

AGRI STIMULUS

Oil palm in sustainable cropping system holds promise for India



India in 2018 imported nearly [15 million tons](#) of edible oils which is nearly 68% of annual consumption demand of about 22 million tons. Of the total imports of edible oil, nearly 60% constitutes palm oil. The consumption for palm oil has increased by about 230% in last 2 decades from 3 million tons in 2001 to nearly 10 million tons now. Despite this increased requirement, India is still importing nearly 70% of the palm oil demand. Government has spent nearly 70,000 crores in 2018-2019 for import of palm oil.

Palm oil is used as the most common cooking medium and in various forms, from chips and instant noodles to tooth-pastes, lotions, lipsticks and other personal care items and cosmetics. It is preferred

over other edible oils by price-sensitive consumers as the palm oil price is generally 20% lower than other vegetable oils. This is due to productivity gains attained by major oil palm producing countries like Indonesia and Malaysia that account for over 82% of world oil palm cultivation. The other reason for less price of palm oil is its lower preference by high-income consumers in countries like US and Europe that prefer olive oil, canola and soy oil etc.

Oil palm, *Elaeis guineensis*, is the highest oil yielding crop among vegetable oil yielding crops. With good planting material, irrigation, and proper management, oil palm has the potential to produce 20-25 MT fresh fruit bunches (FFB) per hectare after attaining the age of 5 years. This, in

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turn, can yield 4-5 MT of palm oil and 0.4-0.5 MT palm kernel oil (PKO) which is about 4.5 times the yield of other traditional oilseeds. In India, 4 million MT of traditional oils is being produced in 15.8 million hectares of land whereas the same quantity of palm oil can be produced in just 1 million hectares. Currently, the country has only about 3.3 lakh hectares under oil palm, while the potential identified for it is 19.3 lakh hectares in the states of Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Karnataka, Kerala, Mizoram, Odisha, Tamil Nadu, and the other North East States by Department of Agriculture, Cooperation and Farmers Welfare (DAC& FW). Andhra Pradesh is the major Oil Palm growing state in India with more than two lakh farmers involved in Oil Palm cultivation while two lakh more farmers are estimated to cultivate the crop in other

parts of the country. The crop has an economic life span of 30 years, comprising three distinct phases viz. juvenile period (1-3 years), stabilizing period (4-8 years) and stabilized period (9-30 years). The major constraints which hinders the expansion of oil palm cultivation in India is the long gestation period of at least 3 years, erratic monsoon leading to shortage of water, high cost of irrigation, fluctuation in prices of Crude Palm Oil in the international market, competition from other economically viable crops such as rubber, arecanut, sugarcane, banana, coconut etc. and variation in import duty on edible oils. Another constraint is the uncertainty in prices of FFBs. Based on the global palm oil market and the oil content of the crop in a particular oil palm growing zone, the state government decides the rate of FFBs every month. But market trends show prices have risen and fallen by up to [50 %](#) over the past 15 years. These challenges needs to be addressed for oil palm growth keeping in mind its advantages and reducing dependence on heavy imports.

Indian Government has taken several initiatives to promote oil palm cultivation since 90's. Technology Mission on Oilseeds & Pulses was taken up by DAC&FW in 1991-92 in potential states. During Eight and Ninth five-year plans, centrally sponsored scheme, Oil Palm Development Programme (OPDP) was taken up. During Tenth and Eleventh 5-year Plan, Government of India (GoI) provided support for oil palm cultivation under Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM). Further to boost oil palm cultivation, GoI had supported a Special Programme on Oil Palm Area Expansion (OPAE) under Rashtriya Krishi Vikas Yojana during the year 2011-12 with an objective to bring



