

EVA STALIN IAS ACADEMY – BEST IAS COACHING IN CHENNAI

12/24, Muthurangan Muthali St, West Tambaram, Chennai - 600045

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Contact Number – +91-8678969915, +91-9940332851

EDITORIAL ANALYSIS → 08 JULY 2022 → THE HINDU:

RICE CULTIVATION IN INDIA:

- **In what manner is rice grown in India?**
- Regarding the origin of rice, there are various schools of view. Some think it came from the foothills of the Himalayas, while others think it came from Southern India and spread to places like China, Korea, the Philippines, Japan, etc.
- Indica, a variety of domesticated rice that originated in the Eastern Himalayan foothills, and Japonica are two of the earliest varieties (originated in Southern China).
- One of the biggest producers of rice is India. It is the top Basmati exporter.
- In India, unique rice varieties including Jasmine, Ambemohar (GI-tagged to Maharashtra), Seeraga Samba, etc. are grown. The most recent addition to the Indian rice types with GI tags is the black rice from Manipur, known as "Chakhao."
- The majority of India's rice is produced in West Bengal. Significant rice production also occurs in areas like Tamil Nadu, Punjab, and Uttar Pradesh.
- By harvesting 22 tonnes of rice from a hectare in 2011, an Indian farmer set a new world record for the highest rice yield.
- In India, the Kharif season is mostly used to grow rice, especially in the northern states. However, states like West Bengal, Assam, Tamil Nadu, Odisha, and Andhra Pradesh also grow it as a Rabi crop.
- For the first time in nine years, farmers in Tamil Nadu have recently begun cultivating Kuruvai rice. In the Cauvery River delta region, rice is grown during this brief crop season.
- The crop may grow in a variety of ecosystems with various soil, climate, and hydrological conditions. It can be grown on irrigated ground, lowlands that are fed by rainfall, tidal marshes, upland areas, etc.
- The best climate for rice production is one that is hot and humid with long periods of sunshine and a steady supply of water. It needs temperatures between 21 and 37 degrees Celsius on average.

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- **The following categories best describe rice types in India:**
 - Coastal varieties
 - Lowland varieties
- Different cultivation techniques are employed depending on a number of variables, including soil characteristics, water availability, labour, and weather conditions, etc.
- Lowland wet rice cultivation techniques: puddled-field transplantation (transplantation/puddled-method) and broadcasting seeds on a field of puddles
- One of the most popular gardening techniques is transplantation in soggy fields. The steps involved are as follows:
 - In nurseries, the seeds are initially germinated and nurtured. The area of the main field, where the crops will be cultivated later, is 15 to 20 percent covered by the nursery beds.
 - After 25 to 35 days, the seedlings are then put onto the soggy field.
 - The crops must be irrigated nearly every day for the first three weeks if there are no raindrops to maintain a 2 to 5 cm water depth.
 - The crop is in the tillering stage when the stem development happens for the next 4 to 5 weeks. Every two to three days, the crops are watered during this time.
 - The field doesn't need to be flooded after the tillering stage.
 - The idea behind field flooding is that weed development, which competes for nutrients, light, and water during the seedlings' early growth phases, can be suppressed by flooding the fields.
 - By cutting off the oxygen supply, the water inhibits weed development, effectively serving as a weedicide. The rice seedlings, which have aerenchyma, a soft tissue that allows oxygen to permeate through the roots, are unaffected by this.
- **What is the state of rice farming research and development in India?**
 - Since 1911, India has launched rice breeding efforts. With the founding of the ICAR (Indian Council of Agricultural Research) in 1920, more extensive research on rice began.
 - The Central Rice Research Institute was founded in 1946, which gave rice research an additional boost.
 - The All India Coordinated Rice Improvement Project (AICRIP), an interdisciplinary R&D initiative for raising rice production, productivity, and profitability in India, was introduced by the ICAR in 1965.

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- The creation of Taichung (Native)-I was one of the most extensive rice breeding endeavours under the AICRIP programme. Padma and Jaya are two of the earliest AICRIP types to emerge.
- India is home to more than 1,200 different rice cultivars.
- **What difficulties do farmers face when growing rice?**
- According to NABARD's 2018 water productivity report, rice is one of India's most water-intensive crops.
- An over reliance on paddy would put stress on groundwater in areas with limited water supplies. Consider the state of Haryana, which relies on groundwater for 61 percent of its agricultural demands and 95 percent of its drinking water needs. The state was determined to be overexploited in terms of groundwater extraction.
- Rice is traditionally grown using labor-intensive techniques, with the germination of the seeds being transferred by hand to the fields. Rice cultivation in the granary states was significantly impacted by the lockdown caused by the COVID-19 conflict and the huge migration of labourers.
- Both upland and lowland agriculture areas struggle with insufficient soil moisture conservation. Rainwater drains swiftly from upland areas while droughts are a big worry in lowland areas.
- Rice agriculture faces difficulties in flood-prone areas (like Assam), areas with low-lying topography, and areas with inadequate drainage due to flash floods, water logging, etc. These areas also experience the accumulation of hazardous breakdown byproducts and soil iron toxicity.
- soil erosion-related low soil fertility. Salinity and land degradation are further problems.
- fertilisers are not used effectively.
- deficiencies in cultivation methods. Not all seeds germinate when using the broadcasting approach, which leads to a low population of crop plants. The unpredictable monsoon causes delays and inefficiencies in the transplantation process.
- Around 78 percent of rice growers are small and marginal cultivators. Due to their economic illiteracy, they frequently lack the resources to embrace more advanced crop production techniques and necessary cultivation inputs.
- Climate change and rice farming are related. It is said that because of the anaerobic conditions created by flooded fields, it emits greenhouse gases like methane. As much as 5% of all global GHG emissions come from such sources.
- The cultivation of rice is also a victim of climate change. It is impacted by severe weather conditions.
- **What does the direct rice seeding technique entail?**

