palm oil is affordable, versatile and is one of the high yielding oil seeds. It is widely produced in South East Asia. India consumes 10 per cent of the total global production of palm oil which is approximately 73 million MT for the year 2020/2021 (USDA, n.d.). India produced around 0.2 million MT of palm oil and imported approximately 8.1 million MT in 2020/21 to meet its needs. Bulk of the imports of Palm Oil comes from Malaysia and Indonesia where oil palm cultivation has widely been linked to deforestation, peatland drainage and biodiversity loss contributing to climate change.

To meet our increasing demand for palm oil, and to reduce the dependence on imports in order to make us 'Atma Nirbhar', the Indian government announced the ambitious National Mission for Edible Oils – Oil Palm(NMEO-OP) in August 2021. The new central scheme has been approved with a financial outlay of Rs 11,040 crore. The expansion of palm oil cultivation in India must be done in a sustainable manner to ensure that it contributes to India's ambitious net zero targets and forest and biodiversity conservation goals. Reviewing the proposed annual plans for the state and the directives from the NMEO-OP, this mission has several overlaps with other missions and programs run by different ministries. As we await further details about the rollout of the NMEO-OP, some recommendations are presented below to ensure the expansion of palm oil is done in a sustainable manner and does not contravene India's climate change and biodiversity conservation ambitions.

Key recommendations

Union Ministry & Missions	**Recommendations**
Green India Mission, Ministry of Environment, Forests and Climate Change	• Forthcoming Forest surveys could consider the quality of forests in assessing the forest cover. • Environmental and Social Impact assessments could be conducted to identify suitable lands for conversion that excludes High Conservation value (HCVs) areas and High Carbon Stock (HCS) forests.
National Biodiversity Authority(NBA), Ministry of Environment, Forests and Climate Change	• Involve the State Biodiversity Boards (SBB) and local Biodiversity Management Committees (BMCs) to prevent loss or degradation of natural habitats in these ecosystems.
National Water Mission, Ministry of Jal Shakti; *National Mission on sustainable agriculture*, Ministry of Agriculture and Farmers welfare	• Incentivise vermi-composting approaches to promote sustainable use of Fresh Fruit bunches and POME to minimise the pollution from POME and reduce reliance on agrochemical input for the plantations • Incentivise sustainable handling of POME including piloting methane capture technologies in the milling operations
India's INDC & Central Pollution Control Board, Ministry of Environment, Forests and Climate Change	• Incentivise vermi-composting approaches to promote sustainable use of Fresh Fruit bunches and POME to minimise the pollution from POME and reduce reliance on agrochemical input for the plantations • Incentivise sustainable handling of POME including piloting methane capture technologies in the milling operations

PRODUCTION OF SUSTAINABLE PALM OIL IN INDIA

The table below presents a detailed overview of the observations and recommendations to support the implementation of the expansion plans for oil palm via the National Mission on Edible Oil - Oil Palm (NMEO-OP). The recommendations have been classified based on the overlaps and linkages that the NMEO-OP has with the other relevant ministries and missions in the context of Climate Change and Biodiversity Conservation.

