

Commentary

Palm oil cultivation in Meghalaya: a health and environmental perspective

Markordor Lyngdoh^{1*}, Daiahunlang Lyngdoh², Shanthosh P. Sundaram¹

¹Department of Community Medicine, NEIGRIHMS, Shillong, Meghalaya, India

²Department of Environmental Science, Shillong, Meghalaya, India

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*Correspondence:

Dr. Markordor Lyngdoh,

E-mail: marsangriang@gmail.com

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ABSTRACT

Palm oil cultivation has long been an ongoing controversy in regards to the threat that it poses to the environment. Countries like Indonesia and Malaysia account for the largest share of the world's palm oil production. The economic benefit that this has brought to these two nations is enormous. However, this is not without consequences. Forests have been destroyed and raging forest fires have claimed the lives of many people. Air and water pollution have threatened the lives of many living beings especially endangered species. Palm oil cultivation also causes occupational health hazards to its many workers. The central government is appealing to many states including Meghalaya to take up palm oil cultivation in order to make the country self-reliant. Many environmentalists are opposed to this move and with good reason. It is therefore imperative to understand the perils of palm oil cultivation in a heavily forested state like Meghalaya not only to the environment but also the health of its citizens as a whole.

Keywords: Palm oil, Health impact, Environmental impact, Meghalaya

INTRODUCTION

In July 2020, Prime Minister Narendra Modi appealed to the farmers of north east India to take up palm oil cultivation in order to make the country self-reliant. The aim of the National Mission on edible oils-oil palm is to cover 6.5 lakh hectares of land under palm oil cultivation; out of which 3.28 lakh hectares will be in the north-eastern states and the union territory of Andaman and Nicobar Islands. The move enraged environmentalists of the country as this would pose an enormous threat to the biodiversity of the area. Palm oil cultivation has long been a controversy. Sacrificing land for the sake of profit. The major producers of palm oil are Indonesia and Malaysia. The exports of palm oil in these countries have yielded economic benefits at a large scale resulting in increased destruction of forest land in recent years. The states in north east India which has already undertaken palm oil

cultivation include Assam, Mizoram, Nagaland and Tripura.

Meghalaya has a land area of 22,429 sq. km and a total population of 29,66,889. It shares a border with the state of Assam to the north and north east and it has an international border with Bangladesh in the south and south west. The literacy rate in the state is 74.43%. As the country plans to expand cultivation in this region, there is a need for a detailed discussion so as to ascertain its feasibility in a heavily forested area like Meghalaya.

PALM OIL

The fruit of *Elaeis guineensis*, also known as palm fruits provides two types of contrasting oil namely "palm oil" and "kernel oil". Palm oil is extracted from the fleshy mesocarp tissue. It is deep orange-red in colour and a semi-solid fluid. On the other hand, kernel oil is extracted from

the endosperm tissue of the kernel (seed) and is a white-yellow coloured oil.¹ Globally, palm oil is one of the most commonly used vegetable oil. It is present in around half of routinely used consumer products ranging from snacks to cosmetics.^{2,3} The main advantage of oil palm in comparison to other oil crops is the significantly higher production per hectare leading to higher income.⁴ The gross domestic product accounted by the palm oil industry in Indonesia is 1.6% and it employs 4.5 million people. The export of palm oil contributes to more than \$18 billion a year in foreign exchange, thus making it the single major contributor in the country.⁵

DEFORESTATION

The Food and Agriculture Organisation (FAO) data shows, that palm oil has contributed to an estimated 5% of deforestation in tropical areas. When looking at global deforestation, palm oil contributes to 2.3% of global deforestation (The European Commission). In major palm oil exporting countries, an annual forest conversion of 270,000 ha is a result of palm oil cultivation from 2000-2011.⁶ It was reported by one study that >50% of Indonesian and Malaysian palm oil plantations in 2005 were located on land that was previously forests in 1990.⁷ Deforestation is associated with carbon dioxide emissions, as crops and marginal lands that usually replace trees after land clearing tend to hold less carbon per unit area than forests.⁸

The largest source of greenhouse gas emissions is conversion of forest and peat lands for the purpose of palm oil cultivation. This results in the changes in land cover which is responsible for a substantial increase in the total carbon emissions countries like Indonesia, Malaysia and Papua New Guinea (13% in 2000-05 to 18% in 2006-10). Over 90% of this conversion of land happened in Sumatra and Kalimantan. Hence, Indonesia is placed third after China and the United States of America among the 10 biggest carbon emitters in the world.⁹

