

Strategies for achieving self-sufficiency of Oilseeds in Assam

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North East India is endowed with a wealth of vegetable oil resources in the form of cultivated annuals, which are grown during Rabi and Kharif seasons. Among the rapeseed-mustard group, toria is predominant because of the suitability of prevailing agro-climatic conditions and early duration of the crop, which enable the farmers to go for the summer crop after harvest of toria. The area, production and productivity of total oilseed crops in Assam is 3.09 lakh ha, 1.98 lakh tonnes and 642 kg/ha, respectively of which rapeseed-mustard occupy the major share i.e. 2.86 lakh ha with a production of 1.84 lakh tonnes having productivity of 643 kg/ha (2018-19). During the period of last seven years, the state achieved 11.2% increase in acreage, 29.4% increase in production and 13.6% enhancement in productivity. The increase in production was mainly owed to increase in area as well as the introduction of improved varieties. Introduction of short duration mustard and late sown improved toria varieties along with improved management practices can pave the way to a better oilseed production scenario. Winter rice in Assam occupies about 18 lakh ha of which 50% area is medium land (9 lakh ha), 35% is low land (6.3 lakh ha) and 15% very low land (2.7 lakh ha). There is ample scope for the increasing area under oilseeds by utilizing winter rice fallows.

Keywords: Oilseed, Rapeseed-Mustard, Rice-fallow, Toria, Winter rice

OILS and fats form the integral part of foods and flavours, cosmetics and condiments, soaps and detergents, lubricants and laxatives, besides their medicinal and therapeutic value. North East India is endowed with a wealth of vegetable oil resources in the form of cultivated annuals, which are grown during Rabi and Kharif.

The important oilseed crops grown in Assam are rapeseed-mustard, sesame, niger and linseed although in some areas groundnut and castor are also grown. Among the rapeseed-mustard group, toria is predominant because of the suitability of prevailing agro-climatic conditions and early duration of the crop, which enable the farmers to go for the summer crop after harvest of toria. The area, production and productivity of total oilseed in Assam

is 3.09 lakh ha, 1.98 lakh tonnes and 642 kg/ha, respectively of which rapeseed-mustard occupy the major share i.e. 2.86 lakh ha with a production of 1.84 lakh tonnes having productivity of 643 kg/ha (2018-19) (Table 1).

Assam occupies about 4% of the national and 70% of NE India oilseed area under rapeseed-mustard;

however, its contribution towards total production of oilseeds in the country is around 2% only. The major rapeseed-mustard growing districts of Assam are Kokrajhar, Lakhimpur, Dhemaji, Karbi Anglong, Sonitpur, Barpeta, Darrang, Dhubri, etc.

The area and production of total oilseeds in the state showed an

Table 1. Area, production and productivity of oilseeds in Assam (2018-19)

Crop	Area (ha)	% of total area	Production (t)	of total production	Productivity (kg/ha)
Rapeseed & Mustard	2,85,736	92.5	1,83,665	92.6	643
Linseed	4,763	1.5	2,898	1.5	608
Sesame	11,983	3.9	8,355	4.2	697
Niger	5,674	1.8	3,129	1.6	550
Castor	724	0.2	336	0.2	455
Total oilseeds	3,08,880	100.0	1,98,383	100.0	642

Source: Department of Agriculture, Govt. of Assam

Table 2. Area, production and productivity of total oilseeds in Assam (1951-52 to 2018-19)

Year	Area (lakh/ha)	Production (lakh t)	Productivity (kg/ha)
1951-52	1.25	0.54	434
1961-62	1.28	0.46	355
1971-72	1.60	0.75	470
1981-82	2.42	1.11	457
1991-92	3.46	2.08	595
2001-02	3.39	1.89	558
2011-12	2.78	1.53	565
2017-18	3.14	2.01	639
2018-19	3.09	1.98	642

increasing trend up to 1991-92 since 1951-52 and thereafter showed a decreasing trend (Table 2). Of late, it is geared up. During the last 69 years, an increase in productivity of 208 kg/ha was realised and the cultivated area was elevated to 3.09 lakh ha from 1.25 lakh ha. In the last seven years, the state achieved 11.2% increase in acreage, 29.4% increase in production and 13.6% enhancement in productivity. The increase in production was mainly owed to increase in area as well as introduction of improved varieties. Introduction of short duration mustard and late sown improved *toria* varieties along with improved management practices paved the way to a better oilseed production scenario.