Union Ministry	Relevant missions/Goals	Key findings	Recommendations
Ministry of Environment, Forests and Climate Change, (Forest and Wildlife Division)	National Mission for Green India: The goal of the mission is to enhance quality of forest cover in a target area of 5 mHa and improve the ecosystem services[1]	The classification of forests in the Forest Survey of India is based on canopy cover and not based on the quality of forest cover. Whilst the overall forest cover has increased based on this definition, inclusion of plantations (including oil palm plantations) in the forest cover could pose a challenge in achieving the targets of enhancing the quality of our forest cover and to protect biodiversity due to the intrinsic economic value of oil palm plantations in comparison to forested lands	• Forthcoming Forest surveys could take into account the quality of forests and monoculture plantations should be excluded in assessing the forest cover. • In the identification of land for expansion of oil palm via the NMEO-OP, prior assessments could be conducted to identify suitable lands for conversion that excludes but not limited to High Conservation values (HCVs) areas and High Carbon Stock (HCS) forests.
Ministry of Environment, Forests and Climate Change	National Biodiversity Authority(NBA) established through the Biodiversity Act that oversees the National Biodiversity Targets(NBT) as per the CBD. (NBT 2, NBT 3 and NBT 5 are of relevance)	NBT2 requires the integration of biodiversity values into the national and state planning processes. NBT 3 sets out the strategy to reduce the rate of degradation, fragmentation and loss of natural habitats whereas NBT5 requires the sustainable management of agriculture. Through the NMEO-OP, 14 states in India have been identified for Palm cultivation. Of these 14 states, 12 states have published their action plans where the districts for expansion have been identified as of February 2022. It is pertinent to note that 6 of those states and districts that have been identified, lie in two of the global Biodiversity hotspots that are present in India namely the Indo-Burma Biodiversity hotspot and Western Ghats	• Implementation of the NMEO-OP in the states that are in Biodiversity hotspots should be done in consultation with the relevant State Biodiversity Boards (SBB) and local Biodiversity Management Committees (BMCs) that have been established under the Biodiversity Act, 2002. This will ensure that oil palm plantations do not result in loss or degradation of natural habitats in these ecosystems. • Prior to conversion of land for oil palm, an Environmental Impact Assessment(EIA)[2,3] should be conducted to identify the impacts and mitigate it.

[1] Targets set under Green India Mission
[2] EIA notification, 2006, Microsoft Word - SO1533_E__amendments_SO3067_E_.doc (environmentwb.gov.in)
[3] Guidelines for conducting integrated environmental assessments | UNEP - UN Environment Programme

Ministry of Jal Shakti; Ministry of Agriculture and Farmers welfare	National Water Mission's strategy 3.3 to ensure physical sustainability of groundwater resources National Mission on Sustainable Agriculture's goal to improve 'Water use efficiency'	Whilst the state level action plans for expanding oil palm plantations have allocation for incentives for efficient water management systems including drip irrigation, the use of groundwater for agricultural purposes remains unregulated in India. It is also important to note that the State action plans vary considerably in the incentives that are provided for Water management. Noting the water requirement for oil palm plantations is considerably higher than other crops (though generally less than paddy and sugarcane), the lack of incentives to harvest and conserve rainwater to replenish the water table, promote aquifer recharge and use of surface water for irrigation poses a risk for over-exploitation of groundwater which could impact the sustenance of the oil palm plantations as it was observed in the earlier schemes in Tamil Nadu where farmers switched to coconuts.	• The Annual action plans of all the 14 states could include clear incentives for On Farm Water Management (OFWM) including rainwater harvesting, storage, aquifer recharges besides the existing incentives for efficient irrigation systems. • Identification of land for oil palm plantation within the districts should be done as per the NMSA guidelines stated under Rainfed areas for development (RAD). • The state action plans should include programs aimed at capacity building of communities on groundwater replenishment and should include incentives for community participation in monitoring, regulation and management of ground water at the local levels as it could prove effective in the long term.
Ministry of Environment, Forests and Climate Change	India's INDC mitigation strategy on the abatement of pollution (Central Pollution Control Board)	Palm oil mill effluent (POME) is a wastewater generated from palm oil milling activities. According to research, POME is observed to be several times more polluted than the municipal sewage as it has a high biochemical oxygen demand (BOD) and chemical oxygen demand (COD). The effluent also contains higher concentration of organic nitrogen, phosphorus and results in significant methane emissions. This effluent requires effective treatment before discharge into watercourses due to its highly polluting properties. The NMEO-OP and the state action plans focus on the production of Fresh Fruit Bunches and therefore the milling operations are not addressed. Whilst the mission and the incentives provided aimed to stimulate oil palm production, it is important to have incentives for sustainable management of the effluents from the milling operations.	• Incentivise vermi-composting approaches to promote sustainable use of Fresh Fruit bunches and POME to minimise the pollution from POME and reduce reliance on agrochemical input for the plantations • Incentives should be provided for the milling operations for sustainable handling of POME including piloting methane capture technologies • Awareness generation and capacity building and training workshops of supply chain actors including millers

