CSAM
Centre for Sustainable Agricultural Mechanization
ESCAP

Sustainable Agricultural Mechanization in Pakistan:
Policy Framework, Interventions and Strategic Directions

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National Mechanization Overview and Needs

1.7 kW/ha

Available farm power is below the 2.6 kW/ha minimum needed and the overall mechanization level is ~40%

29,192

Tractors sold in FY2025 is the lowest in last 22 years

95%

Farmers are smallholders who cannot afford to buy agricultural machines

What is needed?

- **Smallholder access:** affordable small machines and custom hiring services needs to be strengthened
- **Rice-based systems:** mechanized transplanting, harvesting and in-situ residue management machinery
- **Quality assurance:** national testing, standardization and certification of farm machinery is needed
- **Local industry:** better-quality domestic manufacturing and lower cost of high-tech imports
- **Skills:** trained operators, mechanics and machinery service providers

National Agricultural Mechanization Priorities

1 Promote resource conservation and residue management

Zero tillage drills, direct seeders, super seeder, mulchers and balers

2 Adopt regenerative and climate-smart agriculture

Adopt regenerative and climate-smart agriculture for improving soil health and climate

3 Improves access of smallholders to appropriate machinery

Custom-hiring services are being strengthened

4 Adopt precision and digital agriculture

Use of GPS, GIS, UAVs, UGVs, AI and IoT based technologies

5 Reduce postharvest losses

Promote harvesting, threshing, drying, grading, storage and cold chain technologies

6 Focus on indigenous machinery manufacturing and R&D

Promote indigenous machinery manufacturing, technology transfer and commercialization

7 Promote agricultural machinery standards

Focus on machinery standards aligned with international standards of quality, performance and safety

8 Focus on horticultural mechanization

Mechanization of fruits, vegetables and other high-value crops

9 Improve national and international coordination

Focus on investment opportunities, capacity building and international cooperation for technology transfer

Policy Initiatives at the National Level

National Agricultural Mechanization Policy

Being formulated by MNFSR to guide R&D, local manufacturing and custom hiring

Mechanization under CPEC

258 machines (9 types) received from China under CPEC, assembled at AEI-NARC and shared with provinces

Machinery Testing Centre under P-CLAMP

Punjab is actively working with ADB for the establishment of a provincial machinery testing and evaluation centre

Productivity Enhancement Programmes

Wheat: Development of Super Seeder / Pak Seeder
Rice: Provision of Rice Transplanters / combine harvesters

Fiscal and credit support

0-2% customs duty on imported machinery, phased tax cuts, collateral-free loans for small farmers

Human capacity

1,000 agri graduates trained in China, including in farm mechanization and hi-tech AI, IoT categories

Provincial Mechanization Interventions

10,000 tractors

of 50-65 hp for farmers of >5 acres, under CM's Punjab Green Tractor Program (Low Power)

9,500 tractors

of 75-125 hp for farmers of >7 acres, under CM's Punjab Green Tractor Program (Hi Power)

7,500 farmers

Provision of machinery @ 60% subsidy (Rs. 0.5 Million) on 26 Implements

1,600 farmers

Provision of machinery @ 60% subsidy (Rs. 0.5 Million) on 12 Implements

Punjab

- **Punjab Clean Air Program (World Bank) 2025-28:** Provision of 5,000 Super Seeders @ 60% subsidy
- **Productivity Enhancement of Cotton in Bahawalpur (2025-28):** Provision of subsidized (50%) machinery (Sprayers and Chisel Plough)
- **Transformation of Agriculture in Thal (2026-29):** Provision of 1,500 thresher and 1,500 drills (Cost Sharing: 50:50)
- **CM's Punjab Hi-Tech Farm Mechanization Financing Program (2025-29):** Provision of interest free loans to 1,485 farmers / service providers for import of 12 types of hi-tech machinery

