



# Challenges and Solutions for Innovative Agricultural Technologies in North and Central Asia

**Shenggen Fan**

Chair Professor, China Agricultural University  
Dean, Academy of Global Food Economics and Policy

United Nations SONCA, Expert Group Meeting  
27th March, 2024 | Online





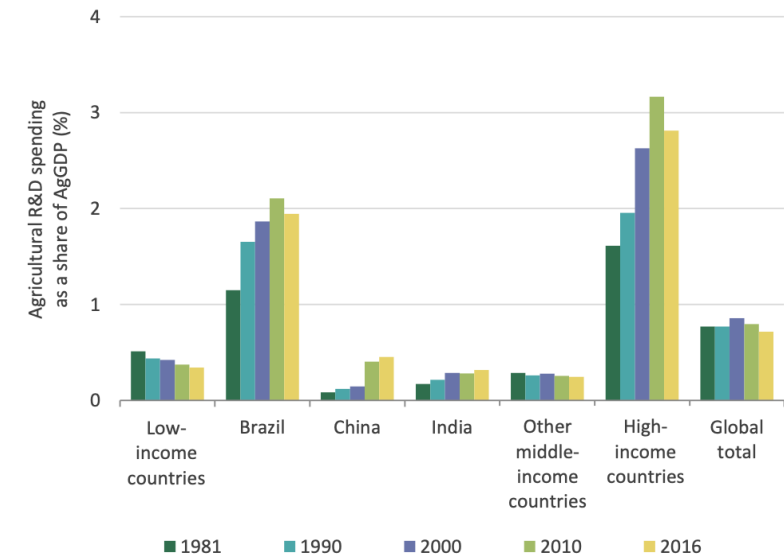
## **Challenges in Advancing Sustainable Agricultural Innovations**



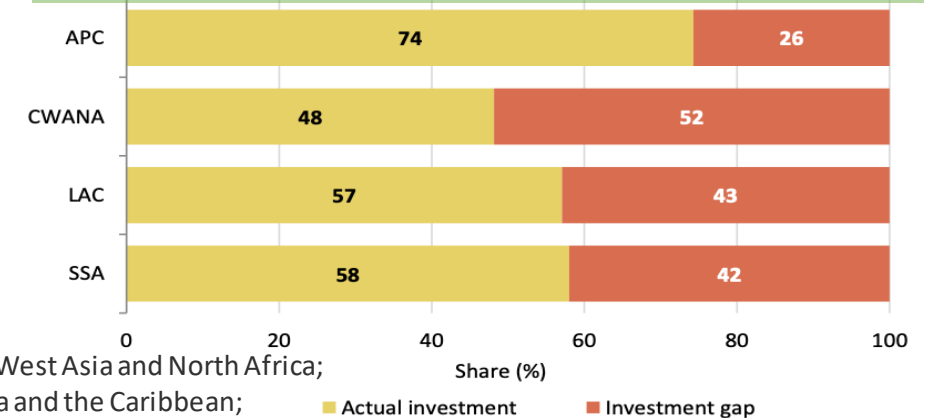
## Strategies for Transforming Toward Sustainable Agriculture

- ❑ In 2016/17, **no Asia-Pacific country** invested 1% or more of their agricultural output in research (Beintema 2020)
- ❑ **Central/West Asia** and North Africa face a **significant 53% research investment gap**
- ❑ In the Asia-Pacific (APC) region, the gap is 26%, relatively low
  - But the low gap is led by China and India's investments (ASTI, 2020)
  - So, **North and Central Asia exhibit high Agricultural research investment gaps**

Traditional agricultural research intensity ratios by income group, 1981–2016



Agricultural Research Investment Gap by income level and region, 2016



APC = Asia-Pacific;  
 CWANA = Central/West Asia and North Africa;  
 LAC = Latin America and the Caribbean;  
 SSA = Africa south of the Sahara