60,000 ha area under Oil Palm cultivation, which continued till March, 2014. During the Twelfth 5-year Plan, National Mission on Oilseeds and Oil Palm (NMOOP) was launched in which Mini Mission-II (MM-II) is dedicated to oil palm area expansion and productivity enhancements. Under this mission, farmers were provided training, subsidized planting materials and input assistance. GoI has also provided financial support for establishment of oil palm processing mill especially in NE/LW areas/hilly states/regions. So far 24 oil palm processing mills have been established in different states with the capacity of 312 MT/hrs for crushing of FFBs. State Governments have also engaged about 15 private entrepreneurs of which M/s Godrej Agrovet Pvt. Ltd., M/s Ruchi Soya Industries, M/s Food, Fats & Fertilizers and M/s Shivasais Oil Palm Ltd are the major ones for developing oil palm seedling nurseries and processing mills in different States. These companies have signed Memorandum of Understanding (MoU) with the State Governments who in turn have allotted lands in Mandals/Districts to the companies for new plantations. The companies have established nurseries in their allotted zone for developing seed gardens of oil palm from seed sprouts of indigenous as well as of exotic origin. They also extend technical

support to the farmers for development of oil palm plantations. Though these initiatives begin with lot of enthusiasm but government has failed to maintain the trend of increasing area under cultivation. To further improve food security and reduce our imports, in April 2017, government decided to remove all land ceilings for the cultivation of palm oil for companies with the additional benefits of 100% FDI, to lure bigger players to "Make in India". Government is now focusing especially on North Eastern region for growth of oil palm cultivation. Need based support is being provided to Indian Institute of Oil Palm Research, Andhra Pradesh for maintenance of existing seed gardens, research & development projects and to strengthen the training infrastructure for oil palm growers/officials etc. under NMOOP. At present more than 70% of total planting material requirement are being met through imports from Indonesia, Costa Rica and Malaysia, Thailand and Ivory Coast.

While there is argument of reducing imports and improving food security, increase in oil palm cultivation threatens the ecological balance. Oil palm plantations threaten water quality changing freshwater ecosystems for decades, lowering the water table, which can lead to increasing concentrations of arsenic in drinking water, and adding salinity to coastal freshwater. Oil palms take up to 80 gallons per tree, per day. The lesson to learn from Indonesia and Malaysia is the extent of deforestation that has happened to increase the area under oil palm cultivation. One of the solution is to grow [oil palm sustainably](#) which some of the companies like Singapore-based Musim Mas, Golden Agri-Resources (GAR), Wilmar International; American agribusiness firm Cargill, and Indonesian grower Asian Agri are adopting. The requirements

of cultivating oil palm keeping in mind the ecological balance are reflected in the industry’s most comprehensive way to identify sustainable palm oil: the Roundtable on Sustainable Palm Oil’s (RSPO) certification system. The RSPO standards consist of eight principles and

more than 40 criteria that growers need to fulfil to prove adherence to the resources and best practices to grow oil palm. Currently, RSPO certification is non-existent in India with only 49 members having certification.

India can now either continue its imports or increase the oil palm cultivation to reduce heavy dependence on imports and enable food security by threatening ecological balance or find a way to grow oil palm sustainably.

Black Rice – the Super food with potential to revamp our food palette

Black rice (*Zizania aquatica*) or “forbidden rice” is a rice variety with promising health benefits derived from its rich content of antioxidants (derived from the black colored anthocyanin pigment), iron and vitamin E content. The presence of anthocyanin pigment on the outermost layer of the rice kernel gives its attractive black color. The traits in black rice are caused due to rearrangement of Kala4 gene, which activates the production of anthocyanins.

Black rice has higher levels of protein, fiber, vitamin B (thiamin and riboflavin), folic acid and minerals (iron, zinc, calcium, phosphorous and selenium) than that of white rice. Lysine and tryptophan are the major essential amino acids present in black rice. It is a rich source of tocopherols (vitamin E), iron, and antioxidants which helps in improving health and increasing life span. It



offers a wide range of health benefits like antioxidant activity, anti-inflammatory properties, lipid oxidation, anti-diabetic, anti-ageing and anti-cancer effects. According to several study findings, black rice helps in management of wide range of diseases including atherosclerosis, diabetes, Alzheimer’s disease, hypertension, high cholesterol levels, arthritis, allergies, aging signs and even cancer (B. Thannuja, R. Parimalavalli; 2018).