Other provinces

- **Sindh:** Benazir Hari Card covers 1.4 million small farmers inclusing machinery support
- **Baluchistan:** gave 900 tractors on 50% subsidy, also giving subsidy on laser levellers, bulldozers and solar tube-wells
- **Khyber Pakhtunkhwa:** received CPEC machines for demonstration
- **Federal-provincial:** co-funding of agriculture projects

Machinery for Rice Residue Management



Pak Seeder: zero-till wheat sowing



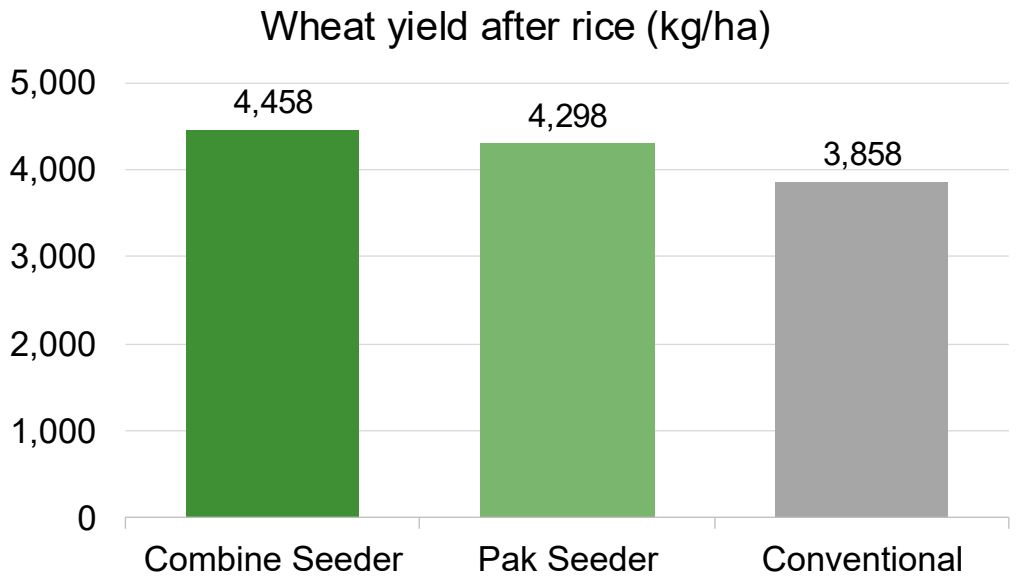
Combine Seeder: residue incorporation



Straw chopper / shredder



Rake and baler: ex-situ use



+16%

Yield with Combine Seeder over conventional sowing

+11%

Yield with Pak Seeder, with no burning of rice straw

Future Strategy

Short term (2026–2028)

1. Notify and operationalize National Agricultural Mechanization Policy, aligned with provinces
2. Establish a national machinery testing station, link machinery subsidies to certified machines
3. Expand custom hiring centres through public-private partnerships
4. Launch a rice transplanter support scheme for small farmers

Medium term (2028–2030)

5. Strengthen R&D institutions to guide indigenous development of machinery to reduce import bill
6. Localize manufacturing of tractors, combine harvesters, residue management machines and >85 hp tractors
7. Scale-up precision agriculture tools: drones, sensors and solar-powered machinery, after feasibility studies
8. Train operators, mechanics and service providers; strengthen after-sales service

Opportunities for Regional Cooperation

Areas for cooperation

Harmonized testing: common test codes and mutual recognition of results through PARC-CSAM-ANTAM

Technology transfer: joint ventures for small residue management machines and rice transplanters

Residue-to-value: joint R&D on balers, pelleting and briquetting machinery

Capacity building: training and exchange of engineers, operators and service providers

Smallholder models: sharing custom hiring and financing models across the region

What Pakistan can offer

- Field testing and local prototyping facilities
- Field-proven residue management machines: Pak Seeder, Combine Seeder, straw mulcher / shredder
- Experience with subsidized machinery and interest-free financing schemes
- Growing demand for agricultural machinery and implement industry

THANK YOU

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