Carrying capacity of Indian agriculture: oilseeds

D. M. Hegde*

Directorate of Oilseeds Research, Rajendranagar, Hyderabad 500 030, India

The carrying capacity of Indian agriculture to support oilseeds production to meet the vegetable oil needs of the Indian population has been considered in the context of available sources of oil from oilseed and non-oilseed origins. India needs to produce 17.84 Mt of vegetable oils to meet the nutritional fat needs of projected population of 1685 million by 2050. This can be easily achieved from various sources like annual oilseeds and also from supplementary sources of oil like rice bran, cottonseed, coconut, oil palm, corn, etc. However, the actual vegetable oil consumption has already exceeded the nutritional needs by a large margin and is likely to further go up sharply in the years to come in response to income growth. This requirement will be difficult to meet by the Indian agriculture given the current status of resources, technology and management.

Keywords: Agriculture, carrying capacity, fats and oils, oilseeds.

Introduction

CARRYING capacity in the context of agriculture broadly denotes the number of people and livestock that an area can support on a sustainable basis. However, since crop and livestock products are produced and consumed all over the country with free inter-state movement, carrying capacity in India can be studied and analysed only in the national context. Further, carrying capacity is always dynamic in nature varying from time-to-time based on the status of resources, technology and management. This article analyses the carrying capacity of Indian agriculture to support oilseeds production to meet the fat needs of the Indian population.

Oilseeds scenario in India

In the agricultural economy of India, oilseeds are important next only to food grains in terms of area, production and value[1]. The diverse agro-ecological conditions in the country are favourable for growing all the nine annual oilseeds, which include seven edible oilseeds, viz. groundnut, rapeseed–mustard, soybean, sunflower, sesame, safflower and niger, and two non-edible oilseeds, viz. castor and linseed. Apart from annual oilseeds, a wide range of other minor oil-bearing plants of horticulture and forest origin, including in particular coconut and oilpalm are cultivated in the country. In addition, substantial quantity of vegetable oils is also obtained from rice bran and cotton seed, and a small quantity of oil from corn and tobacco seed.

There has been dramatic changes in the oilseeds scenario of the country during the last 25 years. India changed from net importer status in the 1980s to a net exporter status during 1989–90, which was again reversed later during 1997–98 when the country had to spend huge foreign exchange to meet the domestic needs of vegetable oils. The gap between export earnings and import costs started narrowing down during the last 10 years, and during 2007–08, the oilseeds sector became a net earner of foreign exchange, which however, could not be sustained for long. During 2010–11, the country imported about 9.2 Mt of vegetable oils costing around Rs 38,000 crores, whereas export earnings were a little less than just Rs 21,000 crores.

During 1951–2010, the area, production and productivity of annual oilseeds in India showed a compound annual growth rate of 1.57%, 3.01% and 1.42% respectively. Major gain in production came mostly from soybean, rapeseed–mustard, sunflower and castor. There has also been large regional variation in area, production and productivity changes during the last two and a half decades. Only a few states like Haryana, Madhya Pradesh, Maharashtra, Rajasthan and West Bengal increased their oilseeds production both through area expansion and productivity improvement. State like Gujarat increased oilseeds production mainly through productivity improvement. In a state like Punjab, oilseeds production declined mainly in response to a sharp decline in area, whereas in state like Odisha both area and productivity declined sharply leading to large decline in oilseeds production.

The domestic achievements in oilseeds production are unparalled when we observe that six times increase in oilseeds production during the period 1950–2011 was achieved under predominantly rainfed (72%) agro-ecological conditions, which is even higher than the production increase in total food grains during this period[1]. It is worth recording that 4.7 times increase in production

*e-mail: dmhegde@gmail.com

of food grains was achieved with the highest national priorities to this commodity group, and also that such production jump was recorded under relatively much more favourable farming environments, particularly irrigated lands.

The vegetable oils consumption is both income- and price-elastic. The per capita consumption of vegetable oils has increased from around 3 kg/yr in 1950 to 14.2 kg/yr during 2010–11. Increase in per capita income pushes the demand for oil significantly. A similar effect is exercised by the price factor as well. In contrast to the pre-WTO period, the real price of vegetable oils had sharply declined in the subsequent period which enabled consumers to access larger quantities that were made possible through liberal imports. If per capita consumption of vegetable oils had stagnated at the level of 1991 or gone down, as had been the case with food grains, during the last two decades, then India would have faced no deficit in vegetable oils. This would imply no need for imports. However, as per capita consumption of edible oils has risen significantly, total demand in the country has risen at a very high rate and has created a big gap between domestic production and consumption, filled by liberal imports.