China accounts for 62% of black rice production in the world followed by Sri Lanka, India, Indonesia and Philippines. In India it is grown in North-eastern states like Meghalaya, Assam, Manipur, Mizoram, and some parts of Odisha, West Bengal, and Jharkhand. In Manipur it is commonly known as Chak-hao, as Kalabati in Odisha, and Kavuni rice in Tamil Nadu. It has cultural and traditional significance to the people of Manipur offering aesthetic value and nutraceutical properties. Poreiton chakhao and Chakao amubi are two of the popular variants of the crop cultivated in Manipur. It takes more time to get cooked than normal rice but is preferred as a delicacy among the locals because of its earthy and nutty taste.

Cultivation of black rice is generally organic, requires less labour for ploughing, weeding and management as compared to other rice varieties. Farmers avoid application of

Comparative nutritional profile of different rice varieties in per 100 g serving*				
Rice Type	Black rice	Red rice	Brown rice	White rice
Carbohydrates (g)	34 ± 0.05	23 ± 0.04	24 ± 0.07	28 ± 0.03
Protein (g)	8.5 ± 0.5	7 ± 0.05	7.9 ± 0.07	2.7 ± 0.04
Fat (g)	2 ± 0.06	0.8 ± 0.01	0.8 ± 0.02	0.3 ± 0.01
Fibre (g)	4.9 ± 0.3	2 ± 0.6	1.8 ± 0.5	0.6 ± 0.1
Iron (mg)	3.5 ± 0.15	5.5 ± 0.14	2.2 ± 0.07	1.2 ± 0.19
Tocopherol (mg)	12.54 ± 0.34	10.77 ± 0.24	2.2 ± 0.76	0.1 ± 0.14
Thiamine (mg)	0.46 ± 0.032	0.33 ± 0.15	0.54 ± 0.07	0.7 ± 0.06
Riboflavin (mg)	0.403 ± 0.04	0.105 ± 0.03	0.1 ± 0.2	0.03 ± 0.33
Zinc (mg)	3.16 ± 0.05	1.91 ± 0.036	1.8 ± 0.05	1.41 ± 0.039

*Murali RD, Kumar N (2020)

chemical fertilizers and farmyard manure in black rice since such applications enhance vegetative growth of the black rice and increases the production of chaffy grains. However, productivity of black rice is lower (~1.3-1.8 t/ha) as compared to hybrid and other traditional rice varieties (~2.0-5.5 t/ha) under normal conditions (Nepolion Borah et al, 2018). Nevertheless, state government's (particularly Manipur) are vigorously pursuing System of Rice Intensification (SRI) based black rice cultivation for enhancing yield of the crop. The introduction of high yielding varieties has been further promoting black rice as superfood.

Owing to its appealing aroma, nutritional value, and healing properties it is gradually gaining popularity among the farming community. It fetches higher market price compared to traditional ones with the non-organic variant available at Rs. 150-200/kg in domestic markets and Rs. 200 – 250/kg in international countries and the [organic variant priced at Rs. 500/kg](#). However, due to lack of appropriate government support, inadequate systems and marketing channels, the farmers fail to exploit the potential of this “superfood” variant of rice.

In the recent past, success stories have been coming in from Odisha, Uttar

Pradesh and Bihar with farmers not only reaping benefits but also popularizing the crop among other farmers. Further, respective state governments are also encouraging cultivation of the crop primarily for export purposes. In Assam the government is promoting large scale cultivation for sale as organic produce at premium prices in overseas markets. Farmers from Chandauli district of UP are [gearing up to export black rice to Australia and New Zealand](#).

