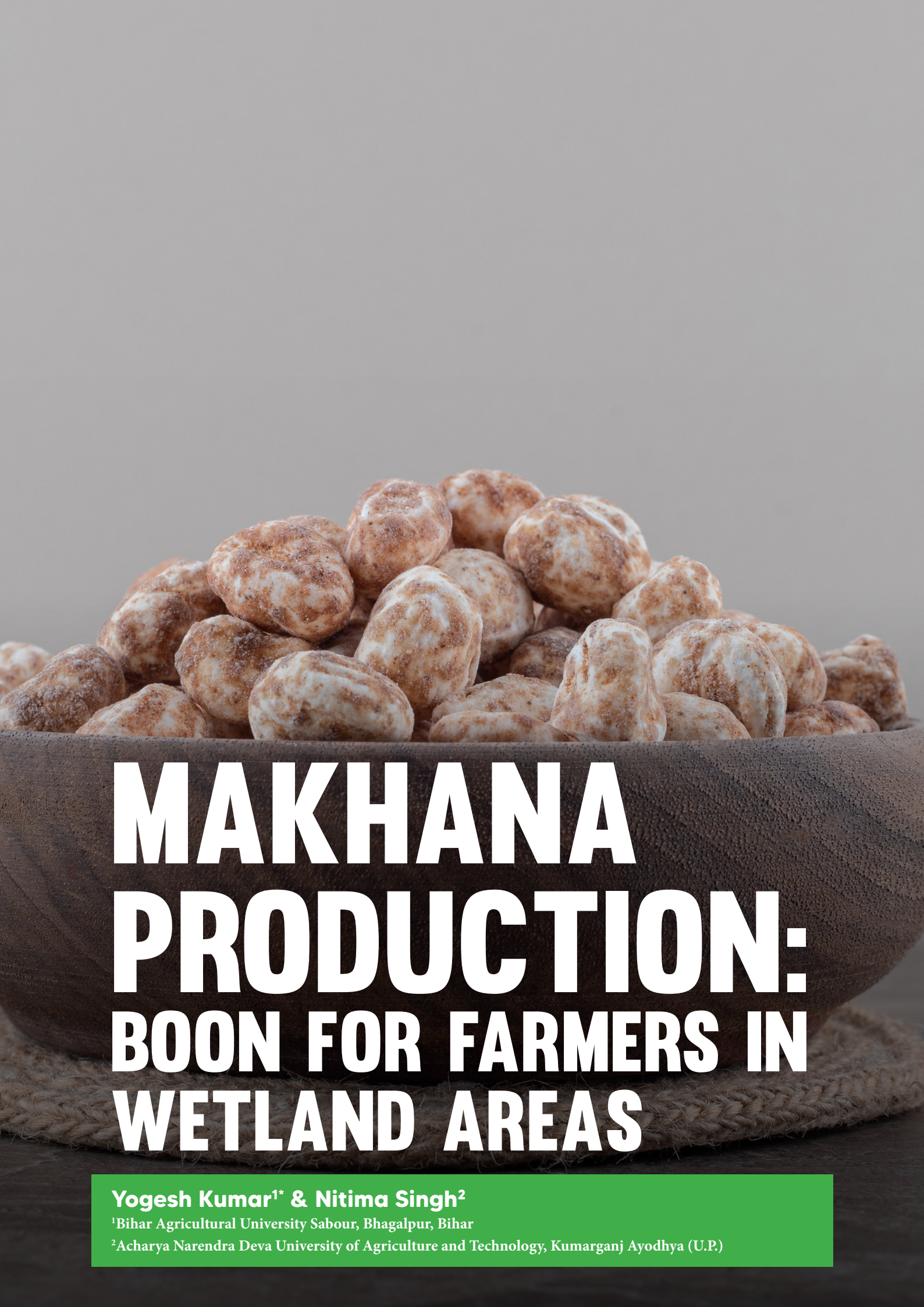

MAKHANA PRODUCTION: BOON FOR FARMERS IN WETLAND AREAS

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MAKHANA/ Euryale ferox

Makhana, often referred to as Fox nut or Gorgan nut, is the seed of the Euryale ferox water lily species, which is native to south and east Asia. It is an indigenous and endangered plant that is the sole living species in the genus Euryale. It is a member of the Nymphaeaceae family. Roughly 90% of the world's makhana is produced in India, mostly in the country's northeast, especially in Bihar's northeast.

Nearly 85% of India's makhana originates from Bihar, specifically from districts like Darbhanga, Madhubani, Saharsa, Katihar, and so on. In addition to India, fox nuts are a major crop in South-East Asian nations like China, Japan, Malaysia, Thailand, the Philippines, Nepal, and Bangladesh. They also grow well in tropical and subtropical regions of the world. The best places to grow makhana are stagnant perennial water bodies such as ditches, ponds, land depressions, oxbow lakes, and swamps where a constant water depth of one to one and a half meters can be found.

Makhana, when combined with aquaculture, can maximise the productivity of Bihar's normally marginal wetlands while also ensuring the food and financial security of the poor and marginal farmers.