VECTOR BORNE DISEASES AND ZOOONOTIC DISEASES

There is a direct link between deforestation and vector borne as well as zoonotic diseases. Deforestation favours mosquitoes that serve as vectors of human diseases.¹⁰ A study conducted by Morand et al showed a positive association between the number of vector-borne disease outbreaks and the increase in land areas converted to oil palm plantations.¹¹ Outbreak of vector borne diseases including malaria, dengue, zika, chikungunya and yellow fever. A finding from Papua New Guinea showed that about one-third of the labourers had positive blood slides for malaria.¹² About 28.6% of those working in a palm oil plantation in Malaysia had serological evidence of leptospirosis infection.¹³ In Ghana, a study was conducted among the employees of a palm oil plantation to investigate the prevalence of worm infestations. It detected 84.1% of workers with onchocerciasis and 41.6% of them

had intestinal worm infestations (predominantly *Ascaris lubricoides* and hookworm).¹⁴ Palm oil monoculture also contributes to zoonotic diseases, rickettsial diseases (scrub typhus, spotted fever group) and even Chagas disease which was seen in palm oil plantations of Columbia.

SLASH AND BURN

Slash-and-burn, alternatively known as shifting cultivation or swidden, is an agricultural system where farms and their existing vegetation are cut down and burned off, and subsequently, the land is used for the cultivation of agricultural crops.¹⁵ The major contributor of greenhouse gases is large-scale slash-and-burn method used for commercial agriculture. The fallow period in turn is shortened because of this agricultural intensification which hampers the recovery of the ecosystems. Along with the short fallow period, the ability of the forests to sequester atmospheric carbon dioxide is impacted.¹⁶ For the purpose of palm oil cultivation, farmers have resorted to the slash and burn method to clear their land for planting the crops. The slash and burn method adopted in Indonesia has resulted in numerous forest fires which have threatened the biodiversity of the area. The iconic Bornean and Sumatran orangutans of Indonesia are now critically endangered. The local climate of the area stripped out of its moisture-holding flora, dries out and the soil stripped of nutrients.¹⁷ In 2015, Indonesia experienced agricultural fires leading to an estimated 100,000 premature deaths. There was also a reported increase in respiratory, eye and skin diseases.¹⁸ The effect of particulate matter exposure on the mortality of foetus, infant and child along with the impact on children's cognition, educational and economic attainment was a major concern.^{19,20}

According to the State of Forest Report of 2017, the forest cover and tree cover of the state of Meghalaya is 17,146 square km and 657 square km which is about 76.44% and 2.92% of its geographical area respectively. In order to make way for palm oil cultivation a lot of this forest cover will be gone. This will not only threaten the biodiversity of the state but also leads to air pollution. The slash and burn method will give rise to uncontrollable forest fires. The resulting haze will give rise to large quantities of particulate matter which push air quality to hazardous levels. Both short- and long-term health impacts develops in the exposed populations. This ranges from skin and eye irritation to life threatening respiratory and cardiovascular problems and even death. Each year, the exposure to particulate matter arising from these fires caused about 110,000 deaths in Southeast Asia.²¹

POME

Palm oil mill effluent (POME) is a wastewater which is generated from milling activities of palm oil. It requires effective treatment before it is discharge into water channels as it contains a lot of pollutants.²² POME has a high biochemical oxygen demand (BOD) and chemical oxygen demand (COD) which makes it 100 times more

polluted than the municipal sewage. Organic nitrogen, phosphorus and different other substances makes up a high concentration of this effluent.²³ When POME is discharged in to watercourses, it poses a grave threat to aquatic life. There is also the possibility of algae bloom because of the high number of total solids (40,500 mg/l) providing large amount of nutrients in the wastewater.²⁴ The cheapest and easiest way for this wastewater disposal that have been practiced in Malaysia is by discharging the treated POME to the nearby river or stream.²⁵ For every metric ton of palm oil produced, a palm oil mill generates 2.5 metric tons of effluent. This causes freshwater pollution when directly released. Consequently, the biodiversity downstream as well as the people are affected.²⁶ This damage caused by POME cannot be undone easily. As a result, treatment of this wastewater is very expensive.

GROUND WATER

A study conducted in the Jambi province in Sumatra, Indonesia discovered that under oil palm plantations, the eroded and compacted soil does not allow adequate penetration of water. As a result, ground water recharge becomes very less as a large amount of water leaves the landscape as runoff. In addition to that, the conversion of natural forests to plantations for oil palm enhances cyclical water scarcity.²⁷

Meghalaya is also known as “The Scotland of the East” and its tourism sector generates a lot of revenue for the state. It gives opportunities and provides employment to the youths. It has over 100 tourist spots all over the state and many more areas are left unexplored. It has an abundance of waterfalls, lakes, rivers and streams. The cultivation of palm oil in the state will severely affect the tourism sector. Treatment of this wastewater will be difficult for the state. Hence, the water bodies will be left polluted from the run-off POME affecting both aquatic and human lives. The ground water resources of the state will also dry up.