BACKGROUND

Palm oil is affordable, versatile and mostly imported. The enormous increase in the use of palm oil over the years has resulted in significant destruction of forests and natural ecosystems, habitats of endangered species in SE Asia. Besides the environmental impact, the sector is also plagued by labour and human rights violations in plantations. There have been concerted efforts by the sector through various voluntary initiatives (eg.RSPO) to mitigate the environmental and social impact in the production. Despite these issues, it is important to note that the yield of palm oil is significantly higher than other oil seeds.

India consumes 10 per cent of the total global production of palm oil which is approximately 73 million MT for the year 2020/2021 (USDA, n.d.). India produced around 0.2 million MT of palm oil and imported approximately 8.1 million MT[4] in 2020/21 to meet its needs. Bulk of the imports of Palm Oil comes from Malaysia and Indonesia where oil palm cultivation has widely been linked to deforestation, peatland drainage and biodiversity loss contributing to climate change.

The demand for palm oil is primarily driven by high consumption as a vegetable oil in food and fast-moving consumer goods industry (products like biscuits, chocolates, personal care products) led by its versatility. Despite its diverse application across different industries, almost 90%[5] consumption happens in the food sector, particularly for households and the food service sector. With a large population still undernourished and palm oil widely distributed through the government's food security programs, the demand for palm oil is only expected to grow in India in the coming years.

NATIONAL MISSION ON EDIBLE OILS - OIL PALM (NMEO-OP)

To meet our increasing demand for palm oil, and to reduce the dependence on imports, the Indian government has been trying to stimulate production of oil palm in India. In 2014, the central government introduced the National Mission on Oilseeds and Oil Palm (NMOOP) as part of the 12th five year plan to boost the production of edible oils and expand the area under oil palm cultivation. Despite the potential coverage of 19.33 lakh hectares for production, only around 3.49 lakh hectares were actually cultivated with oil palm as of October 2019. Non availability of flat arable land, lack of resources for smallholding farmers, the long gestation period of oil palm and the competition from other plantation crops such as tea, rubber were cited by the Minister of Agriculture and Farmers Welfare as the main challenges for expansion[6]. The scheme has been successful in increasing the areas under oil palm cultivation in Andhra Pradesh and Telangana contributing to almost 97% of the domestic production of palm oil.

To overcome these challenges and to make India 'Atma Nirbhar' in edible oils similar to what was achieved in rice, wheat and sugar, the government announced the National Mission for Edible Oils – Oil Palm(NMEO-OP) in August 2021.

The new central scheme has been approved with a financial outlay of Rs 11,040 crore. Some key highlights of the scheme:

- The aim of the scheme, approved in August 2021, aims to raise the domestic production of palm oil by three times to 11.20 lakh tonnes by 2025-26 and to 28 lakh tonnes by 2029-30.
- The scheme has a special focus on the North Eastern region of India. To provide additional assistance to the cultivators of the northeast, the government will bear a cost of 2% of the CPO price to ensure that the farmers are paid at par with the rest of the country.
- It is proposed to have an additional 6.5 lakh hectares for palm oil by 2025-26. The ultimate target is to reach 10 lakh hectares.
- This is a Minimum Support Price-type mechanism and the government will fix this at 14.3 percent of crude palm oil (CPO) price. This will eventually go up to 15.3%. The scheme also has a sunset clause which is November 1, 2037.

