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STRATEGIES FOR IMPROVING PRODUCTIVITY OF MILLETS/NUTRICEREALS, PULSES AND OILSEEDS

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Historically, pulses, oilseeds and millets have provided food and subsistence to the Indian population alongside vegetables and fruits naturally available in fields and forest areas. Millets are one of the cheapest sources of energy, higher content of digestive fibres, protein, vitamins and minerals (Kumar *et al*., 2013). The current production of nutricereals is only 17 million tonnes. In order to promote nutricereals as a staple food and enhance their accessibility, it would be necessary to achieve a jump in production to around 34 million tonnes by the end of 2022-23. The productivity target should be raised to an average of 1.6 tons/ha from the current 1.1 tons/ha to achieve the critical production level and enable the integration of nutricereals into the public distribution system (PDS). Besides, the food and nutritional security of India warrants a stable pulse production achievement in the country. The recent interventions have brought about a substantive increase in pulse production to about 23 million tonnes. The projected demand by 2022-23 is 25 million tonnes, and by 2030 it is 32 million tonnes. On the other hand, oilseed production from primary sources should be increased from the current 31 million tonnes to 45 million tonnes by 2022-23, which will help in increasing the edible oil production in India from the present 7.1 million tonnes to a range of 11-14 million tonnes. Different secondary sources and tree-borne oils (TBOs) can contribute additional 3 million tonnes; besides prohibiting the dependency on import to almost 16 million tonnes, that, on the other hand, will be considerably greater by the end of 2022-23.

Millets/nutricereals

- Millets have been neglected to cause a drastic decline in area coverage, but it is the most appropriate crop for rainfed and less endowed ecologies, and also their relevance

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assumes a critical role in view of climate change implications; hence, millets should be promoted as climate-resilient crops, particularly in rainfed regions.

- Millets are an abundant source of different essential nutrients but low in the glycaemic index, which makes the crops superfoods for a healthy living; hence, promote millets as nutri-cereals and as staple crops.
- This will provide a broad base; the cereal consumption basket, currently dominated by wheat and paddy and millets popularized as nutri-cereals will come to acquire a critical mass in the market and support higher production.
- A virtuous cycle between supply and demand will need to be created for a spiralling growth of nutri-cereals.
- There is a need to adopt both approaches to productivity enhancement and area expansion.
- Of nine millets commonly cultivated in India, three major millets, like jowar, bajra and ragi, may be taken up on a priority basis considering the extent of area under cultivation, the quantum of production, scope for higher productivity, and consumer preferences.
- Small millets like kodo, little and barnyard millets have minimum requirements of water and can be successfully grown in the post-*kharif* fallows using residual moisture available in rainfed areas.
- Finger millet has higher nutritional benefits and can be produced.
- Most of the millets are short duration in nature (generally 65-80 days) and can be successfully grown in the post-*kharif* fallows.
- Additional areas should be brought under millets which will significantly increase the cropping intensity in dryland agriculture and contribute to higher output and farm revenues.
- Area under millets has to be substantially increased from the current extent of 16 million ha.
- Use post-*kharif* fallow lands with residual soil moisture in high rainfall regions like central and eastern Indian states which are estimated at 12 million hectares.
- Crop substitution for rice in *kharif* in Indo Gangetic Plains.
- Promote millet based intercropping systems.

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- Development of wastelands, mostly available in central India and bringing them under millets.
- MGNREGA funds can be used to develop these common wastelands into cultivable lands, and an integrated and target oriented strategy may be drawn up for this purpose.
- One of the prerequisites for promoting millets is the establishment of primary processing facilities at the farm gate/village level; hence, primary processing units should be included under the National Food security Mission (NFSM) and agriculture machinery schemes of the Ministry of Agriculture.
- In order to strengthen and sustain the production of millets, adopt a market-led approach.
- Advocate and promote awareness about nutri-cereals among consumers across the country to create demand; therefore, the year 2018 was declared as the 'Year of Millets' by the Government of India for reorienting research, policy advocacy and demand creation by adopting an aggressive and comprehensive public outreach programme.
- Millets like sorghum are a good fodder source; as a result, integration of nutri-rich millet fodder with existing millet supply chain models in beneficial to contribute to enhanced farmers' income.

Pulses

- The components of a comprehensive strategy for self-sufficiency in pulses include enhancement in yields (from the current average of 0.7 t/ha to 1.4 t/ha), area expansion through intercropping, use of post-*kharif* rice fallows and increased cropping intensity.
- Focus on enhancing the farmers' access to an adequate quantity of quality seeds.
- The existing seed replacement rate (SRR) under pulses is only 15-20 per cent; in order to achieve high yield from good seed, ensure that SRR increases to 42 per cent (by 2022-23), taking care of varietal replacement rate (VRR) concurrently.
- In order to take care of SRR and VRR, the seed production system needs to be diligently planned though the chain consisting of breeder seeds, foundation seeds and certified seeds.
- The ratio of requirement from one stage to the other must be ensured.

