JUST AGRICULTURE
multidisciplinary e-Newsletter

Makhana Overcomes Flood: A Success Story FROM Saharsa, Bihar

Pankaj Kumar Ray[1] and Pallavi Bharti[2]
[1]Subject Matter Specialist, Krishi Vigyan Kendra, Saharsa, Bihar
[2]Research Scholar, Birsa Agricultural University, Ranchi, Jharkhand

ARTICLE ID: 45

Introduction

The Mithilanchal region of Bihar can be considered the global capital of Makhana production, not only because of its massive contribution to total makhana production, but also because of its rich heritage of technical knowhow in makhana production and processing (Euryale ferox Salisb.). In recent years, there has been a renewed emphasis on makhana cultivation, processing, and value addition as a result of rising global awareness about its nutritional and medicinal values. Given the potential economic benefits of makhana farming, its seed is appropriately dubbed "black diamond." The net profit from this aquatic cash crop, also known as fox nut and gorgon nut, has been shown to be many times greater than the net profit from other competing crops traditionally grown in Bihar's Mithila region. Makhana can be grown successfully in many low-lying areas where rice cannot be grown due to the region's recurring floods. It grows and fructifies in stagnant water. Makhana can withstand water depths of as little as 1.0 ft, though it has been seen to withstand up to 12 ft and even more. The lotic ecosystem (running water) is not conducive to its cultivation. Water with a strong current, such as that seen during intense flood events, can be harmful to the makhana crop because it can wash away floating makhana seeds or even uproot the plants, resulting in significant financial losses for farmers. Such incidents are not uncommon in Bihar's Mithilanchal region, which has experienced numerous heavy floods in recent years.

The current article tells the story of a farmer who, after consulting with the author, successfully raised makhana in his low-lying area in the village of 'Sahidiah,' block 'Nauhatta.' Before meeting the scientist of Krishi Vigyan Kendra, Saharsa, farmer Chandan Singh was contemplating leaving makhana farming due to recurrent crop damages caused by heavy floods in recent years and poor crop performance due to lack of awareness about scientific cultivation. He learned scientific makhana farming methods from the KVK and

JUST AGRICULTURE
multidisciplinary e-Newsletter

devised a plan to protect the makhana crop from any potential flood damage, as seen in recent years. He not only saved his crop from this year's flood, but also ensured a net income of Rs. 1,28,000.00 per ha from makhana farming on a land where the entire area (Chaur) remained submerged and unproductive.

Institutional Interventions

The scientist of Krishi Vigyan Kendra, Saharsa provided the following technical inputs for Chandan Singh's successful cultivation of makhana, which helped him save his crop despite heavy floods and challenges posed by biotic stresses.

Nursery Raising Techniques: Because a transplanted makhana crop yields more than a direct sown crop, the farmer was trained in the art of nursery raising. In addition to increasing transplanted crop yield, nursery raising reduces seed requirements by one-third when compared to direct broadcasting. In the first week of January 2021, a nursery was raised using seed at a rate of 20 kg per 500 m2 of nursery area for transplanting in a one-hectare area.

Transplanting Technique: By early April, the Makhana seedlings were ready for transplant. Seedlings were carefully uprooted to avoid major root system damage and transplanted at 1.25 m line to line and plant to plant distances.

Weeding, Plant Protection and Crop Monitoring: Weeding was done by hand during the early growth period following transplanting and before flowering. During a field visit, a KVK Scientist noticed the appearance of insect pests in the growing crop. Timely recommendations for plant protection measures proved critical in saving makhana from heavy insect-pest infestations during the crop's mid-growth phase.

Net Fencing: To prevent floating makhana seeds from being washed away by running flood water, net fencing was installed around the crop prior to the onset of rain, anticipating the flood occurrence seen in recent years. The net, known locally as chatti jaal, was supported by bamboo poles installed at regular intervals just inside the field's boundary. When heavy flooding struck the area during the 2021 monsoon, net fencing proved to be the ultimate saviour. The farmer also grew makhana in other areas without net fencing, and he lost almost all of his crop.

Results and Outcomes: As a result of the KVK scientist's technological interventions, the farmer earned an income never before seen on his farm. He cultivated makhana in 0.4 ha of

JUST AGRICULTURE
multidisciplinary e-Newsletter

net fencing, yielding 10.0 quintals of makhana seed @ 25 q/ha. With a total input cost of Rs. 38,800.00, he earned Rs. 90,000.00 in gross income. A net income of Rs. 51,200.00 was earned by 0.4 ha of makhana farming (with net fencing), implying a net income of Rs. 1,28,000.00/ha (Table 1).

Table 1: Summary of the production and income from makhana farming

Sl. No.	Parameters	Values
1.	Cost of cultivation for 0.4 ha	Rs. 38,800.00
2.	Makhana seed production from 0.4 ha	10.00 q
3.	Gross return from total produce	Rs. 90,000.00
4.	Net income from total produce	Rs. 51,200.00
5.	Cost of cultivation/ha	Rs. 97,000.00
6.	Gross return from total produce/ ha	Rs. 2,25,000.00
7.	Net income/ha	Rs. 1,28,000.00

It's worth noting that the cost of cultivation per hectare appears to be slightly higher than usual due to the additional cost of net fencing. The net used this year, however, can be reused in future seasons. A few irrigations were also applied to the crop prior to the arrival of rain, which increased the input cost. It should be noted that no fertiliser or organic manures were used on the crop, and despite the numerous challenges posed by heavy floods and biotic stresses, the farmer was able to produce up to 20 quintals of makhana per hectare, resulting in a net income of Rs. 1,28,000.00/ha. Income analysis on a per-hectare basis has been presented solely for the purpose of comparison and comprehension.

Success Point

The Scientist from KVK, Saharsa's technological interventions resulted in a net income of Rs. 1,28,000.00/ha from makhana farming in a flood-hit region of Saharsa where the entire area (Chaur) surrounding the farmer's field remained submerged and unproductive. Net fencing around the field, combined with the use of scientific makhana farming methods, did the trick. According to the farmer, this is the highest he has received from makhana farming in any of the flood-affected years over the last decade and a half. Due to flood damage, other makhana fields of the same farmer with no net fencing produced almost nothing.

JUST AGRICULTURE
multidisciplinary e-Newsletter

Conclusion

Flooding continues to be a major challenge for otherwise highly profitable makhana farming in the flood-prone Mithilanchal region of north Bihar. As demonstrated by Chandan Singh's success, makhana can be grown profitably even in flood-prone years using a simple net fencing technique and scientific makhana cultivation methods.