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The study on Pest Problems of Oil Palm and Management

Mr. K.Ragavandaran
Dept. Of Management
AJR Institute of Management, Karnataka, India.

Abstract:

The Oil palm is the richest source for vegetable oil production with a capacity of 4-6 tons of oil per ha per year. It is the most sustainable crop to feed the hungry mouths of the world as it is recognized universally as the most efficient, effective and highest yielding form of edible oil production. The eco friendliness is manifested as it is a perennial plantation crop, maintains its green canopy throughout 30 years of its economic life and does not cause soil erosion, river siltation, etc. With the cultivation of oil palm, the farmers can get more returns as the Benefit Cost Ratio for oil palm is more than 1.8. It can replace the other non remunerative crops which are posing threat. It is a labour saving crop as it is not labour intensive like other crops.

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Introduction

The cost benefit ratio of oil palm in Malaysia is 3.0 which could be the reason for the fast growth of Malaysia's economy. The vegetable oil consumption in India is only 14.10 kg per annum per person as against the world's average of 23.60. According to FAO, the minimum quantity required for human consumption is 18 kgs. Only 50% of our consumption is being produced from the nine oil seeds crops and rest is being imported spending huge amounts of foreign exchequer. To mitigate the gap between demand and supply of vegetable oil in the country, the crop is introduced to cultivate using irrigation. Since 1990 onwards, it is under cultivation in extensive areas in 11 states in India. Andhra Pradesh is leading with 1.02 lakh hectares of oil palm plantation extending in ten districts.Apart from high productivity, the crop also works as a good sink for carbon dioxide absorption and source for oxygen production. One hectare of oil palm plantation produces an amount of 21.96 tonnes of oxygen per annum while absorbing 30.28 tonnes of CO2. It is far superior over other oil seeds crops whose production and productivity of vegetable oil (less than 1 tonne) as well as oxygen (2.54 tonnes) is far below to oil palm. Though

the crop is more sustainable in many ways to growers, processors and to the government, however in the recent years, heavy incidence of pest population is observed causing defoliation and thereby yield loss. This warrants the farmers to go for pesticide application causing environmental pollution and problems to pollinating weevils. Since sustainability of the farmer is the prime concern for cultivation of any crop, at the same time the interest of vegetable oil consumers is also important.

Oil palm, Elaeis guineensis Jacq is an introductory crop to India to mitigate the gap in demand and supply of vegetable oil requirement of the country. Though utmost care is being taken to restrict the entry of any pest population along with the seed sprouts from the importing countries, still many pests are found to infest the crop causing yield losses. Few such pests are rhinoceros beetle, leaf web worm, psychid, slug caterpillar, scales and mealybugs. Except the leaf web worm, Acria sp. rests all are found to migrate from the local ecosystem. Most of these populations are found to migrate from other arecaceae palms like coconut, palmyrah and areca nut which are commonly seen in the adjoining areas of oil palm plantations.

The loss estimation on the yields of oil palm due to the above pests was in the range of 20-30% extending to three years after attack. However, this is further found dependent on the management practices being taken by the farmers with restoration to the normal yield levels within few years of attack.

The loss in the yields due to rhinoceros beetle was mainly due to the breaking of leaves at the petiole region where the pest attack is commonly seen. Nearly 25% yield loss is reported with the 50% breaking per palm. The pest which is common on coconut and palmyrah found migrating to oil palm due to more number of leaf production. Metarhizium anisopliae is found to act as good biological control agent causing green muscardine disease to all the stages of the pest. Psychid, Metisa plana and slug caterpillar,

Darna catenatus which are reported to be minor pests of coconut, palmyrah and maize, found to cause heavy infestation on oil palm causing yield losses up to 50%. The causes of migration may be the existence of congenial conditions like low temperatures and high humidity in the oil palm plantation. The yield losses due to these migrant pests lead to instability on sustainability of the yield as well as cultivation and hence necessary to take good management practices.

Oil palm in India

Agricultural ecosystems are now among the dominant habitat types on the planet (Foley et al., 2005). An expanding global population and a burgeoning demand for food have resulted in agricultural areas increasing dramatically in the tropics (Green et al., 2005), with 80% of the world's new agricultural land coming from the conversion of tropical forest (Gibbs et al., 2010). Conversion of natural ecosystems to agricultural landscapes has had a severe negative impact on global biodiversity (Sodhi et al., 2004, 2010), with losses of species already occurring and further regional and global extinctions predicted to occur. At the same time, global concerns for climate change have resulted in an accelerating demand for biofuel (Koh & Ghazoul, 2008), placing more pressure on remaining natural habitats. Among the most important agricultural crops in the tropics is oil palm.