Fat needs of Indian population

Fat is an essential component of the diet, which provides energy and essential fatty acids (EFAs) to meet the body's metabolic requirements and facilitates the absorption of fat-soluble vitamins. For an adult, not more than 30% of the total calorie intake should be from fats. Excessive intake of fats, especially saturated fats, adversely affects the lipid profile and increases the risk of cardiovascular diseases. There are two types of EFAs: those derived from n-6 fatty acids (which are essential for the integrity of cell membranes), and those derived from n-3 fatty acids (which are essential for certain metabolic functions and protection against cardiovascular diseases). Fish oil is an important source of long-chain n-3 fatty acids. Certain vegetable oils like soybean, mustard, linseed and canola are also rich in linolenic acid, which gets converted into long-chain n-3 fatty acids in the body. The dietary fat intake recommended by the Indian Council of Medical Research (ICMR) Expert Group[2] for Indians of different age groups is given in Table 1.

Oilseeds production to meet nutrition needs

The Nutrition Advisory Committee of the ICMR has made recommendations for dietary fat intake in different groups of Indians (Table 1). If one calculates the average fat needs of Indians by considering proportion of population in different age groups and physical activity, fat intake of 29 g per head per day is adequate to meet the nutritional needs, which translates into annual vegetable oils requirement of 10.585 kg per person. For a population of 1200 million in 2011, 12.70 Mt of vegetable oils is adequate to meet the nutritional fat needs. The current per capita consumption of 14.2 kg is much higher than nutritional needs. For a projected Indian population of 1685 million by 2050, 17.84 Mt of vegetable oils is required to meet the fat nutrition. This is equivalent to roughly 59.41 Mt of oilseeds, assuming that there is no change in the proportion of different oilseeds produced in the country. If one assumes 25% of vegetable oils from crops other than annual oilseeds like rice bran, cotton seed, oil palm, coconut, corn, tree-borne oilseeds (TBOs), etc. then the country needs to produce just 44.56 Mt of oilseeds by 2050 to meet the fat nutrition of the projected population.

To meet the challenges of oilseeds production in the post-WTO regime, there is need to adopt a multipronged strategy which involves enhancing oilseeds production through area expansion and productivity improvement through better adoption of improved technology, value addition to oilseeds and oils to increase their competitiveness, higher recovery of oils through efficient processing of oilseeds and oils, overcoming the constraints of domestic marketing of oilseeds and their products, and finally liberalizing trade in India's oilseeds economy.

Expansion of oilseeds area

The area expansion in oilseeds during the last two and a half decades was a major source of growth in oilseeds production. Nearly 41.9% of the increased oilseed production was contributed by area expansion and 58.1% by productivity improvement during the period 1985–86 and 2009–10. The area increase came where the oilseed crops were superior options to traditional crops. Farmers always searched for technological options and practices which brought them higher returns and readily responded to various economic incentives. The expansion in area has occurred in favour of those oilseed crops which have either shown a higher growth rate of productivity due to technological development as in rapeseed–mustard or whose relative prices with competing crops have moved in their favour as in sunflower or higher growth rates in yields were combined with higher prices resulting in sharp increases in total profitability as in soybean.

In general, there is limited scope to bring additional area exclusively under oilseeds as the demand for land for producing other remunerative crops will continue to rise due to population increase and rising living standards. However, it becomes imperative to search for newer approaches to expand their cultivation under different cropping/farming situations. The area expansion in oilseeds during the last 25 years was mainly possible because of replacement of non-remunerative crops like

Table 1. Recommendations for dietary fat intake by Indians

Group		Minimum level of total fat (%E)	Fat from foods other than visible fats[a] (%E)	Visible fat[b]	
				%E	g/p/d
Adult man	Sedentary	20	10	10	25
	Moderate				30
	Heavy				40
Adult woman	Sedentary				20
	Moderate				25
	Heavy				30
	Pregnant				30
	Lactating				30
Infants	0–6 months	40–60	Human milk[c]	25	
	7–24 months	35[d]	10[e]		
Children	3–6 yrs	25	10	15	25
	7–9 yrs				30
Boys	10–12 yrs				35
	13–15 yrs				45
	16–18 yrs				50
Girls	10–12 yrs				35
	13–15 yrs				40
	16–18 yrs				35

