

# Production security through community rice nursery model in agro-climatic regions of Bihar

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*A community rice nursery is a location specific communal innovation where planting materials are raised, propagated, multiplied, etc. in order to be transplanted in beds or in the puddle field that have been prepared. It can be a solution to address the issue faced by farmers in lowland/medium land/upland areas during seasons of little rainfall. The method entails planting a community nursery in the hamlet that is spaced out and given guaranteed watering every two weeks in a particular village. With the long duration variety (>150 days), the first nursery is taken up by 10<sup>th</sup> June as a backup plan in case the monsoon is delayed by two weeks. This allows for the transplantation of 3–4 weeks old seedlings by the first two weeks of July. In the event, monsoon is delayed four weeks longer than expected, the second nursery will be stocked with seedlings that are three to four weeks old, ready for transplantation in the third or fourth week of July, using medium duration type that takes 130–135 days to complete the crop duration. The third nursery is prepared by the middle of July with short duration variety (<110 days) so that transplanting seedlings of 3–4 weeks old can begin in the first/second weeks of August in the event that there is still no rain by the middle of the month.*

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THE community rice nursery model is a method wherein a group of farmers from the same village work together to raise a paddy nursery. This ensures that the nursery doesn't dry up too soon, which allows for timely transplanting into fields that have been prepared with adequate irrigation. Production of profitable appealing crops is contingent upon the availability of high-quality, true-to-type plants. Establishing a nursery is a sustained endeavor that requires planning and expertise. In nurseries, plants are given optimal growing conditions that ensure germination. The time required to raise the next crop is shortened by the nursery. Establishing a nursery

is a long-term effort that calls for preparation and knowledge.

Community rice nursery model was practiced in NICRA (National Innovations on Climate Resilient Agriculture) adopted village *Merha* and 23 TSP (Tribal Sub Plan) adopted villages i.e. *Budhawabathn, Khirkitari, Manjhladih, Gobardaha, Jamua, Nakti, Menkadih, Laugain*, etc. of KVK, Banka, Bihar. The tribe population of Banka district is poor in financial status, so nobody has facility of assured irrigation to supplement in rice crop. Through this technique, farmers practiced a staggered community rice nursery technique for production security of rice crop because it is the main crop of that society due to maximum water

availability through precipitation in *kharif* season.

In order to address the issue faced by farmers during lowland shortfall rainfall seasons, the establishment of a staggered communal nursery was investigated as a local adaptation technique at the village level. The technique involves raising a staggered community nursery under assured irrigation in the village at an interval of two weeks. With the long duration variety (>150 days), the first nursery is taken up by June 15<sup>th</sup> as a backup plan in case the monsoon is delayed by two weeks. This allows for the transplantation of 3/4 week old seedlings by the first two weeks of July. In order to provide 3/4 week

old seedlings for transplanting in the third or fourth week of July, the second nursery is raised with medium duration variety (130–135 days) by July 1<sup>st</sup> if the monsoon delay prolongs by 4 weeks. Should there be any more delays or insufficient rainfall, the third nursery is planted by mid-July, using short-duration cultivars (less than 110 days) so that 3–4 weeks seedlings can be transplanted during the first two weeks of August.

In the lowlands of Banka, transplanted paddy is frequently grown as sole crop because in contrast to other crops, it can tolerate water stagnation brought on by heavy rainfall. Once the monsoon season begins in mid-June, farmers cultivate long-duration paddy, which require 150–155 days to mature. In July, 20–25 days old seedlings are moved to allow photosensitive types to finish blooming before October and to harvest by mid-November, which allows for the timely sowing of *rabi* crops, including cereals, oilseeds, pulses, and vegetables. This method guarantees the best possible yield from the *rabi* and *kharif* crops. However, abnormal rainfall conditions affected rice output and farmers' livelihoods in five of the preceding ten years in Banka, Bihar. The lack of rain in July seems to be the cause, as the delayed transplantation of paddy has a negative influence on productivity and an adverse impact on *rabi* crops.

Paddy transplanting should be done as soon as possible to maximize yield because older seedlings have poor tillering potential. Due to their overwhelming preference for long lasting cultivars, farmers frequently wait until the end of August to transplant in lowland areas in anticipation of rain. Because of the current practice, nurseries have been abandoned and large areas in a number of South Bihar's rainfed districts have gone unplanted because of insufficient rainfall during the *kharif* season. A further issue brought about by non-transplanting resulting in the absence of fodder for animals during the lean season, which accounts for up to 45% of Bihar's overall agricultural revenue.

KVK, Banka executed this strategy and have shown the concept of community rice nursery in NICRA and TSP communities. In order to ensure the timely transplantation of seedlings of the proper age for increased productivity and minimize the risk of experiencing a shortfall or delayed monsoon commence, farmers appreciated the approach and worked together to produce seedlings. The community adopted traditional paddy nurseries during *kharif* seasons, with staggered sowings on June 15, July 1, and July 15. However, transplanting was not possible in July due to the lack of rainfall (75% of normal), consequently the first two nurseries were forced to close and the seedlings were used as fodder. After

receiving rain in August, only the seedlings from the third nursery short-duration varieties, viz. Sahbhagi Dhan and Sabour Ardhjal could be transplanted.