With opportunities opening up in pockets, the crop demands for a holistic and integrated approach through development of improved climate resilient, high yielding varieties, infrastructure, market support, financial initiatives and processing linkages to pave the way for promoting black rice cultivation among farmers as a key crop for both domestic and international consumers. Some state universities like Assam Agricultural University are already working on development of high yielding cultivars to improve farmer returns. Black rice germplasms should be brought in as part of all India rice evaluation projects to identify potential as well as to popularize among enterprising farmer. Further, research on developing varieties with better cooking quality will widen the market acceptability of the product. The growing demand of black rice in international markets of US,

Australia has the potential to reform the economies of the black rice growing farming communities. Moreover, with the recent [Geographical Indication \(GI\) tag](#) allotment to Chak-Hao, the black rice of Manipur will further contribute to encouraging commercial cultivation and improve market potential of the crop. Likewise, the product will fetch better returns and export earnings by converting black rice cultivation to certified organic farming.

Additionally, the overall nutritional profile of the crop makes it a functional and novel ingredient in food processing. In order to utilize the complete potential of the crop, the food processing industry should include black rice as novel functional food and a healthy alternative to other common foods. Owing to its profile the industry can explore its application in bakery products, extruded products and anthocyanin pigment application. Further, black rice can also be explored as a nutraceutical product offering health benefits as a potential source of dietary antioxidants. The crop demands for encouraging initiatives from the various stakeholders of the industry to exploit the full potential of its benefits.



INDUSTRY SPEAKS

Improving Dairy Productivity by Efficient Nutrition Management using Forage Crops

About Dairy industry - India is the global leader in milk production

With a high Bovine population of 300 Million and an annual output of 188 Million Tons, India ranks 1st and accounts for 21% of world milk Production. Urbanization & improved purchasing power is boosting the demand for milk and milk products. However, milk productivity per animal is lower for Indian bovines at 1,360 L compared to world average at 2,300 L.

Key challenges faced by Dairy farmers

- Low productivity of dairy sector because of nutritional gaps arising out of inadequate nutrition from green fodder, along with dry residues and concentrates,
- Generating sustainable revenues from dairy because of high cost of feeding & dependence on

concentrates (Feed costs accounts for 60-70% of total milk production cost), feeding & dependence on concentrates (Feed costs accounts for 60-70% of total milk production cost),

- Shortages and irregular availability of green fodder (India's average deficit of green fodder is 11.24%),
- Only 5% of gross cropped area is used for Forages, therefore, farmers require more yield from limited available land, and
- High animal health maintenance costs due imbalanced nutrition.

Assumptions:

- Milking animal gives 20 litres/day
- Feed requirement calculated based on the body weight of 450-500 kg

Lack of awareness about the role of green forages in improving dairy



Prashant Belgamwar
Business Director, South Asia,
Advanta Seeds

productivity is also one of the key reasons for high dependency on feeds. Fodder production is one of the neglected areas adversely impacting the productivity and profitability of dairy. It is estimated that there will be a [40% gap](#) in demand and supply of green fodder in the country by 2025. The [reason](#) for this is inadequate fodder seed production, market linkages, and very low seed replacement rate. Green fodder is an economically viable solution of improving nutrition and productivity of daily animals as microbes in green fodder help in improving the digestibility of mixed feeding system in India. By balancing the quantity of Green Fodder, the dependence on Concentrates can be reduced, resulting in savings of ₹ 90 per animal per day, leading to reduction of ₹ 4.5 / Litre in the cost of Production.

Cattle Feeding pattern

Diet Components	Actual Requirements			Farmer's practice			
	Kg	Dry Matter received (kg)	Cost (₹)	Kg	Dry matter received	Cost (₹)	Daily extra expenses (₹)
Green Fodder	40	8	60	15	3	22.5	87.5
Dry Fodder	2	2	10	3	3	15	
Cattle Feed/Concentrate	6	5.4	180	10	10	300	
Total		15.4	250		16	337.6	

Role of Private Companies

Private companies have a critical role to play in making available high yielding certified seeds of green fodder crops to help increased the forage crop productivity and reduce the demand supply gap in the country.