The consumption of fats and vegetable oil in India is far below (11-14 g/day/adult) as compared to the recommendation of the Indian Council of Medical Research (35 g/day/adult). India imports about 70% of its edible oil requirement, estimated at around 23 million tones. Although oilseeds are grown in 3.09 lakh ha in Assam, production is significantly lower than the requirement. The requirement of oilseeds in Assam is estimated at 6.11 lakh tonnes which show a deficit of 4.13 lakh tonnes. The present production can meet only about 33% of our requirement, and the deficit of 67% has to be brought in annually.

Strategies

The demand for vegetable oils has been continually increasing both for consumption and industrial uses. To meet this demand and to save

valuable state exchequer in importing oil from the other part of India, there is need to put emphasis on the following strategies:

A. Increase in Productivity

Winter rice is the main crop of the Assam. About 70% of the area under winter rice remain fallow during *Rabi*. The medium textured medium rice-lands can easily be utilised for oilseed production with certain manipulations in the production technologies of winter rice and *Rabi* oilseeds as well. The production of oilseeds, both in conventional and rice fallow system can be increased by improving their productivity, and for that matter, the following strategies are to be implemented.

Short term

- Timely availability of quality seeds of the high yielding varieties so that sowing could be accomplished before mid-November. In Assam, only one oilseed seed hub under Assam Agricultural University has been in operation since 2018-19 in the Lower Brahmaputra Valley Zone. In the year 2019-20, it produced only 13.3 t of quality seeds of Rapeseed-Mustard as against the seed requirement of 954 t (certified seed considering the SRR 33.33 %). Therefore, at least three more oilseed seed hub in

Barrack Valley, North Bank Plain and Upper Brahmaputra Valley Zones have to be established.

- To popularise *toria* varieties suitable for late sowing after winter rice harvest besides the varieties of *toria* and mustard suitable for normal sowing which are listed below:
- Introduction of suitable hybrids of Indian Mustard
- Popularisation of relay cropping of *toria* (var. JT 90-1 & TS 67) with winter rice targeting rice-fallows to turn into productive lands
- Integrated Nutrient Management (INM) including Boron (Borax @ 7.5 kg ha⁻¹), Sulphur @ 20 kg ha⁻¹ if SSP is not used as source of P and Bio-fertilizer (*Azotobacter* and PSB @ 50 g each /kg seed)
- Facilitating irrigation network: irrigation of 6 cm depth should be applied either at 50 % flowering or at early siliqua formation stage to realize the potential productivity of a variety; avoid sprinkler irrigation at the time of flowering.
- Soil solarization especially in the hilly region
- Integrated insect-pest and disease management: For effective control of Aphid and Sawfly spray with Oxydemeton methyl @ 0.5 l ha⁻¹. Seed treatment with metalaxyl 35 WS @ 6 g kg⁻¹ of seed is recommended for eliminating downy mildew and white rust. For

Varieties	Year of release/recommendation	Duration (days)	Adaptation	Disease & pest reaction	Yield (q/ha)
Rapeseed (Toria)					
TS 46	2015	94	<i>Rabi</i> , suitable for late sowing	-	9.06
TS 67	2015	90	<i>Rabi</i> , suitable for late sowing	-	7.01
TS 38	In the pipeline of release	90-95	Normal sowing; mid Oct to mid Nov	-	10-12
JT 90-1	In the pipeline of release	89	<i>Rabi</i> , delayed sowing in rice fallow	MS to <i>Alternaria</i> leaf and pod blight; MS to aphid and sawfly	6.97
Indian Mustard					
PM 26	2011	107	Normal sowing; mid Oct to mid Nov	-	12-14
PM 27	2011	107	Normal sowing; mid Oct to mid Nov	-	13.44
NRCHB 101	2009	108	Normal sowing; mid Oct to mid Nov	MR to <i>Alternaria</i> leaf and pod blight; tolerant to aphid	13-15

the management of *Alternaria* blight, spray Mancozeb and Captafol @ 0.2% at 15-20 days interval, starting from 30 days of sowing. For control of wet rot or white blight, infected plants are to be collected along with sclerotia and should be burnt and spray with Carbendazim (0.05%) or Ziram (0.3%) or Mancozeb (0.2%).