Because of the crop's enormous economic potential, the ICAR Research Complex for Eastern Region established a regional centre in the Bihar district of Darbhanga to conduct research on a variety of makhana-related topics. This centre's efforts led to the release of the first makhana variety, called Swarna Vaidehi, which is suitable for growing in the state's wetlands. The Bihar Agricultural University (BAU) in Sabour, Bhagalpur, Bihar also released the Sabour Makhana-1 variety of makhana on August 29, 2016. The Bihar government has several schemes to support makhana producers, including the Makhana Development Scheme, which offers a 75% subsidy on the Suvarna Vaidehi variety of seeds, up to ₹97,000 per hectare. The scheme also provides assistance with machinery repair and maintenance work. Makhana is also a part of the One District, One Product initiative of the Union government, which offers food processors subsidies for infrastructure development, marketing, and branding. Cultivation of Makhana is expanding year by year, with farmers shifting increasingly to this crop.

HOW MAKHANA PRODUCTION, BOON FOR FARMERS IN WETLAND AREAS?

Makhana production can be a boon for farmers in wetland areas through many reasons:

Can be grown in a variety of wetland areas -

Makhana can be grown in ponds, lakes, ditches, swamps, and land depressions where a constant water depth of one to one and a half meters can be found.

Can be grown in shallow water –

In standing water, makhana can be produced in as little as 30 cm (1.0 ft) and even less while in vegetative development.

Sustainable crop (Makhana – Fish aquaculture) -

A sustainable crop, makhana, can be grown in water with fish and other crops. Beyond what's already in the pond or river where it grows, it doesn't require any more water.

Within the boundaries of the aquatic system's carrying capacity, the makhana—fish aquaculture—is an illustration of crop diversification and biomass productivity based on the interplay of the naturally occurring trophic chain of food links. In this procedure, two crops are produced simultaneously in the same pond. It can improve the farmers' financial situation by increasing crop yield and lowering the likelihood that their makhana or fish would fail. In their symbiotic relationship, both crops provide support to one another. The fish's excrement decomposition improves the pond's nutritional condition, promoting the growth of the makhana plants. In a similar vein, the pond's nutritional value is improved by the decomposition of the makhana plants, which encourages the growth of phytoplankton, zooplankton, nematodes, gastropods, insects, and other organisms that carp fish naturally consume. Carp fishes also guard makhana plants by consuming the insect pests' larvae.

Can be integrated with other crops

- To increase land productivity and farm income, makhana can be combined with other crops including rice, wheat, water chestnut, and berseem.

A good source of nutrients

Makhana is high in dietary fibre, low in calories, with 350 calories per 100 grammes and saturated fats, sodium, and cholesterol, and a and a good source of protein, with 9.7% protein per 100 grammes, calcium, magnesium, iron, phosphorus, potassium,

and zinc. Makhana is also gluten-free and has a low glycaemic index, which can help maintain blood glucose levels. Makhana has antioxidant and anti-inflammatory properties, which reduce the chance of developing chronic illnesses.

Reduction in Poverty

The demand for makhana is increasing both domestically and internationally, leading to a rise in its market price. Through proper management of wetland and makhana cultivation farmers improve their economic security.

Employment

Mechanization of the popping process can create employment for rural youth and create Job opportunities for women also.

EXPORT POTENTIAL QUITE HIGH

Challenges for Makhana Cultivation:

- ✓ Makhana popping is a difficult, time-consuming, and painful procedure that calls for advanced processing abilities. A little processing mishandling could result in poor quality products.
- ✓ Makhana harvesting from ponds or field systems is a laborious and cumbersome process. Makhana requires a lot of labour-intensive work during cultivation, including scouring the water body's bottom to harvest the seeds.
- ✓ The growing region of Makhana lacks processing units. The majority of the processing is done using outdated and conventional methods.
- ✓ Because prices fall during the offseason and affect market intermediaries, producers, and processors, the degree of price volatility varies significantly.
- ✓ Because the MSP for makhana is not fixed, dealers frequently take advantage of the makhana producers.
- ✓ Lack of market linkage to producers to guarantee reasonable rates for Makhana products.
- ✓ Farmers in the area are dependent on local money lenders to fulfil their credit requirements because there aren't many institutional credit facilities available.

- ✓ Farmers in rural areas are not so well educated and have insufficient knowledge about market linkage, so they do not get the money that is expected.
- ✓ Makhana needs a dry environment and ample space for storage, which can be difficult for small-scale farmers.
- ✓ Lack of mechanisation for processing, grading, packaging, and storage can be a challenge. If they are available, then they are very costly, so a small farmer cannot afford them.
- ✓ Silting and Eutrophication of water bodies (algal deposit).

CONCLUSION:

Makhana farming is becoming more and more well-known as a successful agricultural endeavour. It boosts sustainable agriculture, creates employment possibilities, and boosts the state's economy. Despite being a healthful, nutrient-dense, organic meal, Makhana production's potential is still underutilised, both by and massive remains that are still under numerous restrictions, such as the absence of technological intrusions, a well-organised marketing framework, an ineffective supply chain, and above all, the precarious socioeconomic situation of growers and processors of Makhana. Even though there is a lot of potential, not much popped Makhana is sent outside. The government must fortify the systems that assist farmers. In order to improve the livelihood of millions of Makhana growers and bring attention to this little-known wetland marvel, it would be imperative that many stakeholders collaborate comprehensively and intensively on various elements of Makhana cultivation.

MAKHANA CULTIVATION IN WETLAND AREA OF PURNIA DISTRICT OF BIHAR.