Some of major companies engaged in R&D and marketing of forage crops in India are Advanta Seeds, Foragen Seeds, Mangalam Seeds, Malav Seeds Pvt. Ltd. etc. Advanta is one of the leading companies in Forage landscape and has worked closely with farmers to improve the livelihoods of dairy farmers. The private companies ensure the year-round availability of green fodder though their range of forage crop seeds that meet the requirements of crop type, seasonality, single cut, multi cut, and usage. Some of the focus technologies of private companies for improvement in fodder crop quality and nutrition are:

- i. Improve the digestibility of forages,
- ii. Increase biomass in forage crops by reducing internodal distance that also facilitates mechanization, and
- iii. Reducing the Hydrogen Cyanine to minimize or completely mitigate the risk of animal poisoning even with early harvesting

Some private companies like Advanta Seeds, Foragen Seeds, etc. have also integrated online sale of the forage seeds through e-commerce players and mobile applications enabling the ease of access to quality seeds for farmers.

Private sector is well placed in the country to bridge the demand supply gap in fodder crops of the country by providing high yielding varieties/ hybrids that grow year-round, mature early and can be mechanically harvested. Such varieties/hybrids will help reduce the cost of production for dairy farmers



and increase productivity and profitability of dairy cattle in the country. Some studies by private players like Advanta Seeds have shown that the new generation forage crops can achieve nearly 100% increase in the yield of green fodder, 25% increase in milk production, improve their health by enhancing nutrition, reduce heat stress in the cattle and reduce overall cost of production for dairy business.

NEWS

Chhattisgarh, Haryana and Telangana sanctioned ₹19,444 crore for kharif procurement

To assist State Marketing Federations and facilitate timely paddy procurement operations through respective cooperative organizations, the National Cooperative Development Corporation (NCDC) has sanctioned INR 9,000 crore to Chhattisgarh, INR 5,500 crore to Telangana and INR 5,444 crore to Haryana. This timely step by NCDC will provide the much needed financial support to the paddy farmers in these three states during this pandemic that accounts for 75% of the total paddy production in the country.

[Read more](#)

New Stripe rust resistant genes identified in Wheat Varieties

US Department of Agriculture – Agricultural Research Service (USDA-ARS) and Washington State University in a recent study have successfully identified 37 Stripe resistant genes of which 10 of them are new genes using genotyping by multiplex sequencing (GMS) technique and molecular markers. GMS method was found to be comparatively quite cheaper than wheat SNP Chips and other methods.

[Read more](#)

NEWS

Agriculture; the only sector to grow amid COVID-19 pandemic

Despite the fall in overall Indian GDP by 23.9%, agriculture has achieved a bright spot by showing a growth of 3.4% in the first quarter of 2020 compared to last year. Government has increased its spending in farm sector to generate benefits for the country's economy. The sector has also attracted huge private investments.

[Read more](#)

Two transgenic brinjal varieties approved for confined field trials

Government has approved confined field trials for two transgenic brinjal varieties in eight states during 2020-23 but with the condition of taking no-objection certificate from the states. These varieties contain Bt Cry1Fa1 gene (Event 142) and are developed by the Indian Council of Agricultural Research-National Research Centre on Plant Biotechnology.

[Read more](#)

Corteva AgriScience drives maize dense planting by encouraging the use of mechanical planters

Corteva will subsidise the mechanical planters by half for the farmers of Madhya Pradesh and has tied up with a company to produce the machines which can reduce the variability of yield in a plot. Over 12,000 tribal farming families will be covered in the two districts of Madhya Pradesh.

[Read more](#)

IRRI and Bioseed partner for hybrid rice development

The International Rice Research Institute (IRRI) and Bioseed Research India have joined hands to jointly develop elite hybrid rice. This partnership is beneficial for both the stakeholders and also for farmers as it provides Bioseed an opportunity to leverage IRRI's well established facilities and helps to increase its research capacity in South East Asia to accelerate the development of value-added crops.