[4] https://seaofindia.com/import-of-veg-oil-during-nov-20-june-21-up-by-5/
[5] https://www.idhsustainabletrade.com/publication/helping-india-reduce-its-deforestation-footprint/
[6] LOK SABHA Starred Question 203, Dec 2019, http://164.100.24.220/loksabhaquestions/annex/172/AS203.pdf

PALM OIL CONUNDRUM IN INDIA

At the recently concluded COP 26 summit, India made bold and laudable commitments towards achieving net zero by 2070.The energy sector is the major contributor to emissions in India, followed by the agriculture, land use and forestry sector which contributes about 14% of the emissions as of 2016[7]. The emissions are primarily due to livestock rearing which constitutes 54.6% followed by rice cultivation (17.5%), 19.1% from fertiliser, 6.7% from manure management and 2.2% due to land preparation through burning of agricultural residues. However, it is important to note that the Land Use, Land Use change and Forestry (LULUCF) sector registered an increase of 39% in its net sink activity as of 2016. About 15% of India's CO2 emissions were removed from the atmosphere by the LULUCF sector. The LULUCF sector plays a significant role in India's path to achieving net zero.

Besides the emission reduction targets, India's Mitigation Strategies highlighted in the INDC also include the ambition to bring 33% of its geographical area under forest cover through several initiatives including the Green India Mission (GIM) and establishment of Common Effluent Treatment Plants (CETPs) for small scale industries along with promoting a Zero Liquid Discharge (ZLD) policy[8]. Sustainable Agriculture plays a big part of the adaptation strategies as evident through the establishment of National Mission for Sustainable Agriculture (NMSA) which aims to enhance food security and protect resources such as land, water and biodiversity. In addition to the mission on Sustainable agriculture, a National Water Mission (NWM) has also been established aimed at conserving water, minimising wastage and ensuring efficient and equitable distribution. Besides agriculture and water, the INDC reflects India's ambitions to protect biodiversity and fragile ecosystems.

With the ambitious commitments made by India and the ongoing implementation of these strategies through the different missions, it is imperative that we assess and understand the potential linkages between the NMEO-OP and the other missions. As we await the details of the implementation of the NMEO-OP, the annual plans[9] published by 12 of the 14 states provide a good overview of the districts where the expansion is being planned, the incentives and support mechanisms that are being put in place for the implementation. The expansion of palm oil production in SE Asia, particularly in Indonesia and Malaysia have been identified as one of the primary drivers of deforestation and conversion of peatlands contributing approximately 0.8% of global emissions[10]. The tropical areas suitable for oil palm plantations are particularly rich in biodiversity. According to the IUCN, it is estimated that oil palm expansion could affect 54% of all threatened mammals and 64% of all threatened birds globally[11] (Meijaard, 2018). It also reduces the diversity and abundance of most native species. For example, it has played a major role in the decline in species such as orangutans and tigers. Amongst other impacts observed in SE Asia, it is important to note that the lack of proper treatment and discharge of Palm oil mill effluent (POME) into water sources has been observed to contribute to heavy metal contamination of fish[12] and abundant nitrogen fertilizer causes eutrophication of waterways.

Based on the impacts observed in SE Asia, it is clear that unsustainable oil palm expansion with short-term economic goals could potentially lead to environmental and social issues in India. Although the government has stated that the forest lands will not be converted to oil palm plantations and since peat lands have not been mapped in India[13], it is still pertinent to ensure that the production of palm oil is done in a sustainable manner. Reviewing the proposed annual plans for the state and the directives from the NMEO-OP, this mission has several overlaps with other missions and programs run by different ministries. Some of these overlaps presented below are crucial in ensuring the expansion of palm oil is done in a sustainable manner and does not contravene India's climate change and biodiversity conservation ambitions.