## Insufficient Support to Agriculture

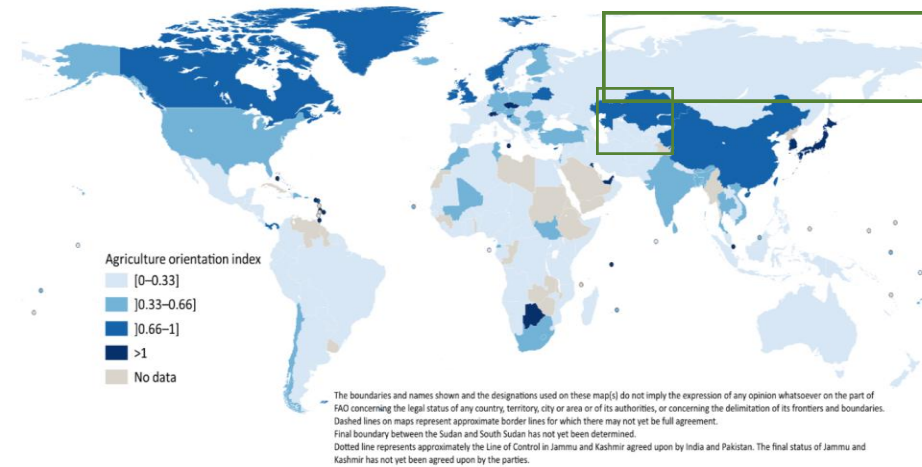
- ❑ In **North and Central Asia**, the AOI tends to be **relatively low**
  - ✓ Typically below 1

## Weak Infrastructure

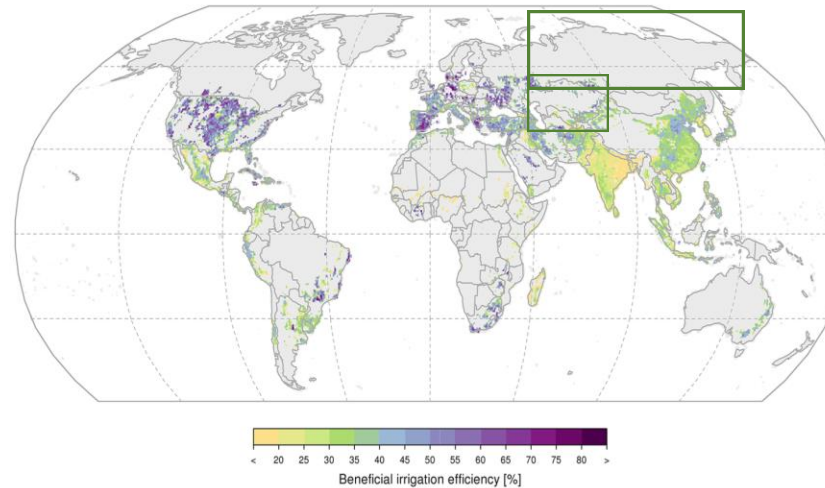
- ❑ For instance, the **beneficial irrigation efficiency** in many **North and Central Asia** is **below 30%**

## Predominantly Small Farmers in Central Asia

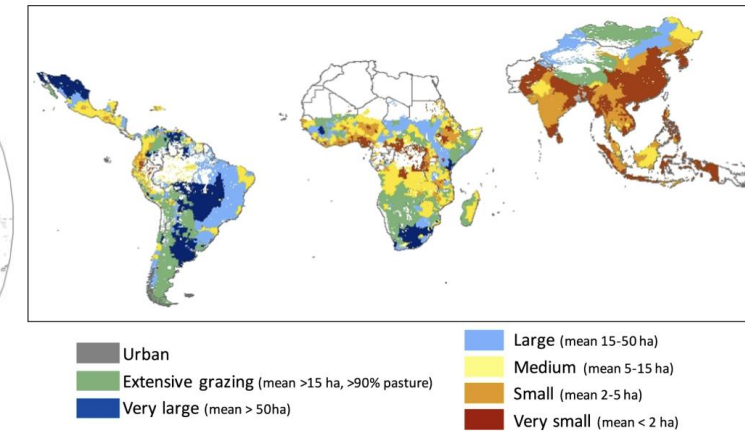
- ❑ Smallholders often **lack access to processing, transport, and retail facilities for their produce**, resulting in **postharvest losses and missed income opportunities**



Agriculture orientation index, 2021–2022 average



Global patterns of beneficial irrigation efficiency (Eb, ratio of transpired and diverted water)



Smallholder Farms in the Developing World

Sources: CAREC, IFPRI, ADB, Agriculture Development in the Central Asia Regional Economic Cooperation Program Member Countries: Review of Trends, Challenges, and Opportunities, 2019





## Challenges in Advancing Sustainable Agricultural Innovations



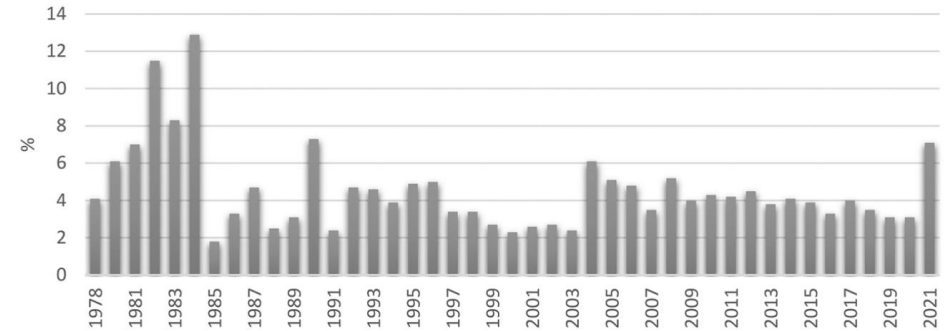
## Strategies for Transforming Toward Sustainable Agriculture