Palm oil is used in a wide range of products, is a particularly important source of vegetable oil (Corley, 2009) and is increasingly used as a feedstock for biofuel production (Basiron, 2007; Henderson & Osborne, 2000; Koh, 2007). Globally, oil palm cultivation is centred in the tropics with the highest levels of production in Indonesia and Malaysia (Basiron, 2007). Both Indonesia and Malaysia are located in global biodiversity hotspots (Myers et al., 2000), so expansion in these areas is likely to have a large negative impact on biodiversity at the global scale (Sodhi et al., 2004).

Based on data from the Food and Agriculture Organisation of the United Nations [FAO] (FAO, 2011), we present trends in the global production of oil palm fruit over a 48-year period from 1961 to 2008 (Figure 1), as well as individual per country production for the top two palm oil producing nations in Southeast Asia, Africa and South America. In terms of quantity, these six nations are among the top ten oil palm producing countries worldwide (Figure 3). We present information on oil palm land area and yield per hectare. Where available, we also present trends in the producer prices for palm oil in each country. Global palm oil prices were estimated as the mean producer price from the 14 countries listed on the price domain of the FAOSTAT database (FAO, 2011). Between 1961 and 2008 production of oil palm fruit has increased from 13 million tonnes to around 207 million tonnes worldwide (FAO, 2011). This rise has corresponded with substantial increases in land area under oil palm cultivation, with centres of oil palm production located throughout the tropics.

Concerns for species losses as a result of palm oil expansion should therefore not be restricted to Southeast Asia, but rather to all tropical regions where forest is being converted (Wilcove & Koh, 2010). Although there have been increases in yield per unit area in most countries, this is not consistent and is very variable between nations and regions, with the well-developed oil palm industry in Malaysia and Indonesia showing the most marked increases in yield. Prices commanded for palm oil, although very variable, also continue to rise. Between the 1960s and 1980s increases in global palm oil production were probably primarily obtained by increased yield per area. However since the 1980s this trend has shifted, with increased global production being driven instead by further conversion of land to oil palm cultivation (Murphy, 2009), threatening remaining forest habitats.

The large difference in yield per area between different countries raises the possibility that, if yield can be increased in those regions at the lower end of the range, pressure on remaining forest habitats may be reduced. The recent development of higher-yielding seedling stock and more efficient processing technology (Donough et al., 2009; Mathews & Foong, 2010; Murphy, 2009) could enhance yield and productivity further, thereby also relaxing pressure to convert further natural habitats to oil palm cultivation.

Oil palm India limited was established in the year 1977 with the objective of propagating oil palm cultivation in the country. Oil palm India limited has got a total planted area of 3646 hect. Oil palm is the richest source of oil. While oil palm can give around 3 to 5 tons of oil per hectare, the yield per hectare of oil seeds like ground nut, sunflower, soybean etc., would come to about one ton only. The cultivation of Oil palm is commercially very much viable in comparison with other commercial crops like Rubber, Coconut etc.,

Palm Oil or Palmolein is the oil produced from the red oil palm tree (Elaeis guineensis), Palm oil is extracted from the pulpy portion (Mesocarp) of the fruit of Oil palm. The crude palm oil is deep orange red in colour and is semi solid, temperature of 20 degree centigrade. Palm oil contains an equal proportion of saturated and unsaturated fatty acid containing about 1-40 % oleic acid, 10% linoleic acid, 44% palmitic acid and 5% stearic acid.

The unprocessed palm oil used for cooking in various countries. Palm oil a very rich source of beta carotene, an important source of vitamin A and it contains Tecopherols and Tocotrienols, a

natural source of Vitamine E. In view of the rich content of Vitamins, palm oil can be utilized for the preparation of cosmetic as well.

Oil palm is the richest source for vegetable oil production with a capacity of 4-6 tons of oil per ha per year. It is the most sustainable crop to feed the hungry mouths of the world as it is recognized universally as the most efficient, effective and highest yielding form of edible oil production. The eco friendliness is manifested as it is a perennial plantation crop, maintains its green canopy throughout 30 years of its economic life and does not cause soil erosion, river siltation, etc.

With the cultivation of oil palm, the farmers can get more returns as the Benefit Cost Ratio for oil palm is more than 1.8. It can replace the other non remunerative crops which are posing threat. It is a labour saving crop as it is not labour intensive like other crops. The cost benefit ratio of oil palm in Malaysia is 3.0 which could be the reason for the fast growth of Malaysia's economy.

The vegetable oil consumption in India is only 14.10 kg per annum per person as against the world's average of 23.60. According to FAO, the minimum quantity required for human consumption is 18 kgs. Only 50% of our consumption is being produced from the nine oil seeds crops and rest is being imported spending huge amounts of foreign exchequer.