KEY FINDINGS - RELEVANCE AND OVERLAPS OF NMEO-OP WITH OTHER MISSIONS

As the government moves forward with implementing the NMEO-OP, it is important to ensure that the implementation is aligned with the other policy initiatives and commitments made by the government. Some key areas of the implementation that overlaps with other policy initiatives and targets along with some recommendations are provided below

[7] https://unfccc.int/sites/default/files/resource/INDIA_%20BUR-3_20.02.2021_High.pdf
[8] India INDC, August 2017, https://moef.gov.in/wp-content/uploads/2017/08/INDIA-INDC-TO-UNFCCC.pdf
[9] https://www.nfsm.gov.in/NMEOActionplan.aspx
[10] (Hannah V. Cooper 2020)
[11] (Meijaard, 2018)
[12] (Sheil 2009)
[13] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1783878

FORESTS AND CONSERVATION OF ECOSYSTEMS: GREEN INDIA MISSION

Explicit mapping is essential at the national level to understand land-use patterns, including protected areas, primary and secondary forests, agricultural land with crops, fallow lands, and degraded areas. Potential areas favourable to grow oil palm must be identified using climatic conditions, rainfall, water balance, and land profile[14,15]. The classification of forests in the forest survey of India is based on canopy cover and not based on the quality of forest cover. Whilst the overall forest cover has increased based on this definition, inclusion of plantations (including oil palm plantations) in the forest cover could pose a challenge in achieving the targets[16] to enhance the quality of our forest cover and to protect biodiversity due to the intrinsic economic value of oil palm plantations in comparison to forested lands. Areas crucial for the survival of biodiversity, such as protected areas, unprotected government- or community-owned primary and secondary forests, and traditional agricultural landscapes such as shifting agriculture, must be spared from future oil palm expansion. This approach would be aligned with the goal set out in the Green India Mission to improve the density and quality of forests over 5mHa[17] of forest land.

The recent Forest Survey of India shows that the overall forest cover has increased by 2,200 sq. kms since the previous assessment period until 2019. However, careful analysis of the data shows that the major contributor to the increase in forest cover is Trees outside Forest (TOF) and the plantation sector. While this is a positive trend, it is important to note that the very dense and medium dense forests are shrinking thereby bringing down the quality and density of forest cover in India. Despite being well on the path to meet the ambitions of increasing forest cover, the inclusion of plantations under the forest cover negatively impacts the other objectives set out in the Green India Mission.

The total forest cover and the changes between the 2019 and 2021 survey are presented in the table below. Of the 14 states that have been identified for Palm Oil expansion as part of the NMEO-OP, it can be observed from the table that 7 states contribute 60% to the forest cover in India and these states have shown a declining trend in the forest cover. As it can be seen from the table below, the overall forest cover in the 14 states has increased but the Moderately Dense Forests (MDF) forests have shown a significant decline since 2019. Very Dense Forests (VDF) forests have marginally increased and the major contributor to the increase in forest cover are the Open Forests (OF) which potentially includes monoculture plantations as well. Expansion of oil palm into these states without proper due diligence in ensuring the quality of forest cover is not compromised is essential in order to reverse this trend. It is also important to note that the five (5) North Eastern states have seen an overall decline of -4.83% (refer to the table below) in the forest cover since 2019. While the overall reduction in forest cover is concerning, the silver lining lies in the increase of 184 sq.km of VDF in these states. The remaining forests in the North eastern states play a crucial role in achieving India's ambitions laid out in the Green India Mission and India's climate mitigation strategies.

Sl No	States	Targeted Expansion as per NMEO-OP	Planned Acreage (approved)	Change(in sq.km)			Total Change (in sq.km)	% change
				VDF	MDF	OF		
1	Mizoram	27000	100	0	-86	-100	-186	-1.03
2	Manipur	31000	150	0	-158	-91	-249	-1.48
3	Arunachal Pradesh	40000	2190	-37	-381	161	-257	-0.39
4	Assam	200000	2500	222	-288	51	-15	-0.05
5	Gujarat	12700	1075	0	-60	129	69	0.46
6	Goa	800	20	0	0	7	7	0.31
7	Chhattisgarh	16400	994	0	81	25	106	0.19
8	Telengana	125300	12963	16	332	284	632	3.07
9	Tamil Nadu	18500	1261	-12	4	63	55	0.21
10	Kerala	6500	152	9	-36	136	109	0.52
11	Karnataka	19300	4527	32	-63	186	155	0.4
12	Andhra Pradesh	112000	15554	0	-9	656	647	2.22
13	Nagaland	30000	*1500*	-1	-85	-149	-235	-1.88
14	Odisha	10500	*1500*	243	-557	851	537	1.04
	Total		**44486**	**472**	**-1306**	**2209**	**1375**	**3.59**