- The agricultural land reform policy, along with accompanying investments and policies, can significantly impact the country's **land tenure**, **crop structure**, and **agricultural productivity**

First, the land market should be further developed and land should be allowed to transfer among farmers with secured land rights

Second, agricultural input and output marketization should be further enhanced

Third, public service institutions in agriculture must be strengthened to support smallholder farmers



The growth rate of China's agricultural GDP

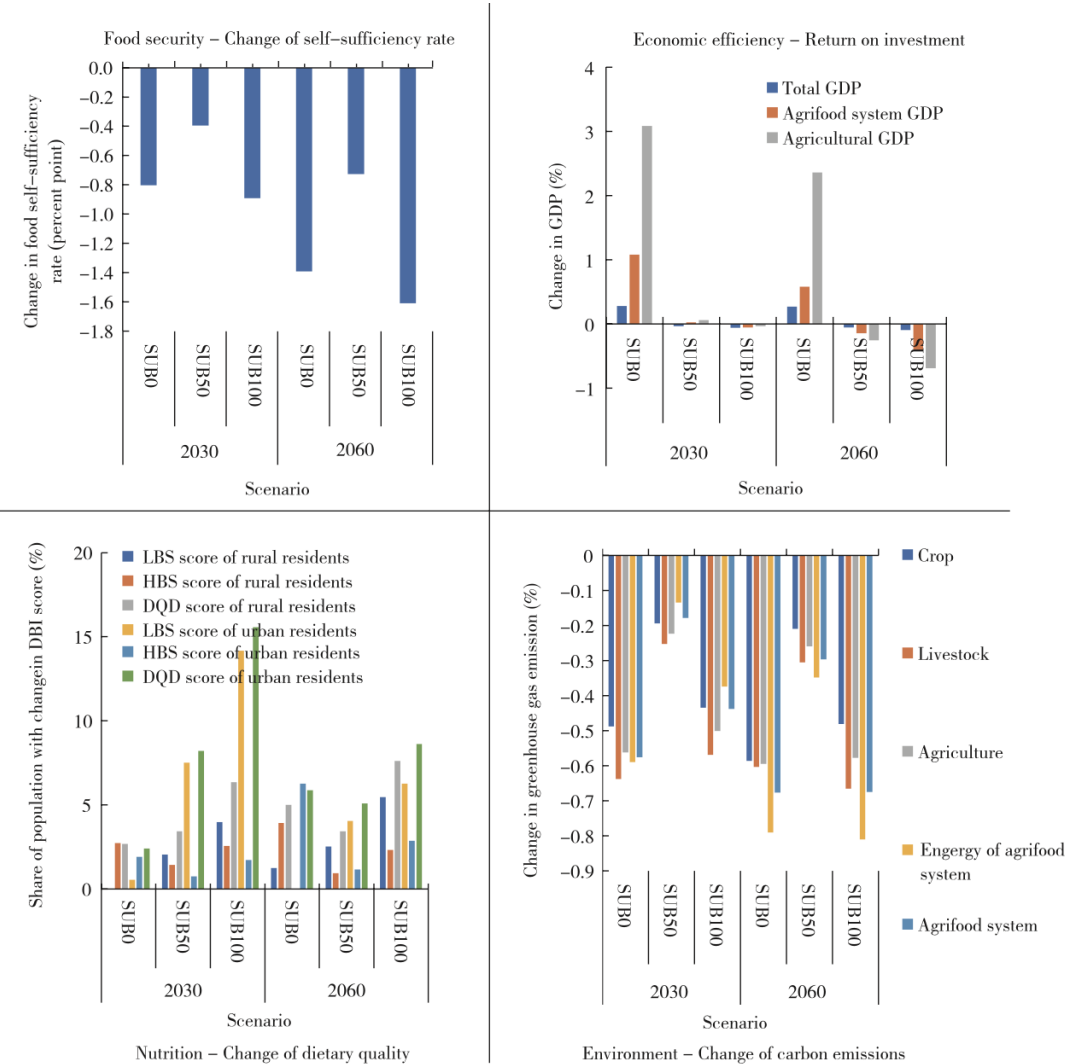
### Case of China's land tenure reform

- From 1952 to 1977, China followed the Soviet Union in adopting a collective form of land organization
- Since 1978: China has adopted a series of reforms, which gradually transformed the agricultural land system into a market-oriented one