MUSCULOSKELETAL DISORDERS

More than a million workers are employed in the palm oil industry. Musculoskeletal disorders are quite common among the employees. Twelve-month prevalence for low-back pain, injuries of the shoulder, injuries of the upper back and knee injuries particularly those in hilly terrain were pretty high. Jusoff et al detailed that there were 69% of workers who were cutting at heights above 13 metres. Out of those cutting at heights above six metres, 87% had musculoskeletal disorders of the hand/wrist area while 84% had musculoskeletal issues of the shoulders and arms.²⁸

NON-COMMUNICABLE DISEASES

In 2018, the Food and Drug Administration of the United States of America (USA) banned the use of trans fatty acids in food products. This ruling was made so as to “prevent

thousands of heart attacks and deaths each year.” This would lead to an increase use of palm oil in manufacturing of processed food. The developed nations like the USA would heavily rely on the increase production of palm oil from nations like Malaysia and Indonesia.

The composition of palm oil includes saturated fatty acids (50%), palmitic acid (44%), stearic acid (5%) and a bit of myristic acid. Oleic acid (40%) and polyunsaturated linoleic acid (10%) accounts for the unsaturated fatty acids.¹⁹⁻²¹ The saturated fatty acid content in palm oil has been a source of debate as to its safety in consumption. There have been studies that found a link between adverse effects like increased mortality from ischaemic heart diseases, cardiovascular heart diseases and low-density lipoprotein with palm oil consumption. However, there have been other studies as well that could not find any negative correlation or even favourable health outcomes associated with the consumption of palm oil.²⁹

PESTICIDE AND HERBICIDE EXPOSURE

Paraquat dichloride or simply paraquat is a non-selective herbicide mainly used for palm oil cultivation. It has been banned but still widely used especially in the state of Andhra Pradesh. Other pesticides utilised include malathion, glyphosate metalaxyl, maneb, captan, cypermethrin and carbaryl. Among the plantation workers in Sabah, Malaysia, there was an increased risk of having irregularities in the quality parameters of semen which include sperm count, motility and teratospermia. However, the sample size of the exposed was small and no differences was detected based on the type of pesticide.³⁰

STRESS AND MENTAL HEALTH DISORDERS

There can be a lot of stressors for workers in the oil palm plantation. These include the highly demanding manual labour, the probability of musculoskeletal diseases and infections, impoverished conditions of living, poor remuneration, long hours of work and instability of the work. Moreover, migrant workers form the bulk of labour force on oil palm plantations. These are usually without a supportive social network.³¹ In a study conducted in Selangor Malaysia, 36% of the plantation workers reported mental distress while 28% had mild to moderate anxiety, 9% had mild to moderate depression.³²

CONCLUSION

Palm oil has taken an integral part in the vegetable oil market as it is high yielding crop. It requires only half the land required by other crops to produce the same amount of oil. It has a high demand in a country like India which is aiming to be self-sufficient in its production. If palm oil cultivation is undertaken in a small state like Meghalaya, it would more likely lead to a boost in the state’s economy. Whether this financial success is an inevitable one remains to be seen. Lack of adequate transportation because of poor road access in many parts of the state will definitely cause

problems for local farmers. While the direct effects of palm oil consumption are still a contested issue, the indirect effects are numerous. If Meghalaya is keen to undertake palm oil cultivation within its borders, it has to do so at a huge risk. There will be an issue of food insecurity as farmers will replace food crops with oil palm. Land rights will also become an issue where the tribal population of the state will be forced to give up their indigenous land for expansion of the area of cultivation in the name of profit. There is the certainty of threatening the rich biodiversity of the state thus impinging the natural beauty of Meghalaya. Forests will be cut down. Shifting cultivation will be more rampant as it already widely practiced in the state. POME or the wastewater generated from the palm mills will pollute the abundance of lakes and rivers. Aquatic life will be at risk. The ground water resources of the state will be depleted. The air and water pollution will hamper the health of the locals. The efforts of the government to eliminate malaria will be thwarted as it is a common vector borne disease seen in most areas where palm oil cultivation is undertaken. The economic benefit for the state will come at a price of the citizen's health. This will ultimately lead to a decrease in productivity. Thus, the risks will outweigh any benefits that the state is hopeful to gain.

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