(Source: Forest Survey of India 2021, https://fsi.nic.in/isfr-2021/chapter-2.pdf)

In order to meet the objectives, set out in the Green India Mission and minimise the environmental footprint of the NMEO-OP, it is imperative that mapping assessments need to be conducted in the 14 states to assess the presence of High Conservation Value (HCV) areas and High Carbon Stock (HCS) forests before conversion of land happens.

[14] (Budidarsono 2013)
[15] (FAO 2017)
[16] About the Mission | The Official Website of Ministry of Environment, Forest and Climate Change, Government of India (moef.gov.in)
[17] https://moef.gov.in/en/division/forest-divisions-2/green-india-mission-gim/about-the-mission/

BIODIVERSITY CONSERVATION: NATIONAL BIODIVERSITY AUTHORITY

India is one of the twelve mega biodiversity countries and contains 7-8% of the recorded species of the world. India has four of the 34 biodiversity hotspots of the world, namely, the Himalaya, Indo-Burma, Western Ghats, and Sundaland. As per the 2018 annual report of the National Biodiversity Authority (NBA[18]) over 91,200 animal and 45,500 plant species have been documented in the country. Due to the rapid economic development, there is immense pressure on natural resources and biodiversity rich ecosystems resulting in an unprecedented loss of habitats and species. In line with the Convention on Biological Diversity (CBD), India enacted the Biodiversity Act in 2002 aimed at conserving and enhancing biodiversity. A three-tier structure comprising a National Biodiversity Authority (NBA), State level biodiversity boards (SBB) and a Biodiversity Management Council (BMC) at the local level. These institutional structures could play a role in ensuring the implementation of the NMEO-OP while conserving biodiversity.

Plantations are markedly less complex than natural forests, as they have a uniform tree age structure, lower canopy height, and sparse undergrowth[19]. As a consequence of this, the species that are typically found in a plantation are typically generalist species as the habitat is far simpler than a complex forest ecosystem. Of the 14 states that have been identified for oil palm expansion, 5 North eastern states play host to the Indo-Burma biodiversity hotspot and 6 southern states play host to the Western ghats. It is widely believed that the traditional shifting cultivation or Jhum cultivation practiced in the North eastern states have resulted in significant loss of biodiversity as they replace secondary forests. Therefore, a perennial oil palm plantation with a life cycle of around 25 years appears to be a better option to protect biodiversity in comparison to the Jhum cultivation. However, based on research conducted in Mizoram, it has been shown that when compared with monoculture plantations, jhum- with a mosaic of forest patches at different stages of regeneration—is far better at maintaining biodiversity in larger landscapes[20]. Forest bird abundance in the jhum landscape was similar to that in rainforest, on average 304% higher than in oil palm plantations. It was also observed that the rapid recovery of diverse and dense bamboo forests during fallow periods, makes the jhum cultivation better suited for bird conservation than oil palm plantations. It is important to note that a large proportion of forest land in the Northeast is managed by communities. Converting large expanses of community-owned shifting cultivation lands into monoculture oil palm plantations will potentially destroy key habitats of conservation importance, along with cultural heritage.

