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Broadcasting and Television School
中央农业广播电视学校

FULLY MECHANIZED RICE AND WHEAT PRODUCTION WITH A FOCUS ON LOSS REDUCTION

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PART.05

Mechanization in Rice Harvesting

Types of Rice Harvesting Machinery

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Five main categories

- Full-feed combine harvesters (including self-propelled wheeled and tracked models).
- Semi-feed combine harvesters.
- Backpack-type harvesters.
- Multifunctional harvesters.
- Small-scale harvesters.

Self-Propelled Combine Harvester

Tracked Full-Feed Combine Harvester

Semi-feed combines harvesters

Backpack-type harvesters

Small-scale harvesters

Key Advantages

- Adapts to different field conditions and operational requirements.
- Enables efficient and integrated harvesting and threshing.

1. Scientifically Determine the Harvesting Period

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Optimal Timeframe

- From late wax-ripening to early full-ripening stage.

Key Indicators

- Grain moisture content 15%-28%, husks turning yellow, grains hardening.

Special Operations

- For segmented windrowing operations, harvesting can begin during the late wax-ripening stage.

2. Select Appropriate Machinery

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■ Semi-feed harvesters recommended for

- Rice height: **65-110cm**; panicle size difference **<25cm**.
- Medium-height, uniform fields.
- Increase stubble height and reduce threshing depth.
- Tough-threshing varieties (>180g resistance) to minimize losses.

■ Full-feed harvesters preferred for

- Easy-threshing varieties or high-stubble requirements.
- Higher operational efficiency.

Semi-feed combines harvesters

Tracked Full-Feed Combine Harvester

■ Key Principle

- Match harvester type to **rice height**, **panicle shape**, and **threshing difficulty** to reduce losses and enhance efficiency and quality.

3. Conduct Thorough Equipment Inspection Before Operation

Comprehensive Checks

- Inspect key parts：**moving components, lifting systems,** and **belt tension**.
- Ensure **good sealing** around **auger housing**, **grain bin joints**, and **vibrating sieve** to minimize losses.

Trial Harvest

- Perform a **30-meter trial harvest**.
- Adjust working speed and assess grain loss rate, breakage rate, and impurity rate.

Quality Compliance

- Only begin **full-scale operations** once **standards are met**.

4. Choose Proper Harvesting Route Based on Field Shape

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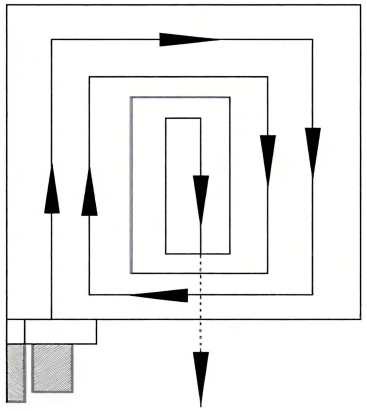
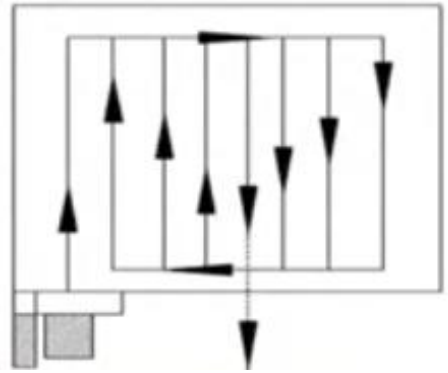
Large fields with similar length/width



Four-Border Spiral Method

Advantage: Edge-spiral pattern boosts efficiency.

Small fields with uneven length/width



Centripetal Circular Method

Advantage: Inward circles minimize turns.

- **Combined Application**

  Dual benefits: Reduce loss + Improve efficiency.

5. Strictly Control Operating Speed

1. Gear Selection Standards

- Follow the gear settings specified in the operator's manual; avoid high-speed gears to reduce losses.
- Do not turn while cutting.

2. Speed Adjustment Principles

- Start at a slow speed and adjust based on trail results speed.

3. Tracked Harvester Requirements

- Adjust track tension according to field moisture (tighten for muddy conditions, loosen for dry fields).
- Improve mobility and reduce wear for efficient, low loss harvesting.

6. Harvesting in Wet Fields or Moist Crops

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Anti-clogging Preparation

- **Pre-clean** concave sieve and cleaning sieve to **prevent clogging**.

Speed Management

- Reduce **speed** and avoid **sharp turns/abrupt starts/stops**.
- For **muddy fields** or **lodged/moist crops**, adopt **slow speed, low volume operation**.

Track Adaptation

- Adjust **track tension** (**tighten in wet conditions** and **loosen in dry conditions**) to ensure **smooth operation** and reduce **breakdown risks**.

7. Harvesting Lodged Crops

Preventive Measures:

- Install crop lifters and anti-lodging tines to reduce grain loss.

Angle-Specific Protocols

- Lodging angle < 45° : Harvest crops in the normal way.
- Lodging angle between 45° - 60° : Move the reel forward and tilt tines backward.
- Lodging angle > 60°
  - ✓ Use full-feed harvester for reverse harvesting.
  - ✓ Move the reel forward with reduce speed.
  - ✓ Tilt the tines backward to maximize recovery.

8. Harvesting Overripe Rice

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Adjust stubble height

- Lower the **stubble height** to **10–15 cm** to prevent cutter from sinking into soil.

Avoid semi-feed harvesters

- Prevent grain loss or missed panicles.

Handle gently

- **Prevent panicle breakage** and ensure **efficient grain collection**.

9. Enable Online Monitoring

Technology Integration

- Equip harvesters with **sensors** for **real-time monitoring** of **grain loss**, **impurities**, and **breakage**.

Dynamic Adjustment

- Fine-tune **operating speed**.
- Optimize **feed rate**.
- Adjust **stubble height**.

Key Benefits

- Continuously optimize performance and maintain grain quality.

10.Operator Guidelines for Combine Harvesters

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1. Operator Qualifications

- Must be operated by trained professionals or skilled personnel following standard procedures.

2. Safety Protocols

- Prioritize the safety of people and watch out for obstacles.

3. Quality Control

- Regularly monitor stubble height, loss rate, cleanliness, and breakage rate.

4. Skill Requirements

- Master the skills in obstacle crossing, turning, movement, and grain unloading.

5. Maintenance Practices

- Clean debris and dust from threshing drums/cleaning systems after use.
- Timely maintenance to ensure equipment performance and efficiency.