

Threshing Operation of Kharif Crops and Safety Guidelines

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Kharif crops, known as monsoon crops, are planted during the rainy season. The term "Kharif" comes from Arabic. These crops are usually sown with the arrival of the southwest monsoon, which provides about 86% of India's rainfall and 91% of Rajasthan's rainfall. The sowing period generally falls between June and July, and harvesting happens between September and October. The timing of sowing depends on the arrival of the monsoon. For instance, in South India, where the monsoon arrives earlier, sowing begins sooner than in North India. Kharif crops need high temperatures (around 35°C or more) and high humidity during growth, and cooler temperatures (18-32°C) during ripening. They also require a lot of water, about 500 mm, which makes them heavily dependent on monsoon rains. Common Kharif crops include paddy (grown on 43.86 million hectares, producing about 104.80 million tonnes), millet, maize, sorghum, cotton, moong, groundnut, and cowpea.

Threshing

Threshing is the process of separating grains or seeds from the harvested crop by beating, crushing, or using machines to release the grains from stalks and husks. Proper threshing ensures minimal grain loss and better efficiency. Based on the power source used, threshing can be classified into three main types: manual threshing, animal-powered threshing, and mechanical threshing.

Manual Threshing

Manual threshing is the most traditional method where grains are separated by beating the harvested crops against a hard surface or rubbing them with hands or sticks. This method is highly labor-intensive and results in low productivity, with only about 50 kg of grains separated per hour. Grain loss can be as high as 20% due to incomplete separation and scattering, making it inefficient. Additionally, this method puts a lot of physical strain on the person involved, causing pain in the waist, wrists, and body. Despite technological advancements, manual threshing is still practiced in remote areas with limited access to machines.



Animal Powered Threshing

Animal-powered threshing involves using animals like oxen or bullocks to walk over the spread-out harvested crop. Their hooves crush the crop, releasing the grains. However, this method is inefficient as the grains are not completely separated, and many grains get damaged by the hooves. The productivity of this method is around 40 kg per hour, and there is a high risk of spoilage if it rains suddenly. This method is time-consuming and results in uneven separation due to the inconsistent pressure applied by animals. While this practice is still used in some rural areas where animals are readily available, it is not a reliable or efficient method.



Mechanical Threshing (Multi-crop Thresher)

Mechanical threshing, which is the most efficient and modern method, involves the use of machines like multi-crop threshers to separate grains quickly and effectively. Mechanical threshers are designed to maximize efficiency, resulting in minimal grain loss. Multi-crop threshers, which can process crops like paddy, gram, mustard, pigeon pea, and groundnut, have significantly higher productivity, ranging from 2,000 to 2,500 kg per hour. These machines are generally powered by diesel engines or electric motors and have an average lifespan of about eight years, weighing approximately 460 kg. Their operating speed is usually set at 540 rpm for optimal performance. Proper drum speed and concave clearance ensure effective threshing without grain damage, while controlled feed rate and suitable sieve adjustments improve grain-chaff separation.



The use of mechanical threshers offers several advantages, including high efficiency, reduced labour requirements, better grain quality, and lower risk of spoilage from adverse weather conditions. However, there are some challenges, such as the high initial investment, the need for regular maintenance, and the lack of awareness among farmers regarding proper usage. Despite these drawbacks, mechanical threshing remains the most reliable and effective method for threshing various crops.

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Comparing these methods, it is evident that mechanical threshing is far superior in terms of productivity, efficiency, and grain quality. While manual and animal-powered threshing are still practiced in certain regions, particularly rural areas with limited resources, the adoption of mechanical threshing equipment has been increasing. However, awareness about the benefits of mechanical threshing needs to be improved to ensure more widespread adoption among farmers.

Safe Usage of Threshers: Essential Guidelines for Farmers

Agriculture involves the use of various hazardous machines, and threshers are among the most dangerous. Mishandling these powerful machines can result in severe injuries, permanent disabilities, or even death. Therefore, operating a thresher with utmost care and following all safety precautions is not just advisable but essential. Farmers should only use threshers that are marked with the Bureau of Indian Standards (ISI) to ensure quality and

safety. However, even with certified machines, improper handling can lead to disastrous consequences. Following these guidelines can help farmers use threshers efficiently while minimising the risk of accidents:

1. For electrically operated threshers, always cover wire joints with plastic tape to prevent electrical accidents and use a circuit starter for safe operation.
2. Diesel engine threshers must be equipped with a protected belt transmission system to avoid accidental contact.
3. Operate the thresher at the manufacturer's recommended speed, usually 540 rpm. Altering the speed can cause malfunction, damage, or accidents.
4. Always set up the thresher on a flat, stable surface to prevent tipping or unintended movement during operation.
5. To reduce vibrations, place the thresher's wheels in a 15 cm deep pit.
6. Ensure the chaff is expelled in the direction of the wind to prevent it from blowing back towards the operator.
7. Maintain proper belt tension; a loose belt can slip, reduce efficiency, and potentially cause accidents.
8. Never wear loose-fitting clothing while operating a thresher, as it can get caught in moving parts, leading to severe injuries.
9. The feeding pipe or gargoyle should be approximately 90 cm long, with at least 45 cm covered to prevent hands from being accidentally pulled into the beater. Removing this cover is extremely risky and should be avoided.
10. Before starting the thresher, ensure all nuts and bolts are tightly secured to prevent excessive vibration or structural failure.
11. Regularly grease the thresher's bearings to prevent wear and tear, ensuring smooth operation and avoiding breakdowns.
12. Refrain from smoking or consuming any intoxicants while operating the thresher, as this impairs judgment and can lead to fatal accidents.
13. Avoid continuous operation of the thresher for more than eight hours to prevent fatigue-related accidents.
14. When not in use, turn off the motor and store the machine in a shaded area to protect it from environmental damage and unintended operation.
15. Always keep a well-stocked first aid box nearby to provide immediate medical assistance in case of injuries.
16. Ensure adequate lighting if operating the thresher at night to enhance visibility and safety.

Threshers are powerful machines that, when not handled properly, can cause life-altering accidents. By following these safety guidelines and maintaining a high level of caution, farmers can greatly reduce the risk of injuries while ensuring efficient threshing operations.

Conclusion

Threshing is an integral part of agricultural operations, significantly impacting the efficiency and quality of grain production. Traditional threshing methods, including manual and animal-powered techniques, remain prevalent in rural areas but pose challenges such as low productivity, high labor intensity and grain loss. In contrast, mechanical threshing offers a far more efficient and reliable solution, improving productivity while reducing labor requirements and grain wastage. However, the safe operation of threshers is paramount to prevent injuries and accidents. Adopting modern threshing technology, coupled with proper safety measures, can significantly enhance agricultural productivity and ensure the well-being of farmers. Therefore, raising awareness about the benefits of mechanical threshing and implementing strict safety guidelines are essential steps toward a more efficient and secure farming environment.

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