Learning from the impacts of oil palm cultivation on biodiversity in Mizoram, the government must ensure that the expansion of oil palm cultivation in the biodiversity rich states should be done in consultation with the local BMC's and the SSBs to minimise the loss of habitats. This would ensure that the implementation respects the National Biodiversity Act and the National Biodiversity Targets (NBTs). An environmental impact assessment (EIA) and/or a High Conservation Value (HCV) assessment prior to expansion would enable identification of the species diversity within and around the areas identified for oil palm cultivation. Conducting these assessments with the support of the local communities and authorities would ensure that the potential impact on biodiversity is fully understood and help in securing the buy-in of the local communities as the success of the NMEO-OP rests with the support and cooperation of the local communities.

EFFICIENT USE OF WATER: NATIONAL WATER MISSION

Oil palm is extremely water intensive, requiring 280 to 350 L of water per plant per day[21]. Oil palm is a rain-fed crop and is globally cultivated in regions where there is sufficient water available through annual rains. The National Mission on Oilseeds and Oil Palm (NMOOP) states the crop requires evenly distributed annual rainfall of 2,500-4,000 mm. However, with the changing climatic patterns in India and variance in the monsoons in India, it will be difficult to rely on precipitation alone for oil palm cultivation. Inadequate water supply results in varying yields of Fresh Fruit Bunches (FFB). While measures must be taken to effectively harvest rainfall, the cultivation in India has to largely depend on groundwater irrigation.

According to a press release in 2018 by the Ministry of Water Resources, India is the largest user of groundwater in the world accounting for 25% of the total extraction. Almost 90% of this extraction in India is for irrigation[22]. There has not been a lot of research studies in India on the impacts of oil palm cultivation on ground water tables. Andhra Pradesh, which contributes the most to the domestic production of palm oil, has a publicly available dashboard on the ground water levels in each mandal. However, historical information is not available. Anecdotal evidence published in some news articles[23] farmers in Andhra Pradesh indicate that the water table has gone down over the last few decades resulting in them having to deepen the bore wells up to 900 feet in some cases.

[18] http://nbaindia.org/uploaded/Annual_report_2017-18_english.pdf
[19] (Yaap 2010)
[20] (Jayadev Mandal 2016)
[21] (Carr 2011)
[22] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1555824
[23] https://www.thethirdpole.net/en/food/oil-palm-in-andhra-pradesh-prosperity-at-what-cost/

As the states are preparing the implementation of the NMEO-OP scheme and identifying districts for oil palm expansion, it is important that they adopt the NMSA's Rainfed Development Area (RAD) approach[24]. This is a 'watershed plus approach' that aims to establish clusters where appropriate farming systems will be introduced by integrating different components (e.g. Agriculture, livestock, fishery etc.) to ensure development and conservation of natural resources. This approach would allow the district administration to assess and integrate oil palm cultivation with other farming systems within the district so that the available water sources are sustainably managed. Involving the communities in identifying land for oil palm cultivation and building their capacity to identify and manage the water resources within the community would build their support for the integration of oil palm within their villages. More importantly, community participation in land and resource management promotes cooperation and prevents potential conflicts over water needs for competing crops grown within the community.

The annual action plans published by the states under the NMEO-OP guidelines include incentives for farmers to set up drip irrigation and bore wells and to construct ponds and purchase pump sets for irrigation. However, no measures of replenishing the ground water table are incentivized. In the North eastern states where it rains for almost 6 months of the year, irrigation is less of an issue but all the state action plans should include incentives to build the necessary infrastructure to manage water on the farm, including rain water harvesting, storage tanks and infiltration systems. Using techniques like Managed Aquifer Recharge and adopting some traditional small reservoirs known as Cheruvu in Andhra Pradesh and Telangana, it is possible to artificially facilitate the increase in ground water storage. This is a technique to intentionally recharge suitable aquifers for subsequent recovery. Some of the Southern states could see a switch from rice cultivation to oil palm which would be beneficial for water management. Anecdotal evidence from Andhra Pradesh indicates that the water consumption for a drip irrigated oil palm plantation uses approximately 77.5% lower than rice paddy.