[a]If higher than 10%E, visible fat requirement proportionately reduces. [b]Cooking oil, butter, ghee and margarine. [c]Infant formulae/milk substitutes should mimic contents of fat and fatty acids in human milk, including arachidonic and docosahexaenoic acid. [d]Gradually reduce depending on physical activity. [e]Human milk/infant formula + complementary foods. [f]Depending on physical activity.

millets and minor food crops and partly from increased cropping intensity. This will continue to some extent, as the oilseeds will have an edge over other crops in terms of market price and relative primal production under environmental stress conditions. Extending cultivation to underutilized farming situations such as in rice-fallows of eastern India where about 15 M ha is under lowland rice is one such possibility. Also, there is considerable scope to bring large areas under oilseeds through intercropping. In India, about 45 M ha is available with widely spaced crops (cotton, sugarcane, maize, pigeonpea, tapioca, etc.), where introduction of oilseeds as an intercrop is possible. In addition, oilseeds can be introduced as intercrop in less remunerative, traditional, staple food crops whose replacement is not possible as in wheat in peninsular India. Newer areas and seasons for cultivation of oilseeds are the grey areas to be exploited. Further, under situations of limited water availability for the second crop of rice or in tail-end areas of canals, oilseed crops are better options where good crop of oilseeds like sunflower, sesame and groundnut can be harvested with less than one-fourth of water needs of rice. Oilseeds also perform well in saline areas than cereals or pulses. There is also considerable potential for expansion of oilseeds area under rice-based cropping systems. There is an urgent need for diversification of rice–rice and rice–wheat cropping systems by introduction of oilseeds for conservation of scarce water resources and better sustainability.

Oilseed crops like sunflower and sesame may also be better options under contingency planning where the season for regular crop is not conducive or when these crops have failed. Sunflower and sesame crops can also fit well as catch crops in the period left between two regular crops. Value addition to some of the main products and by-products of oilseed crops will further increase their competitiveness and help expand the area. This will also arrest constant decline in area observed in some minor oilseed crops like safflower and linseed in recent years. It must be possible to reach a target of at least 33–35 M ha under oilseeds if concerted efforts are made with appropriate policy back-up along with scientific adjustments in cropping systems by 2050.

Improving oilseeds productivity

With limited scope to bring additional area under oilseeds, bulk of the future increases in oilseed production have to come primarily from land-saving technologies, highlighting a combination of high-yielding varieties/hybrids, balanced and integrated crop nutrition, efficient crop management, protective irrigation, integrated pest management and selective farm mechanization. It may not be difficult to achieve an average productivity of about 1.5 t/ha by 2020 and 2.0 t/ha by 2050, if concerted efforts are made for effective dissemination of available improved technologies.

The productivity of all oilseeds in India is just 50–60% of the world average and only 15–25% of the productivity observed in the country with the highest productivity, except in case of castor. There is great opportunity to enhance average productivity of all oilseed crops in the country, which needs concerted efforts in the coming

years to reduce our dependence on huge imports of vegetable oils.

Supplementary sources of vegetable oils

Contributing more than 25% of the total vegetable oil consumption in the country, the minor and TBOs have considerable oil potential which needs to be fully tapped. Oil is obtained from rice bran, cotton seed, corn, coconut and oil palm, apart from seeds of underutilized plants like *Jatropha*, *tumba*, rubber seed, mango kernel, *neem*, *karanj*, *mahua*, *kusum*, *sal*, *simarouba*, *jojoba*, *cheura*, wild apricot, tung, etc. The current level of vegetable oils production from all these sources (2.767 Mt) could be further stepped up, given their tremendous potential (> 4.4 Mt; Table 2).

Rice bran oil

Rice bran oil is an important source of vegetable oil which is yet to be fully exploited. India is the second largest rice producer in the world, next only to China. The country produced 142.00 Mt of paddy during 2010–11, which is equivalent to 94.11 Mt of rice, and this could yield 80.00 lakh tonnes of rice bran which has the potential to yield 13.20 lakh tonnes of rice bran oil. However, the country could produce only 8.5 lakh tonnes of rice bran oil during 2010–11, which is just 64% of the potential. There is need to process all the rice bran produced in India for recovering the oil, which can make significant contribution to the vegetable oils basket. At the same time, a large number of high-value by-products need to be recovered during the rice bran oil processing, which will change the economy of the entire process. By 2050, India is expected to produce about 160 Mt of rice, which has the potential to yield 22.44 lakh tonnes of rice bran oil (Table 3). Even if 90% of this potential is realized, the country must be able to produce about 2 Mt of rice bran oil.

