CSAM
Centre for Sustainable Agricultural Mechanization
ESCAP

Agricultural Mechanization in the Republic of Korea

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Eleventh Regional Forum on Sustainable Agricultural Mechanization
Climate-smart Agricultural Mechanization for Sustainable Crop Residue Management and Resilient Agrifood Systems
26-28 October 2026 – Tianjin, China

Status and Challenges of Agricultural Mechanization in Korea

99.7%
Rice mechanization

67.0%
Upland crop mechanization

Upland-crop mechanization by operation (2023)



Priority gap

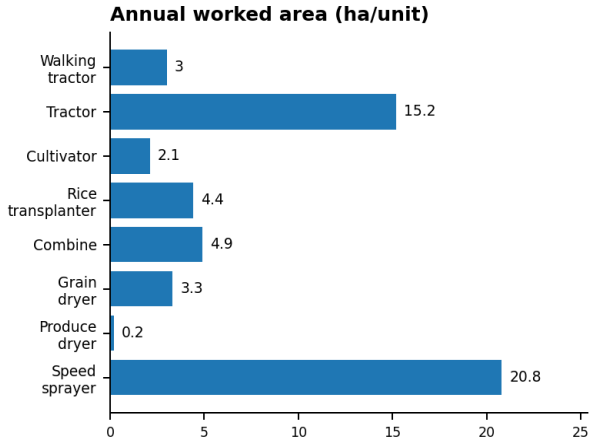
Expand seeding/transplanting & harvesting mechanization
Improve machinery utilization efficiency and smart use

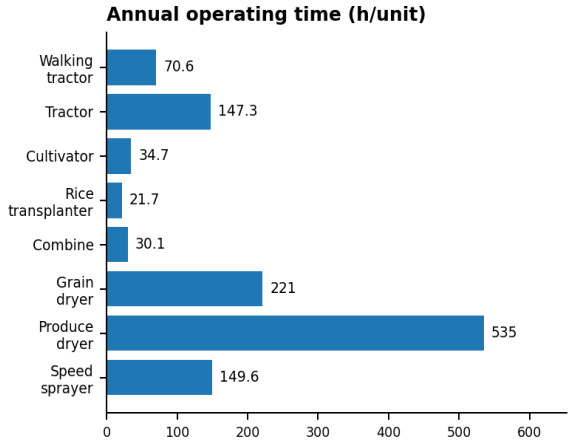
Major Machinery Stock and Utilization

Major machinery stock (2024)

Approx. 1.98 million units

Walking tractors	**516k**
Cultivators	**463k**
Tractors	**316k**
Rice transplanters	**169k**
Combines	**73k**





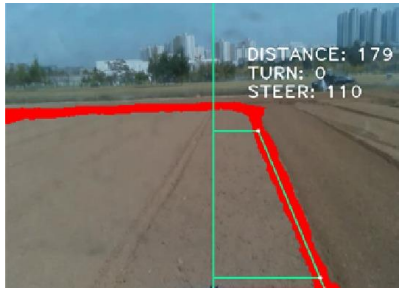
Smart & Low-Carbon Mechanization for Climate Resilience



1 Precision Irrigation & Water Management

- Automatic irrigation based on soil moisture and weather data
- Integrated irrigation–drainage for drought and excess water
- Soybean yield: +19% in paddy fields / +38% in uplands

Underdrainage and automatic irrigation disseminated to 103 sites / 286 ha since 2018



2 Autonomous Machinery & Agricultural Robots

- Autonomous tractors commercialized and increasingly used in the field
- R&D on agricultural robots, drones and field-operation automation
- 2026–2030 R&D budget: KRW 57.2 billion

18 core R&D projects: autonomous tractors, precision weeding, orchard robots, drones, etc.



3 Drones for Climate-Risk Response

- Rapid scouting and precision spraying over large fields
- GPS-guided automated spraying already used in the field
- Remote operation reduces exposure under heat and weather constraints
- R&D on drone-based precision spraying and seeding

Remote scouting and operations complement field response to weather risks



4 Electrification & Decarbonization

- Field demonstration of an eco-friendly electric tractor (2026)
- Electrification expanding mainly in compact farm machinery
- Eco-friendly powered machinery stock: +30.9% year-on-year

Mainly aerial work platforms, utility carriers and sprayers

Crop Residue Management: Mechanized Paddy & Upland Systems

Paddy farming | Mechanized rice-straw silage

1. **Rice harvest**
   Combine
   
2. **Raking & collection**
   Rake / windrower
   
3. **Round baling**
   Baler
   
4. **Wrapping**
   Bale wrapper
   
5. **Storage & feeding**
   Loader / feed use
   

Collect → bale → wrap → livestock feed → crop–livestock nutrient cycling

Upland farming | Mechanized soybean operations

1. **Seeding**
   Tractor-mounted planter
   
2. **Weeding & ridging**
   Cultivator / inter-row weeder
   
3. **Crop protection**
   Boom sprayer, etc.
   
4. **Harvesting & threshing**
   Soybean / multi-crop combine
   
5. **Residue composting**
   Shred → compost / soil return
   

After harvest, stems and pods are shredded and composted or returned to the soil → less burning and more organic-matter recycling

Turn crop residues from a “waste to manage” into a “circular resource”

Recent Korean Field Applications of Conservation Agriculture Principles



1 Reduced Soil Disturbance

Dry-Paddy Harrowing

- Eliminates repeated rotary tillage and harrowing after flooding
- Farm-machinery energy use −17.7%
  methane emissions −14.0%
- Suspended solids −96%; total P runoff −86%
- Disseminated to 12 municipalities in 9 provinces in 2026



2 Soil Cover & Organic Matter Return

Rye + Hairy Vetch Mixed Green Manure

- Mixed green-manure cropping in Saemangeum reclaimed land
- Dry matter: 502 kg/10a; N production: 7.21 kg/10a
- Soil organic matter: 9.29 g/kg, 60 days after incorporation
- About 1.5× higher soil organic matter than chemical-fertilizer treatment



3 Crop Diversification & Sequential Cropping

Wheat–Soybean Sequential Cropping in Yeongwol

- Field demonstration with Yemil Farming Cooperative since 2024
- Soybean grown after wheat harvest
- Soybean area: 3 ha (2020) → 100 ha (2025)
- Wheat area: 1 ha (2024) → 20 ha (2026)

Conservation agriculture requires integrated mechanization linking reduced soil disturbance, soil cover & organic-matter return, and crop diversification.

Validate and optimize mechanized conservation-agriculture systems under local farming conditions.

Thank You



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