[Read more](#)

Blending of mustard oil is prohibited from Oct 1

The Food Safety and Standards Authority of India (FSSAI) has taken the decision to prohibit the blending of mustard oil from October 1 to facilitate sale of pure mustard oil for domestic consumption. Generally the rice bran oil is blended with mustard oil for oryzanol as it is cheaper source.

[Read more](#)

Acardia Biosciences acquired hemp seedling company Industrial Seed Innovations (ISI)

Acardia Biosciences acquired Oregon-based Industrial Seed Innovations (ISI) which specialize in organically grown, high Cannabidiol (CBD) feminized hemp seeds and seedlings. Acardia will now have robust catalogue of hemp seeds to address larger customers.

[Read more](#)

Bayer and Kezzler collaborate to protect farmers from counterfeit seeds

Bayer, a market leader - collaborates with Kezzler, a global leader in supply chain traceability and serialization technology. Bayer will leverage Kezzler's managed SaaS platform to provide supply chain visibility, traceability and enhanced affiliate management. The Kezzler platform will eliminate the risk of counterfeit goods, which can lead to substantially lower yields and have a detrimental effect on the environment.

[Read more](#)

Indian cotton exports seen rising owing to lower prices and increased global demand

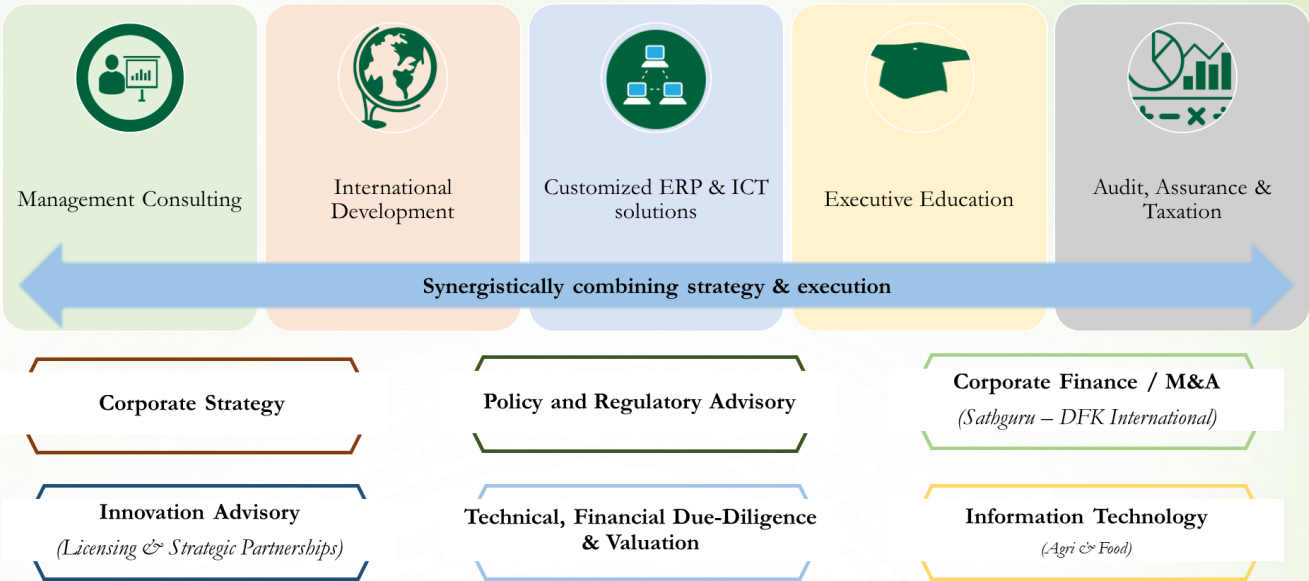
Amid the current pandemic and the global tensions with China, India is emerging as the go to option for importing cotton. Compared to last year's export of 50 lakh bales (2019-20), exports are likely to rise to 60 – 65 lakh bales. Due to the lower cost of cotton in the global market, and US ban on cotton from China, it is predicted that the cotton exports from India will rise.

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