A rice nursery business is a win-win situation for farmers and entrepreneurs alike, providing rural women and youth with a seasonal source of income and a reliable means of ensuring crop establishment in the face of monsoon/climate vulnerability by providing healthy seedlings when needed at a reasonable cost. When the business owner uses excellent management techniques to raise healthy seedlings to maintain his or her enterprise, money and resources are saved. Farmers who used rice seedlings from entrepreneurs increased their rice yield more than those who used their own self-grown nursery with over-aged seedlings. An entrepreneur employs almost all inputs (land, seed, fertilizer, and water) wisely due to his technical know-how and excellent management strategies.

#### Impact of community rice nursery model

The data showed that the grain yield obtained was in the range of 40.60 q/ha with 13.09% increase in yield by using seedlings from first nursery for transplanting, 34.80 q/ha with 11.89% increase in yield with seedlings from second nursery and 30.40 q/ha with 16.47% increase in yield with seedlings from third nursery in *kharif* season,

**Table 1.** Description of community rice varieties among farmers as community in NICRA and TSP villages

S. No.	Duration	Varieties	Appropriate community nursery sowing time
1.	Long Duration	Rajendra Mahsoori-1, MTU-7029	25 May-10 June
2.	Medium Duration	Rajendra Sweta, BPT-5204	10 June-25 July
3.	Short Duration	Sahbhagi Dhan, Sabour Adhjal, Sabour Harshit, Sabour Deep	25 June-10 July

**Table 2.** Impact assessment and yield gap analysis of rice varieties among farmers as community in NICRA and TSP villages

Variety	Yield (q/ha)			Net Return (₹/ha)			B: C ratio		
	Staggered	Community	% increase	Staggered	Community	% increase	Staggered	Community	% increase
Rajendra Mahsoori-1	35.90	40.60	13.09	23,100	27,600	19.48	2.42:1	2.72:1	12.39
Rajendra Sweta	31.10	34.80	11.89	18,600	22,200	19.35	2.21:1	2.51:1	13.57
Sahbhagi Dhan	26.10	30.40	16.47	14,200	17,100	20.42	2.11:1	2.41:1	14.21



Uprooting of community rice nursery in NICRA village



Demonstration of community rice nursery among tribes



Rice crop demonstration



Rice crop under community rice nursery in NICRA Village

as determined by experiments conducted at farmers' fields for the yield gap analysis and evaluation of impact. Transplanting seedlings from the first nursery yielded the maximum net returns of ₹ 27,600 and benefit cost ratio of 2.72, while transplanting seedlings from the second nursery yielded the highest net returns of ₹ 22,200 and benefit cost ratio of 2.51, and transplanting seedlings from the third nursery during the *khari*f season yielded ₹17,100 and benefit: cost ratio of 2.41. In July and the first two weeks of August, the village had a shortage of rainfall; farmers found the staggered community rice nursery to be profitable.

#### Gender and youth relevance

Young people in rural areas are leaving agriculture because of the low payment. In addition, mechanization in agriculture is causing women to lose their jobs in tasks like transplanting, weeding, harvesting and winnowing as well

as related agronomic practices. As a result, the nursery enterprise model was developed and effectively tested with young people (as individual entrepreneurs) and women's organizations (as community nurseries) among tribes where the irrigation facility is available to sale the nursery seedling for timely transplanting. Through KVK Banka, the approach was also implemented by TSP and NICRA in the Banka district. By including potential people, especially women's and youth groups in skill development, entrepreneurship was encouraged and localized agricultural service provision boosted the local economy.

Food security has been improved due to the community rice nursery model with the help of increasing production potential as well as nutritional security in remote villages through TSP and NICRA adopted villages. Maximum transplanting of nursery in the village is done timely, due to staggered community rice nursery

as well as production is achieved in the paddy area. The tribal farmers are cultivating pulses as well as oilseed crops due to the less water requirement in crops after timely harvesting of paddy.

#### Business model perspective

Not a seedling, if it's a seed! Why don't farmers purchase easily accessible, healthy seedlings from business owners if they are having trouble obtaining high-quality seed and are raising nursery under risk? This is one of the model's motivating elements. Furthermore, it has been noted that the business model benefits the farmer as well as the entrepreneur. But since this is new in the geography, a significant push is required. The government may introduce a unique programme with significant incentives to help women and youth organizations start providing seedlings. This might be connected to mechanical transplanted rice initiatives to make it more sustainable and effective.

## SUMMARY

This type of model is very necessary for low land as well as rainfed ecosystems, where monsoon unpredictability poses significant challenges, but it can also thrive in any climate or biophysical setting. The rice nursery business model works better in a rice-wheat cropping system, and this rice nursery concept works well for both manually and mechanically transplanted rice. The State Department of Agriculture of Bihar has started a programme to support community nurseries run by

farmers with guaranteed irrigation, providing paddy seedlings for transplanting in case of emergency. A community rice nursery is established under the programme on 150 acres in each district and 5 acres in every panchayat. The farmer receives a subsidy of ₹ 6500/acre for each nursery to cover production costs, and an additional ₹ 1000/acre for the purchase of seedlings to be transplanted in 10 acres from a single nursery. The Department of Agriculture, Government of Bihar provided a sum of ₹ 16,500 towards

the construction of a one acre community rice nursery. Promoting community nurseries with short duration varieties is advised in the case of rainfall shortfall in July, as has been the case in a number of Bihar districts in recent years. Considering the changing climatic scenario year by year, farmers may prove an important contribution to the food security.

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