To mitigate the gap between demand and supply of vegetable oil in the country, the crop is introduced to cultivate using irrigation. Since 1990 onwards, it is under cultivation in extensive areas in 11 states in India. Andhra Pradesh is leading with 1.02 lakh hectares of oil palm plantation extending in ten districts.

Apart from high productivity, the crop also works as a good sink for carbon dioxide absorption and source for oxygen production. One hectare of oil palm plantation produces an amount of 21.96 tonnes of oxygen per annum while absorbing 30.28 tonnes of CO2. It is far superior over other oil seeds crops whose production and productivity of vegetable oil (less than 1 tonne) as well as oxygen (2.54 tonnes) is far below to oil palm.

Though the crop is more sustainable in many ways to growers, processors and to the government, however in the recent years, heavy incidence of pest population is observed causing defoliation and thereby yield loss. This warrants the farmers to go for pesticide application causing environmental pollution and problems to pollinating weevils. Since sustainability of the farmer is the prime concern for cultivation of any crop, at the same time the interest of vegetable oil consumers is also important.

Palm Oil and Human Health

Palm oil is an edible oil derived from the pulp of fruits of the oil palm (Elaeis guineensis). Palm oil is used around the world in such foods as margarine, shortening, cooking oil, soups, sauces, crackers and other baked goods, and confectionary products. Indeed, after soybean oil, it is the most widely used oil. It is highly versatile and can be substituted for hard animal fats (butter and lard); for soy, olive, or canola liquid vegetable oils; and for partially hydrogenated vegetable oil, which is a staple of the baking, fast-food, and other industries.

Tran's fat, which is created when liquid soybean oil is hydrogenated to create a more solid, stable form, is a potent promoter of heart disease. Trans fat raises LDL ("bad") cholesterol in blood as effectively as saturated fat, and it slightly decreases HDL ("good") cholesterol. In addition, trans fat appears to increase the risk of diabetes, impair cardiac rhythm, and have other adverse effects. Commendably, many food processors are seeking alternatives to partially hydrogenated oil so they can eliminate the trans fat from their products. Palm oil is highly attractive both because of its taste and cooking properties and because it is about one-third cheaper than soybean oil (partly because oil palm plants yield 10 times more pounds of oil per acre than soybeans). Unfortunately, palm oil, while not as harmful as partially hydrogenated soybean oil, is still considerably less healthful than other vegetable oils.

Moreover, the industry claims, the palmitic acid that constitutes 44 percent of palm oil affects cholesterol levels much like oleic acid. In contrast to the palm oil industry's contentions, most health authorities—supported by most of the medical research on the health effects of different fats—agree that palm oil promotes heart disease. The research they cite goes back to at least 1970. Two "meta-analyses"—a research technique that combines similar studies to achieve greater statistical strength—examined the effect of palmitic acid on serum cholesterol. In a 1997

meta-analysis based on 134 human experiments, prominent British medical researchers concluded that palmitic acid raises blood cholesterol levels. Polyunsaturated fatty acids, such as the linoleic acid in liquid vegetable oils, lower cholesterol levels.

Economical importance of oil palm pests

Losses attributed to oil palm pest can be substantial if pest damage is allowed to occur without any natural or artificial intervention. To data on the relationship between pest damage and yield reduction are still limited to a few pests such as bagworms and rodents. Liau (1987) reported that a severe defolitation by Mahasena corbetti resulted in crop losses in excess of 40% - 50% in the two subsequent years. In a later study, Basri (1993) found that a light defoliation did not affect the yield but a moderate defoliation by Metisa plana resulted in a crop loss of 33% - 40%. Thus bagworm defoliation should be prevented from reaching a moderate level as it will result in economic loss.

Rhinoceros beetle attacks are normolly serious during the immature phase of the crop. The damaged palms have an extended immaturity period (Liau and Ahmad, 1991). Therefore, the initial yield can be severely reduced after a serious attack. Rata are also important pests of oil palm because at high population, they could cause a crop loss of 240 kkg oil ha/ year (Wood and Liau, 1978). At a palm oil.

Conclusion

A development on IPM for oil palm pests was generally accepted amongst crop protectionist that pest control should not rely only one technique for any specific pests. In the past, complete reliance on chemical approach has often led to the development of other more persistent problems such as resistance of pests to treatment; build up of chemical residues in environment, elevation of insects from secondary to primary pests and the disruption of populations of natural enemies. As such, an understanding of pest population dynamics and adoption of IPM are somewhat essential and rather inevitable for the management of oil palm pests.

IPM has a much broader meaning and this can best be summarized by FAO definition which states IPM is defined as a pest management system that in the context of the

associated environment and population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible a manner as possible and maintains pest populations at levels below those causing economic injury. Thus in IPM, the focus should not be on a single approach and the strategy is not total eradication.

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