Cotton seed oil

India is one of the major cotton-producing countries of the world. Cotton seed which forms about two-thirds of seed cotton contains an important source of vegetable oil. The cotton seed contains about 18% oil, which is nutritionally good oil. India produced 339.30 lakh bales of seed cotton yielding 11.40 Mt of cotton seed during 2010–11, and produced 11.99 lakh tonnes of oil through traditional processing technology, wherein only 11–12% of oil is recovered (Table 4). Nearly 95% of cotton seed is processed through traditional methods and less than 5% is processed through scientific processing which can recover nearly 17% of the oil. Thus, a huge amount of oil of the order of 6.5 lakh tonnes is lost, which is worth more than Rs 2500 crores. In addition, there is also loss of linters, hulls and soap stock in traditional processing and together with the lost oil, the country is losing about Rs 5000 crores worth of products, which needs to be prevented on priority. By 2025 and 2050, the cotton production in India is projected to increase to 500 and 650 lakh bales respectively, which can lead to marketable surplus of 167.82 and 208.45 lakh tonnes of cotton seed for processing that can potentially yield 28.53 and 35.44 lakh tonnes of cotton seed oil respectively. This will be a huge contribution to India's vegetable oils basket, which needs to be fully exploited through scientific processing of cotton seed. There is need for a policy intervention to make scientific processing of cotton seed mandatory along with certain incentives or one-time grant for switchover from traditional processing in the larger interest of the country.

Table 2. Supplementary sources of vegetable oils (2010–11)

Source	Potential (lakh tonnes)	Current production (lakh tonnes)
Rice bran oil	13.20	8.50
Cotton seed oil	19.62	11.99
Coconut oil	5.20	4.68
Palm oil	Huge	0.74
Tree-borne oilseeds oil	6.00	1.05
Corn oil	–	0.70
Tobacco seed oil	0.02	0.01
Total	44.04	27.67

Oil palm

Among the major tree crops, oil palm forms another high-potential prospective and long-term source of edible oil, which is expected to contribute significantly towards meeting the growing edible oil demand in the country. It can yield 4–7 t of oil/ha compared to less than half a tonne from most of the annual oilseed crops. As against the potential area of 10.715 lakh ha spread over 14 states in the country, hardly 1.6 lakh ha was planted up to March 2011, of which almost 30,000 ha was uprooted. The country is currently producing just about 0.74 lakh tonnes of oil from a bearing area of about 40,000 ha. In the years to come, oil palm is likely to play a major role in augmenting the supply of vegetable oil in the country. By 2050 even if an area of 8 lakh ha is covered under oil palm, the country must be able to produce about 3.2 Mt of oil. There is a need for proper policy back-up along with remunerative prices for sustaining the long-term commitment of the farmers to oil palm.

Tree-borne oilseeds

India is endowed with a vast potential of oilseeds of tree origin. The country has an estimated potential of more than 5 Mt of tree-borne oilseeds (TBOs). However, only 8–10 lakh tonnes is being collected and less than 1.5 lakh

Table 3. Rice bran oil production by 2050

Particulars	2010–11	2025	2050
Paddy (Mt)	142.00	187.50	240.00
Rice (Mt)	94.00	125.00	160.00
Rice bran (lakh tonnes; 8.5% of rice)	80.00	106.25	136.00
Rice bran oil (lakh tonnes; potential; 16–16.5% recovery)	13.20	17.53	22.44
Rice bran oil production (lakh tonnes; realized)	8.50	–	–

Table 4. Cotton seed oil production by 2050

Particulars	2010–11	2025	2050
Cotton production (lakh bales)	339.30	525.00	650.00
Cotton seed (lakh tonnes)	113.99	174.82	216.45
To be retained for sowing and direct consumption (lakh tonnes)	5.00	7.00	8.00
Marketable surplus (lakh tonnes)	108.99	167.82	208.45
Production of washed cotton seed oil (lakh tonnes)			
Traditional processing	11.99	18.46	22.93
Scientific processing	18.53	28.53	35.44
Losses in traditional processing (Rs crores)	5000	–	–

tonnes of oil is being extracted out of an exploitable potential of more than 1 Mt of oil from tree origin sources. The major constraints which restrict the seed collection to only 15–20% of the potential are due to scattered plantation of most of the TBOs and short collection period of 4–6 weeks that also precedes the rainy season. There is a need to give attention to tree improvement for developing high-yielding varieties, germplasm enrichment, identification of superior material, development of location-specific package of practices and value addition. There is huge potential to plant TBOs in degraded and waste lands if proper planting materials and practices are developed. Considering the progressive increase in the demand for non-edible oil due to industrial development in the country, if proper planning for supply of non-edible oil is not ensured, a sizeable amount of edible oil may be diverted to meet the industrial requirement, thereby causing further shortage in edible oil supply.