- Reforming subsidies in the region can not only enhance nutritional outcomes but also promote green, low-carbon development

## Case of China

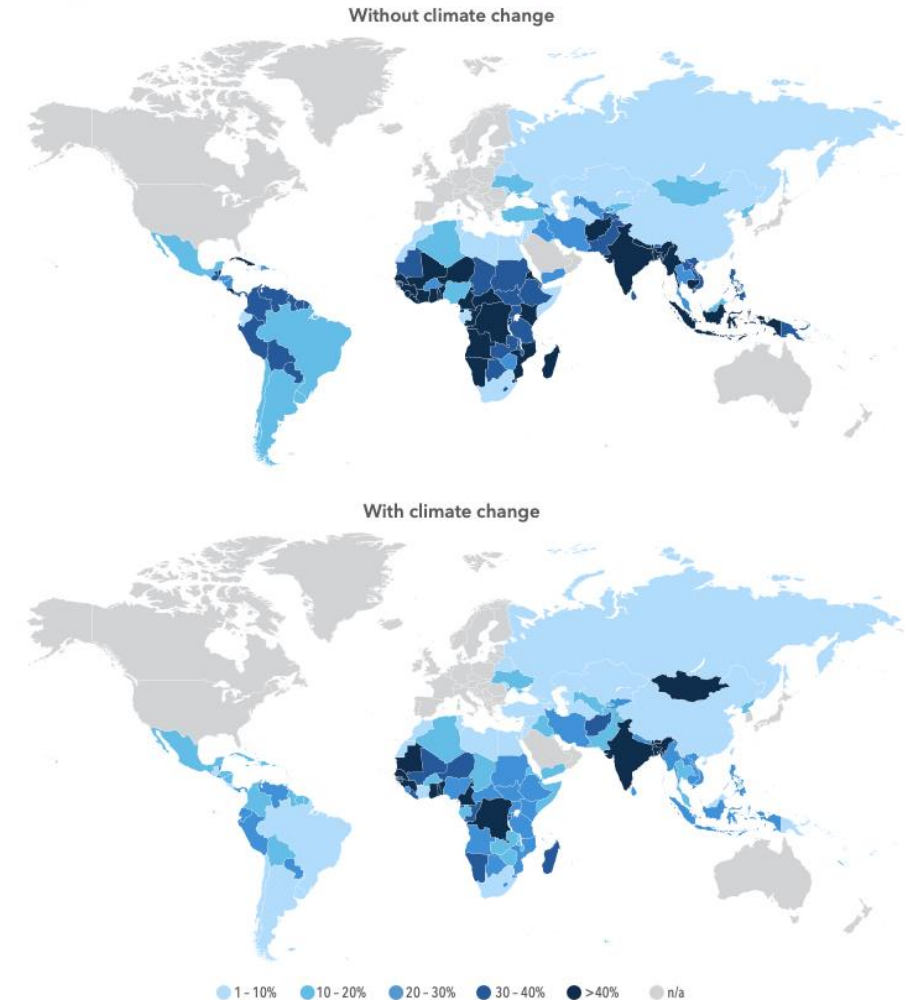
- If, half of the cereal subsidy is used to subsidize the production of foods with high nutritional value and low-carbon emissions, then compared with the 2030 baseline:
  - Food security and farmers' agricultural incomes would be only modestly affected
  - Dietary quality would be improved
  - Agrifood system emissions would be reduced by about 0.3%



# Reprioritizing R&D Investments

## Reprioritize R&D investments to achieve multiple wins in North and Central Asia, especially facing climate change

- Repositioning R&D investments for sustainability could achieve a substantial return
  - There is a \$4.5 trillion annual global opportunity associated with the transition to more sustainable, resilient food and land use systems (FOLU)
  - Eg, **in Mongolia**, in 2030
    - ✓ Investments in agricultural R&D, water management, and market access infrastructure **reduce hunger by only 10%-20% in a scenario without climate change**
    - ✓ However, **under climate change conditions**, the impact surges to **over 40%**



Impact of investments in agricultural R&D, water management, and market access infrastructure on hunger reduction (% reduction in 2030 compared to no climate change scenario in 2030)



Incentivizing private-sector agriculture investment in North and Central Asia is crucial

