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POTENTIAL OF MAKHANA (EURYALE FEROX) CULTIVATION IN WEST BENGAL

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Makhana (Euryale ferox Salisb., family Nymphaeaceae), popularly known as fox nut or gorgon nut, is a valuable aquatic crop. It grows best in stagnant or slow-moving water bodies such as ponds, marshes, oxbow lakes, and waterlogged agricultural lands. Due to its high economic value and adaptability to wetland ecosystems, makhana is now considered as an important climate-resilient crop which is capable of supporting sustainable agriculture and improving the livelihoods of rural farming communities.

It is mainly grown in the eastern and north-eastern parts of India. Although Bihar has traditionally been the leading producer, the cultivation of makhana is gradually expanding to neighbouring states such as West Bengal due to the presence of extensive wetlands, low-lying flood-prone areas, fertile alluvial soils heavy monsoon rainfall and increasing consumer demand for healthy and nutritious food products. In West Bengal, several districts including North and South 24 Parganas, Nadia, Murshidabad, Cooch Behar, Jalpaiguri, and parts of Malda and Uttar Dinajpur contain large areas of wetlands and low-lying lands suitable for aquatic farming

Nutritional Benefits of Makhana:

Makhana is a high value aquatic crop with great agronomic and economic potential. The nutritional and medicinal uses of makhana have played a significant role in giving rise to its rising commercial demand. Makhana seeds are rich in carbohydrates, proteins, amino acids, minerals and antioxidants and low in fat. Popped makhana is a nutritious snack food, as it has almost 9-10 % protein and nearly 85 % carbohydrates, which is why it has seen a rise in both urban and international demand. The researchers also found medicinal properties such as anti-inflammatory, anti-aging, anti-diabetic and antioxidant properties. Due to these nutritional attributes, makhana is also becoming known in the national and international markets as a "superfood". We can easily understand it in a table given below:

Nutritional Composition (Approximate per 100 g)

Nutrient	Amount
Carbohydrates	75–77 g
Protein	9–10 g
Fat	0.1–0.5 g
Fiber	7–14 g
Energy	350–370 kcal
Calcium	60 mg
Magnesium	90 mg

Agro- Climatic Suitability in West Bengal:

Climate:

Makhana grows well under warm-humid conditions with high humidity and moderate temperature of 20-35°C, which is the case in the state of West Bengal where annual average rainfall ranges from 1200 to 2500 mm. Water availability and the long monsoons in kharif and post-kharif season are beneficial for growing water crops.

Water Requirements:

Makhana is an aquatic crop which needs the stagnant water bodies like ponds, oxbow lakes (chaurs or beels), wet lands or shallow low lands with stagnant water for almost 7-8 months. In West Bengal, many districts have ponds and seasonal wetlands both natural and man-made which are not utilized in the wet season. The productive utilization of these water bodies can be made possible for makhana cultivation.

Soil Suitability:

Makhana favours clay loam over loamy soil that is more organic and has a better water holding capacity. In West Bengal the alluvial soils of the Gangetic plains are fertile and are good for aqua crops. Besides, the acidic to

neutral pH (5.5 to 7.5) and low percolation rate of water is ideal for makhana. The proper management of many of the flood prone or marshy tracts in West Bengal can make them productive makhana fields.

Potential Zones in West Bengal:

The districts with the greatest potential for makhana production are given below:

- **North Bengal:** There are plenty of ponds, jheels and swampy lands and climatic conditions are favourable in North Bengal with Cooch Behar, Alipurduar, Jalpaiguri and part Malda.
- **Central Bengal:** The wet lowlands and oxbow lakes of Central Bengal (Murshidabad, Nadia and Birbhum), can be utilized for makhana growing.
- **Southern Bengal:** North and South 24 Parganas and areas of East Midnapore (low lying areas which flood for extended periods) can be used.

Economic Importance:

In an economic sense:

- Makhana has a high market value as ₹500 to 800 per kg for popped seeds.
- It is more profitable than the conventional crops in waterlogged and flood prone regions per unit area.
- Makhana can be cultivated along with fish or duck farming or vegetable farming and is suitable for Integrated Farming Systems (IFS).

Challenges in Adoption:

However, there are a number of challenges to overcome:

- Lack of awareness and technical know-how among farmers in West Bengal.
  Harvesting and post-harvest activities are manual labour intensive.
- Special facilities required for drying, grading and popping of makhana seeds.
- Shortage of quality planting material (seeds/rhizomes) and lack of mechanisation.

Policy and Institutional Support:

- Standard agronomic practices and high yielding variety of makhana has been developed by ICAR,ICAR-RCER Patna.
- Technology dissemination through the support of Krishi Vigyan Kendras (KVKs), State
- Agriculture Departments and watershed management programs can be very important.
- Bihar experience of makhana production and processing in Makhana Cluster Development Scheme can be replicated in West Bengal by way of Farms' Groups' Organizations (FPOs) and self-help groups.

Way forward for promoting Makhana cultivation in West Bengal:

1. **Pilot Projects:** Conduct pilot demonstration in selected districts where the farmer trainings and visits to makhana growing areas are being conducted.
2. **Capacity Building:** Conduct training for the rural youth and women on makhana cultivation, processing and value-addition.
3. **Water Body Mapping:** Identify and map appropriate ponds, chaurs and wetlands for the cultivation of makhana.
4. **Institutional Linkages:** Ensure Quality Inputs and Technical Support through ICAR, Agricultural Universities and NGOs.
5. **Market linkages & branding:** spread awareness on market linkages of local makhana, create brand awareness for Bengal Makhana in local and export markets.

CONCLUSION

The cultivation of makhana is a good opportunity for West Bengal particularly in those areas where water resources are not used to its full. If supported with appropriate training, policy and market development, makhana can be a viable and viable alternative crop that can ensure livelihood security to thousands of rural households. With the demand for healthy and organic snack foods increasing, makhana is a good opportunity now for diversifying the crops and also for the rural

entrepreneurship in the state.

Makhana plant

Popped Makhana

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