Corn oil

Maize production in the country has shown remarkable progress in recent years, which is likely to continue in the years to come because of inherent strengths in the crop. Currently, about 2 Mt of maize is used in the starch industry yielding about 70,000 t of corn oil as a by-product. By 2050, it is expected that about 8 Mt of maize will be used in the starch industry, which can yield about 3 lakh tonnes of oil. If efforts are made to develop maize hybrids with higher oil content in the germ, the oil yield from starch processing can go up further.

Coconut oil

India is the second largest producer of coconut with a share of about 15% of area and 21% of production in the world. The crop is grown in nearly 2 M ha. However, the average productivity of coconut in India is very low (about 8000 nuts/ha/yr). India produces about 5–6 lakh tonnes of coconut oil every year, of which about 30% goes for edible use and 70% for non-edible purposes. There is further scope to increase area under coconut in states like Maharashtra, Odisha, West Bengal, Bihar, Gujarat and the North East. There is also scope to increase productivity which is very low in many states presently cultivating coconut. Replanting of old plantations with new, high-yielding varieties coupled with standard crop management practices can play a major role in increasing the average productivity by at least 100% by 2050, enabling the country to produce a million tonnes of coconut oil.

Meeting India's fat nutrition by 2050

The total vegetable oil needs of the projected Indian population of 1685 million by 2050 works out to 17.84 Mt to meet the nutrition requirement. If one takes into consideration possible production of vegetable oils from sources other than annual oilseeds, at least 10 Mt will be available (Table 5), leaving a balance of 7.84 Mt of oil from annual oilseeds. During 2010–11, country produced around 30.2 Mt of oilseeds, which have the potential to yield about 9 Mt of oil.

Thus, even with the present level of oilseeds production, if we can increase production of supplementary sources of vegetable oils as indicated earlier, the country can easily meet the nutritional fat requirements of the projected population in 2050. But this never happens in practice as vegetable oils consumption is highly income- and price-elastic. China's per capita consumption of vegetable oils was just 3.09 kg during 1976–80, which increased to more than 23 kg by 2008–09. During the

same period, India's per capita consumption of vegetable oils increased from 6.45 kg during 1976–80 to 13.6 kg during 2008–09. The falling domestic prices and increasing income levels during the last two decades have virtually doubled per capita consumption of vegetable oils, outstripping the domestic production and necessitating huge imports. The per capita oil consumption has surpassed the forecasts made earlier and may continue to increase at a blistering pace in the years to come, if the present conditions of vegetable oil price decline and income increase continue. The government policies with respect to processing, market and trade are mainly responsible for the present situation. The remarkable progress India could achieve in the oilseeds sector during initial years of the technology mission period (1986–95) would not have been possible without an appropriate policy back-up from the government. If the country has to turn near self-reliant in the vegetable oils sector in the coming years, a comprehensive policy framework for the entire sector taking into consideration various demands and interests of all the stakeholders (consumers, industries, farmers and traders) with diverse interests is a prerequisite. The policy must stimulate balanced growth of the vegetable oils sector which can be sustained over a long run. Some of the major elements of this policy framework are as follows:

- All traditional oilseeds are reserved for the small-scale sector with an inefficient processing set-up, losing more than one million tonnes of oil. There is a need to decontrol all these oilseeds to enhance efficiency of processing. India has large processing industry with low capacity utilization leading to high processing cost. Opening up all oilseeds to modern processing will lead to efficient processing, benefiting both producers and consumers.
- Although the government has been regularly announcing the minimum support price for oilseeds, effective market intervention by the National Agricultural Cooperative Marketing Federation (NAFED) to give price support was not forthcoming in most of the years and in several regions leading to distress sales and consequent low realization from oilseeds by the farmers and diversion of limited farm resources to more remunerative crops.
- India's liberalized import policy on vegetable oils is adversely affecting the domestic farmers, although consumers are benefited by cheaper availability of vegetable oils. Care has to be taken not to let low international prices affect the domestic market. Political and international pressures on the government to follow import-friendly policy must be resisted.
- The oilseeds policy framework has to promote the goals of techno-economic efficiency and social equity through a creative combination of policies, which puts a premium on science and technology. Public policy should support greater involvement of the private sector in providing inputs and services to the farmer, processor and trader. The tariff policy should strike an appropriate balance between the promotion of domestic production and of export, while safeguarding the interests of consumers through reasonable imports.