- To encourage beekeeping as subsidiary enterprise and also for increasing productivity of cross pollinated *toria*, 5 honey bee colonies ha⁻¹ is recommended.
- Rain water harvesting in the crop field with micro-irrigation facilities
- Rice stubble management through recycling to use for mulching, compost preparation, etc.

Long term

- Cyclic seed replacement for sustaining increased productivity (a cycle of 3 years)
- Phase-wise increase in area under irrigation
- Transfer of technologies through various agencies
- Resource conservation for sustainable oilseed production
- Biological and rationale management of insect-pests and diseases
- Organic oilseed production especially sesame
- Development of HYV

B. Expansion in area

There is ample scope for the increasing area under oilseed crops by utilising winter rice fallows. Winter rice in Assam occupies about 18 lakh ha of which 50% area is medium land (9 lakh ha), 35% is low land (6.3 lakh ha) and 15% very low land (2.7 lakh ha). These medium and low land situations have both medium and heavy textured soils while very low lands are mostly heavy textured soils which are not suitable for *Rabi* oilseeds. In medium and low land situations, about 9.9 lakh ha are medium textured soil and suitable for *Rabi* oilseeds. However, out of this 9.9 lakh ha, at present *Rabi* oilseeds occupy about 1.0 lakh ha, summer rice 1.1 lakh ha, *Rabi* pulses 0.59 lakh ha and about 0.70 lakh ha is occupied by other *Rabi* crops. So, the

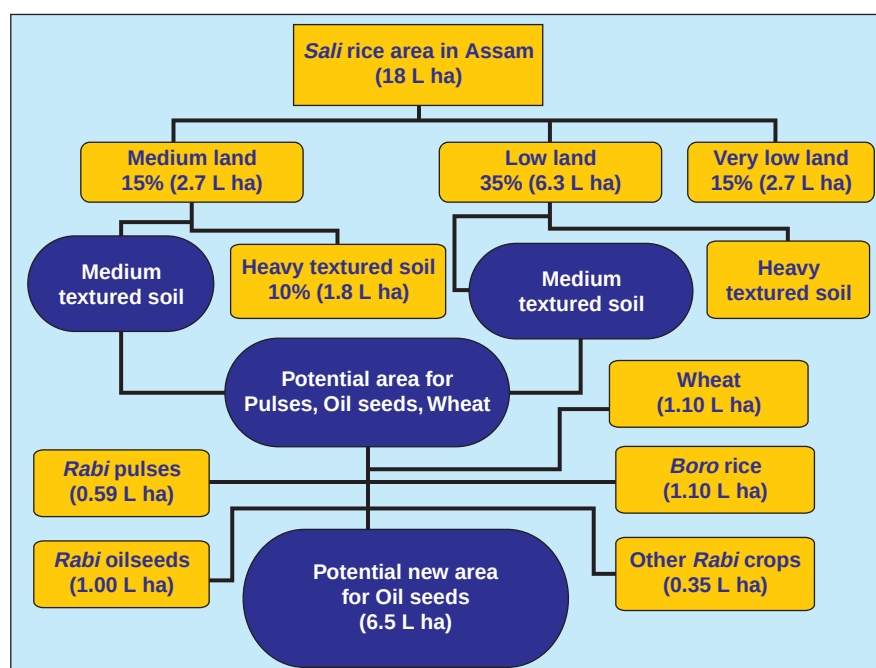


Fig. 1. Potential Oilseeds area in winter rice-fallow system in Assam

remaining 6.51 lakh ha area has the potential for raising *Rabi* oilseeds (Fig. 1). A portion of this area can be brought under suitable oilseeds, mainly Rapeseed-Mustard and thereby production can be increased.