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- Support decentralized seed production system by establishing seed processing plants at Gram Panchayat levels and institutes like KVKs/SAUs and ICAR centres.
- Pulses are generally cultivated under rainfed conditions and less endowed farming systems; therefore, it is necessary to create small irrigation structures combined with micro irrigation systems to offer protective or life saving irrigation, particularly at the critical crop growth stages.
- Integrated pest management (IPM) practices should be adopted as pulse crops are vulnerable to pests and diseases during growth stages as well as storage conditions.
- To incentivize the farmers to continue with pulse production, a favourable intercrop comparison with competing crops like cereals, cotton will have to be ensured.
- The maximum scope for area expansion under pulses comes from post *kharif* fallow lands, which is estimated at about 12 million ha, largely in central and eastern India, where residual soil moisture is good due to higher annual precipitation.
- An important intervention of securing the cultivated area from open grazing of cattle and the promotion of green fencing should be advisable.

Oilseeds

- To enhance oilseed production, the focus should be on increasing the oilseed productivity, in addition to bringing more area under their cultivation.

- Target an area increase under primary sources of edible oils from 26 million hectares in 2015-16 to 31 million hectares by 2022-23; and production from 25 million tonnes to 45 million tonnes. In consonance, productivity should increase from 968 kg/ha to 1500 kg/ha in the same period.
- Among nine seasonal oilseeds, rapeseed and mustard can become the core focus, as it offers major scope in terms of area coverage, productivity and oil conversion factor.
- Soybean and groundnut are two others that can help in scaling up the output.
- **Rapeseed and mustard**

✓ Timely sowing, seed treatment and maintenance of plant population
✓ Application of boron and zinc-based on soil test values
✓ Intercropping with chickpea or lentil, irrigation management and foliar spray
✓ Management of aphids

- **Soybean**

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- ✓ Varietal cafeteria approach using zone specific varieties
- ✓ Seed treatment and use of bio-fertilizers
- ✓ Broad bed and furrow (BBF) system of planting
- ✓ Balanced nutrient management and irrigation at the seed filling stage
- ✓ Intercropping with pigeon pea, maize etc.

- **Groundnut**

- ✓ Broad bed and furrow (BBF) system of planting in kharif and crisscross planting in rabi season
- ✓ Protective irrigations at flowering and pod formation stages
- ✓ Application of zinc, seed treatment and use of bio-fertilizers

- Extend oilseed cultivation to non-traditional areas and non-traditional seasons.
- Harvest the advantage of castor productivity and promote its cultivation by assessing domestic demand and export potential.
- The country's non-edible oil demand is also growing, and there exists greater scope for the use of castor oil in the industry.
- In order to promote domestic production of second and third-generation derivatives, having higher economic value, adopt a suitable policy framework for castor to help the farmers to reap higher farm revenues or incomes.
- The area under mustard can be enhanced by substituting it with wheat in Punjab, Haryana and Western Uttar Pradesh by 5-10 per cent.
- Mustard may also be promoted in unconventional areas, including northeastern states.
- Promote oil palm cultivation by addressing some constraints like long gestation of oil palm tree through intercropping to support better income flow, fluctuation in global prices of crude palm oil, etc.
- One of the important area expansion strategies includes utilizing an estimated 12 million hectares of post *kharif* fallows for promoting oilseeds besides pulses and nutri-cereals.

Conclusion

One of the most significant means for addressing developmental challenges in the Indian context is an achievement of self-sufficiency in food production and ensuring nutritional security for all. India's massive vegetarian diet based population, food access

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issues encountered across states and escalating sustainability detriments in agriculture make it important to have policies for promoting the production of pulses, oilseeds and millets due to their higher compatible nature and also to guarantee improved accessibility and delivery at affordable prices. Another vital challenge is the inactivity of the Government in procuring and distributing millets, pulses and oilseeds especially through the public distribution system. Additionally, pulses' and millets' procurement continues to be a deficit arena depriving the growers to enjoy full advantages of minimum support price. In order to achieve the aim of doubling farmers' income by 2022, there are requirements of viable strategies encompassing major elements such as *the* introduction of millets-based pulses and oilseeds cultivation to minimize risks; capacity building with R&D along with input supply in single-window mode; promotion of value addition and creating market demands through collective actions like the formation of FPOs and SHGs; and policy support for buy back arrangements with MSP; crop insurance; inclusion in MDM and PDS system; infrastructure for farm gate processing and warehouses.

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