Virtual Seminar on modernization and technology for sustainable agriculture in Latin America and the Caribbean

Data-Driven Food Systems Transformation Lessons from Pakistan

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Food Systems Transformation, Why it Matters

- Food systems face triple pressures **climate change**, **malnutrition**, and **economic instability**
- Fragmented data → fragmented decision-making
- Transforming agriculture requires- Food Systems Lense
- Modernization & technology can only succeed when embedded within a food systems transformation framework

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Key Message

- **Technology + Data + Governance** = **Sustainable Food Systems**

- Modernization plays its role only when

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Lessons from Pakistan's Food Systems Transformation Pathway

01 Data- driven governance

02 Systems- oriented policy reform

03 Resilient and inclusive agriculture

04 Healthy diets and food safety

05 Climate–nutrition integration

06 Digitalisation and innovation scaling

07 These pillars guided the modernization of agriculture & nutrition planning.

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Digital and Data Platforms in Pakistan

Pakistan built several robust national and provincial platforms:

- Food Systems Dashboard (Sub-National)
- Food Systems Transformation Digital Platform

Lesson: digital infrastructure improves transparency, early warning, and coordinated planning.

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Why Data Integration Matters

01 Supports precision planning similar to precision agriculture

02 Enables evidence- based budgeting & PC- 1 formulation

03 Strengthens climate–nutrition analysis

04 Facilitates real- time monitoring

05 Helps prioritize geographic areas and vulnerable populations

06 Precision agriculture cannot operate without precision data.

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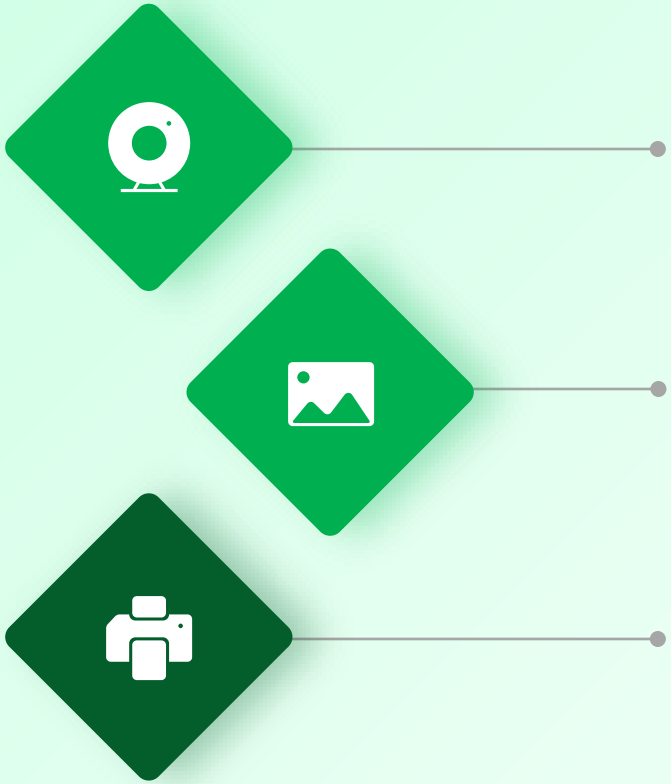
Connecting Precision Agriculture to Food Systems

- Precision agriculture uses **digital tools** to improve farming efficiency.
- Inputs **like water and fertilizer** are applied only where needed.
- It **reduces costs**, **improves yields**, and protects the environment.
- Precision farming strengthens **climate resilience and food security**.



Precision agriculture:

Food systems lens adds:

Data bridges agriculture with nutrition and climate action.

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From Data to Policy Pakistan's Focus

National Data Harmonization 01

Provincial Integration 02

Academic Capacity Building 03

Digital Platforms for Public Sector Use 04

Climate–Nutrition Integration 05

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Reforming Higher Education for Food Systems Transformation

Pakistan's Higher Education Commission (HEC) is revising national higher education policies to embed future-oriented competencies for agriculture, nutrition, climate resilience, and food systems.