Table 5. Supplementary sources of vegetable oils by 2050

Source	Projected production 2050 (lakh tonnes)
Rice bran oil	22.44
Cotton seed oil	35.44
Coconut	10.00
Oil palm	32.00
TBOs	5.00*
Corn oil	3.00
Tobacco seed oil	0.02
Total	107.90
*Excluding TBOs	102.90

Harnessing the unexploited yield reservoir

For increasing oilseeds production, besides generating new technologies, concerted efforts are also needed to transfer the existing technologies from research stations to the farmers' fields through efficient and effective technology transfer programmes. The data generated from nearly 30,000 frontline demonstrations organized by the Directorate of Oilseeds Research, Hyderabad during the last 22 years in the farmers' fields across various crops, seasons and situations clearly indicate the possibility of enhancing oilseeds production to a great extent. Different components like improved cultivars, nutrient management, need-based plant protection, weed control, protective irrigation, appropriate plant stand through adjustment in spacing and thinning, etc. have profound influence on the productivity of different oilseed crops. The improved technology packages were also found to be economically attractive. Yet the adoption of several components of technology was low, emphasizing the need for better dissemination. There exists a commercially exploitable yield reservoir to the tune of nearly 73% of the national production, which can be harnessed by the adoption of currently available improved technologies (Table 6).

Thus, it is clear that with full adoption of the presently available oilseed technologies, more than 43 Mt of oilseeds production could be achieved, which is almost adequate to meet the requirement of vegetable oils in the country. Future needs of vegetable oils to meet the nutritional fat needs even by 2050 can easily be met if we can increase production of supplementary sources of vegetable oils along with bridging the yield gap in annual oilseeds. However, unbridled increase in vegetable oils

Table 6. Exploitable yield reservoir in oilseeds

Crop	FLD average yield (kg/ha)	National average yield (kg/ha; 2009–10)	Yield gap (%)	National production in 2009–10 ('000 t)	Expected production ('000 t)
Groundnut	2,218	1,007	120	5,510	12,122
Rapeseed–mustard	1,296	1,159	12	6,413	7,183
Soybean	1,829	1,028	78	10,046	17,882
Sunflower	1,479	607	144	900	2,196
Sesame	618	322	92	657	1,261
Safflower	1,380	632	118	171	373
Niger	374	269	39	101	140
Castor	2,173	1,209	80	985	1,773
Linseed	880	440	100	148	296
Average/total	–	955	–	24,928	43,227

Yield gap – Increase in FLD average yield over national average yield expected in percentage.
Expected production – production, if yield gap is bridged through complete adoption of improved practices.

consumption may be difficult to meet if the current trend of consumption continues for long in the future.

Summary

An average fat intake of 29 g per head per day is adequate to meet the nutritional needs of Indians, which translates into annual vegetable oil needs of 10.585 kg per person. For a projected Indian population of 1685 million by 2050, 17.84 Mt of vegetable oils is required to meet the fat nutrition. This is equivalent to roughly 59.41 Mt of oilseeds. If one assumes 25% of vegetable oils from crops other than annual oilseeds, then the country needs to produce just 44.56 Mt of oilseeds by 2050 to meet fat nutrition of the projected population. With full adoption of currently available oilseed technologies, this level of production could easily be achieved. There is tremendous scope to increase vegetable oils production from supplementary sources like rice bran, cotton seed, oilpalm, corn, TBOs, coconut, etc. This along with bridging the yield gap in annual oilseeds by effective technology transfer can easily meet the vegetable oil needs of the country in the foreseeable future. However, the present level of vegetable oils consumption has already exceeded the nutritional needs by a large margin and is likely to go up further in response to income growth and lower oil prices. Any unbridled increase in per capita vegetable oil consumption in future will be a formidable challenge on the carrying capacity of Indian agriculture to support oilseed production.

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