## Some strategies to promote private-sector investment

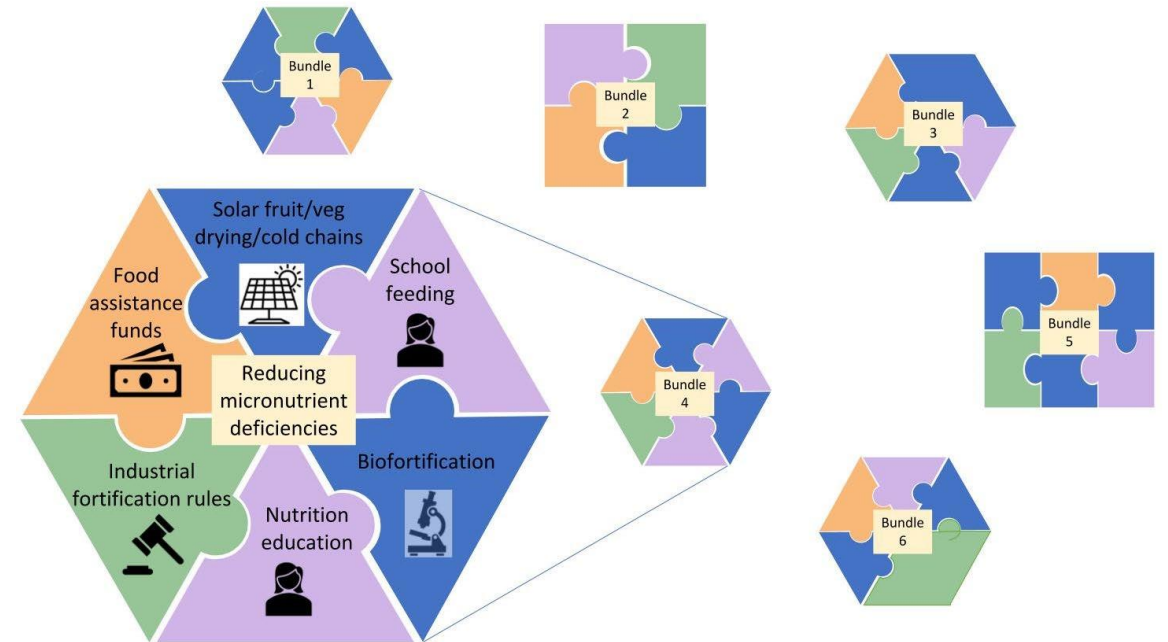
- Create investment opportunities
  - Corporates raise the bar for sustainability on existing business-as-usual investments and continue mainstreaming ESG commitments
- Expand Green Financing Aligned with Climate Impact
- Accurately assess risk and deploy appropriate risk-mitigating mechanisms
- Intermediate/match to the respective risk-return profiles of different sources of private capital

## Prospects of the contribution from the private sector

- Promote innovative research and drive the adoption of innovations
- Creates employment opportunities
- Investments in infrastructure, processing facilities, and value chains boost economic activity and livelihoods
- Fosters market linkages, trade, and export opportunities

# Promoting Bundling Innovations

- A single technology requires a tradeoff between multiple goals, and a single innovation serves only one incomplete purpose
- Successful innovations require the enabling environment essential to development and diffusion
- It is necessary to combine the social and scientific to unlock the transformative potential of emergent technologies
  - ✓ **Technology**
  - ✓ **Knowledge**
  - ✓ **Institution**
  - ✓ **Culture**
  - ✓ **Policy**



# Bringing Together Global Innovation — WAFI and the Pinggu Consensus

- ✓ The **2023 World Agrifood Innovation Conference (WAFI)** took place from November 2nd to 4th in Pinggu District, Beijing
- ✓ The event drew **800** delegates, comprising **scientists, educators, entrepreneurs, government officials,** and **young talents** from **61** countries and regions around the globe
- ✓ Participants actively participated in thorough discussions and workshops focused on the theme of '**Food Security and the Future of Agriculture**,' ultimately culminating in the formulation of the **Pinggu Consensus**



I. Global food and nutrition security is the foundation for future human survival and development

II. Innovations in science, technologies, policies, institutions and business models are the fundamental driving force for the transformation of agrifood systems.

III. Cutting-edge, multi-disciplinary, and cross-sectoral global cooperation on agricultural science and technologies is crucial to transforming agrifood systems.

IV. Universities are for scientific research and talent development to transform agrifood systems.

V. Engagement of entrepreneurs and the private sector is essential for agrifood systems transformation as they are major drivers of innovations.

VI. The young generation shoulders the responsibility and mission of ensuring future global food and nutrition security.

- ✓ Conference participants finally suggest that WAFI should be held regularly to ensure momentum, contributing to agrifood systems transformation at the local, regional, and global levels





# Academy of Global Food Economics and Policy