Key achievements - enabling systems transformation

Why this matters- **Greater Impact**

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Three New National Courses Developed (UG–PG Level)

Pakistan designed and introduced three new **academic courses**, now being integrated into undergraduate, graduate, and postgraduate degree programs:

Impact: more than 30,000 Food Systems Advocates per year

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Recommendations for LAC Countries

Content Title Number + Content Title

01

Embed precision agriculture inside the broader food systems agenda

02

Invest in national data platforms—not isolated databases

03

Strengthen institutional capacity to use data for planning

04

Integrate climate and nutrition metrics into agricultural modernization

05

Use universities as accelerators of digital agriculture adoption

06

Create regional knowledge-sharing hubs (LAC–Asia–Africa collaboration)

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The Future From Data → Intelligence → Action

01 Real- time intelligence for crop losses

02 Predictive modelling for food prices & climate shocks

03 Precision nutrition to match precision agriculture

04 District- level early- warning systems

05 AI- supported input optimization

06 Food systems transformation will be intelligence- driven.

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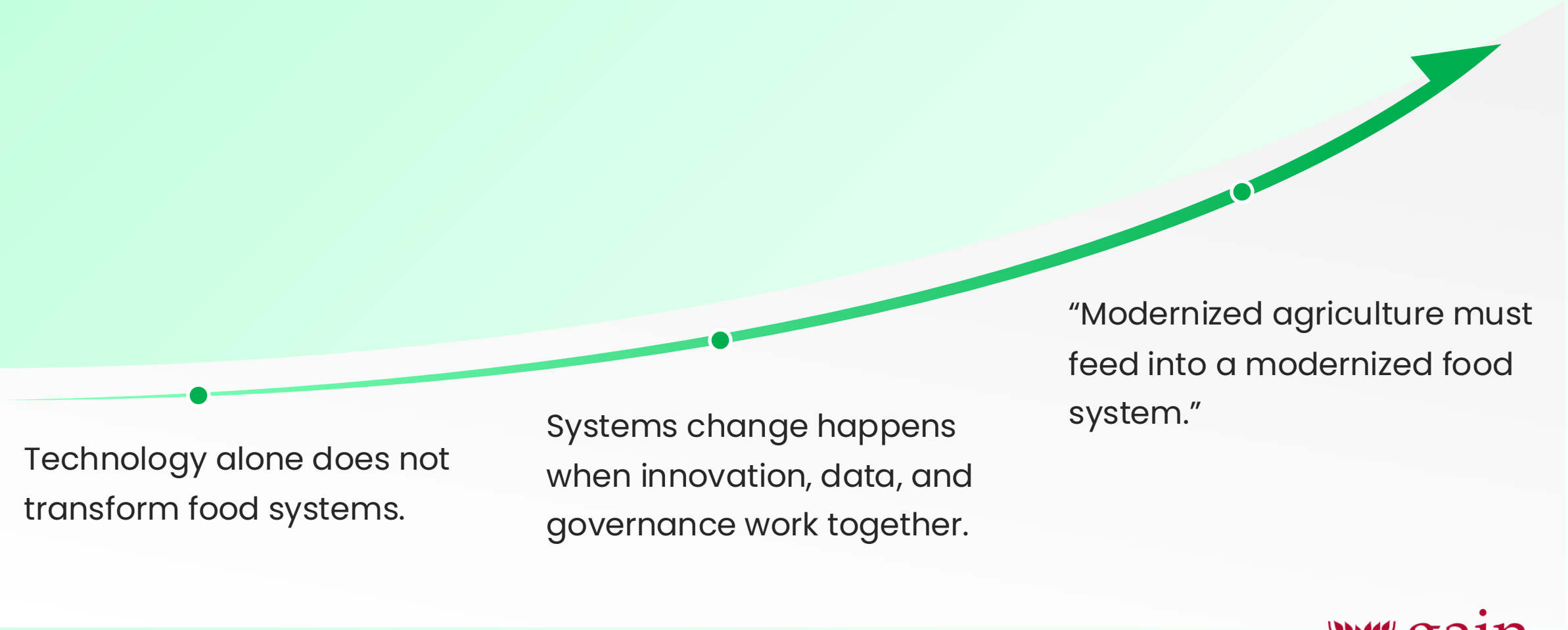
Final Message



Technology alone does not transform food systems.

Systems change happens when innovation, data, and governance work together.

“Modernized agriculture must feed into a modernized food system.”

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Thanks

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