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- Recently, Punjab and Haryana pushed their farmers to switch from the traditional transplantation method to Direct Seeding of Rice, or DSR.
- Using an equipment powered by a tractor, the seeds are drilled straight onto the main field. No need for nurseries or transplants exists.
- The DSR approach utilises actual chemical pesticides to address the weed problem rather than the traditional practise of using water as a herbicide.
- The Lucky Seed Drill, created by the Punjab Agricultural University, is one such device used for DSR. This device can spray herbicides and plant seeds at the same time. It is distinct from the Happy Seeder, which was employed to address the burning stubble issue.
- **The DSR approach involves the following steps:**
 - To guarantee that the water is distributed equally, the land is levelled using a laser leveller.
 - A "rauni," or pre-sowing irrigation, is performed on the ground to provide favourable soil moisture levels.
 - The next step is two rounds of ploughing and planking, which smooths out the field's surface.
 - The tractor-powered device is used to plant seeds and apply herbicides to the ground.
- **Two varieties of herbicides are available:**
 - Herbicides used prior to germination are called pre-emergent agents. The Lucky Seed Drill machine utilises this kind. Additionally, it can be applied right away following sowing using standard seed drills. Consider pendimethalin.
 - Herbicides used post-emergence are used 20–25 days after the seeds are sown. For instance, Fenoxaprop-p-ethyl and Bispyribac-sodium.
- **What benefits does it offer?**
 - It conserves water. Compared to the transplantation approach, it uses 30–40% less water.
 - Only 21 days after the sowing is the first watering after the rauni necessary. This is in contrast to the transplantation approach, where irrigation is needed virtually every day to keep the field inundated.
 - It reduces labour costs. Its current emphasis during periods of severe labour shortages is primarily due to this benefit. On the other hand, the puddle method might need up to 600,000 workers alone to cultivate the fields in Punjab.

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- In terms of price, it is more cost-effective. Experts note out that while pesticide costs under the DSR approach would be within 2,000 INR/acre, transplanting labour costs even in normal circumstances can be in the region of 2,400 INR/acre (which would be significantly higher in the current crisis period).
- It is a time-saving technique. The transplantation process in the puddled approach takes a week. For DSR, a few days would be plenty to drill the seeds in.
- **What drawbacks does it have?**
- Herbicide accessibility is a significant issue.
- Under the DSR approach, more seeds are needed. The DSR approach takes twice as many seeds per acre (8–10 kg), compared to the transplantation method's 4-5 kg.
- To get results from the DSR approach, laser levelling is required. Each acre of this technique costs 1,000 INR. The transplantation procedure is not required to use the same.
- The timing of the sowing must coincide with the beginning of the monsoon. By the first week of June, the sowing must be completed, and before the monsoon, the seeds must germinate. This is not a problem in the case of transplantation because the seedlings have previously been raised in nurseries.
- Due of the rice farmers' poor economic standing, adoption of new technologies like the Lucky Seed Drill also faces difficulties.
- When the seeds don't sprout properly within the 21-day window, farmers frequently lose patience and resort to irrigations that have an adverse effect on the process' results.
- A concern raised by some experts is that the approach could lead to the "corporatization of agriculture."
- Mechanization of agriculture has historically resulted in underemployment of farm labourers. When and if the workers choose to return to these fields after COVID, this could become a problem.
- Concern has also been raised about how using herbicides will affect the environment.
- **What should we do next?**
- In the foreseeable future, there won't be a decrease in the need for rice. The International Rice Research Institute (IRRI) estimates that in order to meet future demand, rice production must rise by 25% over the next two decades.
- Given the profitability of the crop, it is anticipated that a significant majority of farmers in the granary states will continue to grow rice in the near future. 27 lakh hectares are anticipated to be used for rice

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farming in Punjab. Of these, 7 lakh hectares will be used to grow Basmati rice, which is highly prized for its superior quality.