Area increase through Cropping System Approach

- Use of short to medium duration winter rice varieties
- Transplanting long duration winter rice varieties such as Ranjit by the month of June for growing *Rabi* oilseeds as pure crop
- Relay cropping of *toria* in loamy medium winter rice lands
- Extensive Rapeseed-Mustard production in flood affected winter rice lands and riverine tracts

Developmental Strategies

- To strengthen the quality seed production programme within the state
- Strengthening coordination amongst the researchers, extension workers and the farmers
- Capacity building of various stakeholders
- To conduct massive field demonstration and technology showcasing to popularize the improved varieties and production technologies
- Establishment of processing and value addition units in PPP mode

involving FPOs/FPCs

- To facilitate organized marketing infrastructure
- Agricultural loan and crop insurance facility to the farmers for cultivation of oilseeds.
- Encourage greater private sector participation in activities like seed production, input supply and direct farmer-scientist and farmer-processor linkages
- Greater use of information and communication technologies to train up unemployed youths to build networks for agricultural marketing including agribusiness and export sectors
- Encouraging food sovereignty of respective regions and linking it with inter-state as well as international trade
- Ensuring concessional credit flow for development of infrastructure related to small to medium scale edible oil industries
- Gearing up of e-commerce in the agribusiness sector

Two-dimensional approach for attaining self-sufficiency in oilseed production will take almost 7 years. During this period, the productivity of oilseeds is to be gradually raised from 642 kg to 1,000 kg/ha (9.0, 7.1, 6.7, 6.3, 5.9, 5.6 and 5.3% in respective years) and concurrently, area under these crops is to be expanded from 3.09 lakh ha to 6.5

Table 3. Abstract Action Plan for achieving self-sufficiency in oilseed production

Demography, Production and Deficit	
Population:	
2011 census	312 lakh
Increase of population per year (approx.)	3 lakh
Estimated population of 2018-19	336 lakh
Adult equivalent in 2018-19	268 lakh
Requirement for consumption (2018-19):	
Requirement of oils & fats per head (35g/day/adult of which 10 g from other sources)	25g/day/adult
Total oils & fats requirement per year for 268 lakh adult equivalent =	2,44,550 t
Total oilseed requirement (assuming 40% oil content in oilseeds)	6,11,375 t
Production of oilseeds in Assam:	
Production in 2018-19	1,98,383 t
Deficit of oilseeds in Assam:	
Deficit in 2018-19	4,12,992 t
Target area and Productivity	
Target productivity:	
Target productivity of oilseeds after 7 years	1,000 kg/ha
Present productivity of oilseeds in Assam	642 kg/ha
Target requirement of oilseeds after 7 years:	
Requirement of total oilseeds after 7 years for consumption	6,49,700 t
Requirement of area under oilseeds after 7 years:	
Present area under oilseeds in Assam (2018-19)	3,08,880 ha
Area required to produce 6,49,700 t oilseeds	6,49,700 ha
So, additional area required	3,40,820 ha

lakh ha (yearly about 50 thousand ha). However, as the rapeseed-mustard group is the major edible oil provider in Assam, horizontal and vertical expansion considerations have to be kept limited to this group only. In that case, the productivity of rapeseed-mustard is to be increased

from 643 kg to 1000 kg/ha and by doing this, there will be near surplus oilseed production by the end of 7th year. This can be achieved through specific technological interventions put in the production system according to their importance.

In addition to productivity

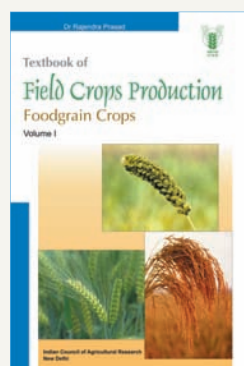
increase, an additional area of 3.41 lakh ha is to be brought under rapeseed-mustard. The additional area should be distributed categorically amongst the potential districts in a phased manner. This can be achieved by taking the winter rice-fallows into consideration without posing any competition with other crops.

From the above discussion, it is evident that there lies vast scope for expansion of oilseed cultivation in rice fallows and increasing productivity through technology intervention in Assam which will contribute significantly towards increasing oilseed production to the tune of attaining self-sufficiency within a limited period of time. This needs the concerted and coordinated efforts from farmers, extension agencies, scientists and development authorities. The time frame for attaining self-sufficiency in oilseed production may be attained as per the action plan envisaged (Table 3). Further, the time period could be shortened with more intensive efforts.

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