SUSTAINABLE MANAGEMENT OF POME : CPCB

Palm Oil Mill Effluent (POME) is one of the major waste products of primary processing of Fresh Fruit Bunches and extraction of palm oil in mills. Based on research conducted in Malaysia, it is estimated that for every tonne of crude palm oil produced, about 2.5 to 3.5 tonnes of POME[25] is generated. POME contains a high Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) besides high concentration of organic nitrogen and phosphorus that causes significant reduction in biodiversity and affects aquatic ecosystems if discharged into water courses. Discharging POME into water courses has been the most common practice across mills in SE Asia as the treatment of POME comes at a significant cost to the mills. With increasing awareness and regulations on handling waste, open ponding has been observed to be the most cost effective and efficient way of handling POME. Despite the low operating costs of open ponding systems, it is becoming a less desirable option for handling POME due to the significant amount of methane (CH4) emissions that is emitted into the atmosphere through the digestion of POME in these open ponds. As studies have shown, Methane has more than 80 times the warming power of Carbon dioxide over the first 20 years[26] after it reaches the atmosphere thereby accelerating the pace of warming compared to carbon dioxide emissions.

On average, it is observed that BOD (Biological Oxygen Demand) ranges from 8,200 to 35,000 mg/L and COD (Chemical Oxygen Demand) ranges from 15,103 to 65,100 mg/L in untreated POME[27]. Whilst the CPCB does not have an industry specific standard for Palm Oil Mills on handling waste water discharge/effluents, the general standards require COD of 250 mg/.L COD and BOD around 30 - 350 mg/L[28] depending on the area of discharge. It is evident that stringent rules around handling of POME are needed in India to avoid soil and water pollution and methane emissions due to improper handling of POME. While we anticipate these rules to be developed by the CPCB for the palm oil sector, the industry could be incentivised to adopt environmentally friendly practices in the treatment and handling of POME that should be designed in conjunction with the implementation of the NMEO-OP to minimise the environmental impacts of the expansion program.

Vermi-composting of POME which is an organic waste with the aim to use it as fertilisers for the palm plantations has shown promising results based on studies conducted in Malaysia. Vermicompost is rich in NKP, micronutrients and beneficial soil microbes that act as plant growth regulators[29]. Some of the Annual plans prepared and published by the States have provided incentives for Vermicomposting. This is a great initiative by these states to minimise the environmental pollution that arises from POME and to support the farmers with the organic compost that is produced from the waste thereby minimising the reliance on chemical fertilisers. This incentive model could be replicated across all the states and could become part of the operational guidelines for implementing NMEO-OP program.

[24] https://nmsa.dac.gov.in/pdfdoc/NMSA_Guidelines_English.pdf
[25] (Osman 2020)
[26] Environmental Defense Fund n.d.)
[27] (Yahaya S. Madaki 2013)
[28] Environment Protection Act, Centre for Pollution Control Board, https://cpcb.nic.in/env-protection-act/
[29] (Bidattul Syirat.Z 2013)

Besides vermicomposting, the treatment of POME also provides opportunities for methane capture and production of biogas. Biogas is formed naturally when palm oil mill effluent (POME) decomposes in the absence of oxygen through anaerobic digestion. Biogas is typically composed of 50–75% methane (CH_4), 25–45% carbon dioxide (CO_2)[30], and trace amounts of other gases. Converting POME emissions to biogas for combustion can produce energy, as well as significantly reduce the climate change impacts of palm oil production. Based on a study[31] conducted by Winrock international with the support of USAID, it was estimated that an FFB mill that operates at a capacity of 60 tons of FFB/hour could produce 2.1 MWe from their POME. To tap into the potential of POME as a source of energy, the central government can consider allocating funds and provide incentives to palm oil mills to promote methane capture and biogas production technologies.

[30] (USAID, Winrock 2015)
[31] (USAID, Winrock 2015)

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