- Several farmers are already using the DSR method (on a lesser scale), and they have reported yields that are equivalent to the transplantation method. Therefore, since they only need to increase the practise, adoption of the strategy should be quite simple.
- Since 2009–10, the Punjab government has attempted (with varying degrees of success) to encourage widespread DSR technique use. This objective will be achieved thanks to the current severe labour shortage. The area used for DSR cultivation is over eight times greater than it was the previous year, according to even preliminary estimates.
- Additionally, the governments are subsidising the price at which the DSR devices are provided. As can be seen from the uneven adoption of technology throughout the early stages of the Green Revolution, this is crucial. The government's role is vital in ensuring the equal distribution of gains from a new agricultural technology to all segments of the farming community, according to one of the lessons learned from the 1950s and 1960s.
- Additionally, farmers themselves have taken action to solve a number of issues. For instance, some farmers have converted Happy Seeder machines, which are typically used for sowing wheat, to plant paddy seeds using the DSR method, so avoiding the need to buy new equipment.
- However, conditions on the fields are not ideal. With few sprouts sprouting even after the early June rains, the farmers' faith in the DSR approach has been damaged. Farmers in numerous parts of Punjab have turned back seeds sown by the DSR method and switched to the transplantation method out of fear of losses, especially during the times when the economy is poorer.
- This just serves to increase the farmers' losses in terms of time, money, inputs, and labour.
- To allay the concerns about the procedure, the agricultural authorities must provide adequate instruction and help. The state agriculture website or the farm extension system could be used for virtual guidance in this.
- To inspire more farmers to adopt the method with greater assurance, it is necessary to raise awareness of the practise and showcase success stories.
- Uttar Pradesh and Bihar account for a sizable portion of the agricultural labourers employed in granary states like Punjab and Haryana. The loss of farm labourers as a result of mechanisation of agriculture will be partially offset by the creation of local employment prospects in this area.
- To increase the effectiveness of water utilisation, drip irrigation, sprinkler systems, and micro-irrigation are encouraged.
- To lessen the strain on groundwater supplies, rice farming may be prohibited for farmers who utilise high horsepower engines.
- The cultivation of rice could be moved to new locations where the crop has not been grown recently.

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- Mulching and non-synthetic herbicides are two alternatives to the use of chemical herbicides.
- Given that government measures to increase food production during the Green Revolution mostly drove the cultivation of rice in areas that had not historically grown the crop, it is now again the responsibility of the government to encourage a "reverse/ upward transition."
- It is important to realise that many places are unsuited for rice farming due to the severe water shortage that exists there. The government must accept this and implement diversification initiatives. For instance, the Haryana government decided to switch 1 lakh hectares of rice-growing land to other crop farming (like maize).
- One possibility is to encourage diversification. For instance, the Haryana government recently introduced the "Mera Pani- Meri Virasat" financial incentive-linked diversification programme, under which farmers who migrate from rice to crops like maize, bajra, cotton, and horticulture crops are paid 7,000 INR/acre.
- By offering MSPs, the profit gap between rice and other crops like maize can be closed. Fulfilling such commitments is a crucial component in winning the farming community's trust.
- By substituting some of the rice in the Public Distribution System rations with other grains like maize, millets, and other traditional cereals, diversification can be further supported. To encourage better health and generate demand for these substitutions, such cereals can also be incorporated into Mid-day Meal Schemes and Nutrition Schemes.
- **What additional sustainable techniques are there for growing rice?**
- The Food and Agriculture Organization introduced the "produce more with less" Save and Grow technique. It focuses on topics like effective water management, appropriate crop choices, and conservation agriculture.
- Rice and fish farming: Fish are raised using this technique in rice fields that have been flooded. In addition to improving soil nutrition, these fish help farmers earn additional revenue and minimise methane emissions from the rice fields. This lessens the need for fertilisers and insecticides.
- The System of Rice Intensification (SRI) approach was found in Madagascar in the 1980s. With this technique, fewer seeds are evenly distributed throughout the area. It is common practise to fertilise fields with organic manure. The crops are subjected alternately to dry and wet conditions rather than being continuously maintained in flooded conditions. The technique boosts crop resistance to floods and droughts while boosting production by 20% and using less water. The technique improves oxygen availability while lessening competition among the plants.
- By 2021, the Sustainable Rice Platform—supported by IRRI, the UN, and other stakeholders—seeks to persuade 1 million farmers worldwide to switch to sustainable rice farming practises.

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- **Conclusion:**

- Over half of the states in India cultivate rice, making it a significant component of the country's agricultural sector. It provides a significant section of the agricultural community with their livelihood, and an even greater portion of the people with their nourishment. As a result, it is vital to protect the crop against problems such a lack of water and labour. Given the enormous risks, any new technology introduced into rice production must be done so with the utmost caution. The DSR approach is a solution to the immediate issues. The current moment asks for a different kind of "Green" Revolution with an emphasis on how it will influence the environment and the agricultural community, whereas the Green Revolution of the 1950s and 1960s sought to enhance food production.

- **Mains Question:**

- **The COVID-19 crisis caused severe labour shortages, thus the governments of the northern granary states looked to the Direct Seeding of Rice method to continue rice farming. Compare this approach to the conventional approach and weigh its advantages and disadvantages.**

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