

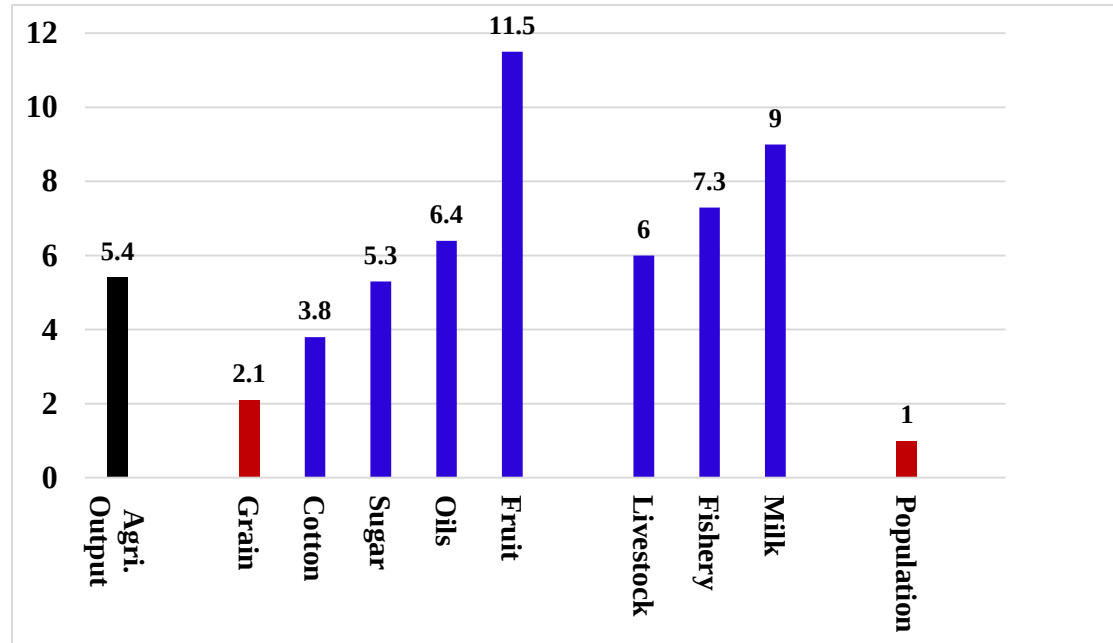


**China-U.S. Scientific Engagement on
Sustainability: A Workshop Series
Workshop I: Sustainability and Biodiversity
July 27-29, 2022 / July 28-29, 2022**

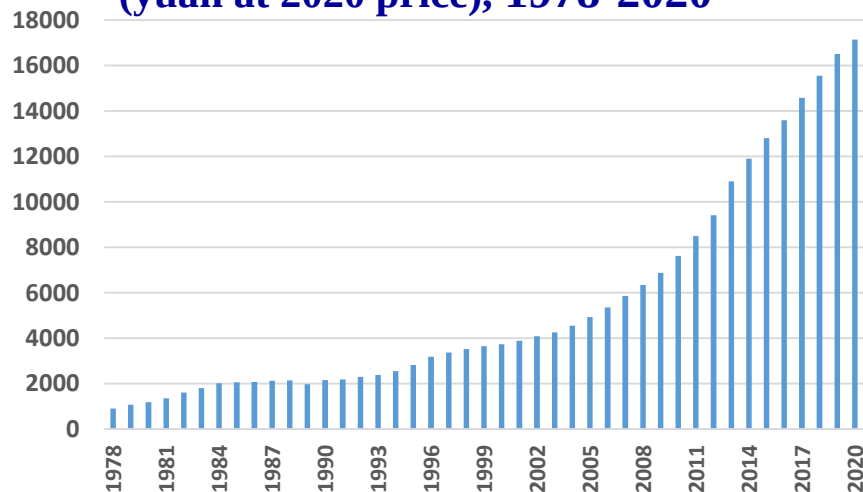
Ensuring Food Security and Greener Agriculture in China: Current Efforts and the Way Forward

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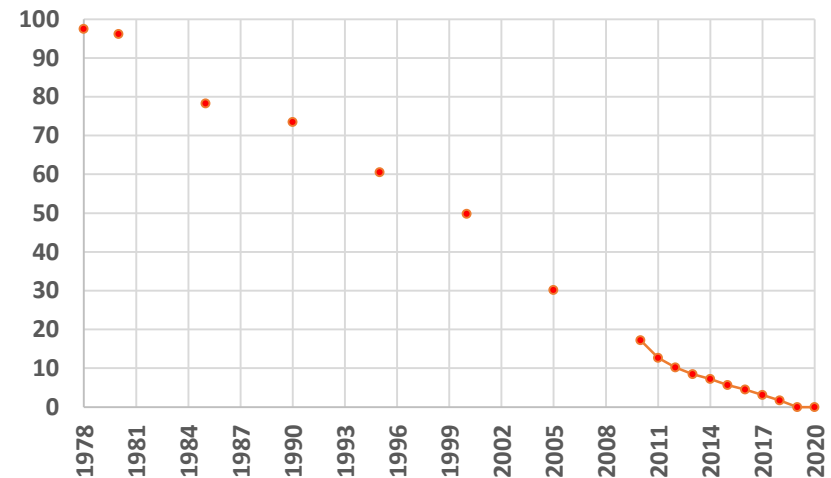
Annual growth of agriculture and population in the past 4 decades, %



Rural household per capita income (yuan at 2020 price), 1978-2020



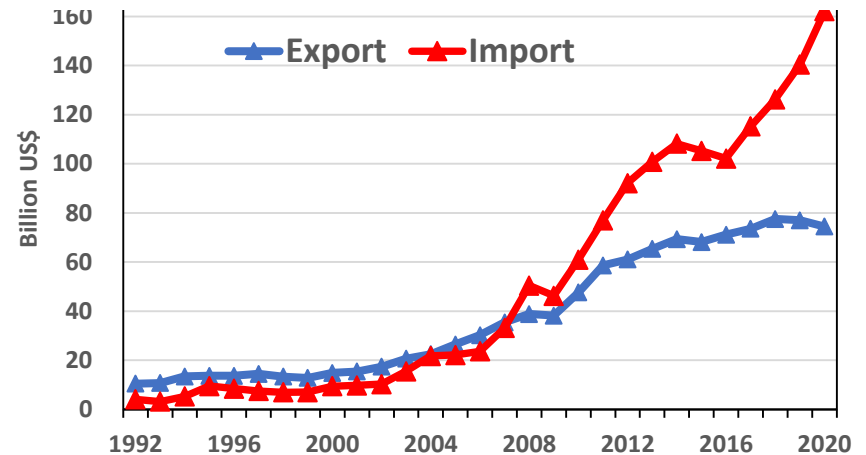
Rural poverty incidence, 1978-2020



Challenges

- **Food security:** Despite rapid agricultural growth in the past 4 decades, feed and food import have been rising since the early 2000s (shifted from net exporter to importer since mid-2000s).
- **Environmental degradation, sustainability & biodiversity:** Past production growth has been in expensive of resource and environmental degradation and biodiversity.

China food trade, billion US\$



In many regions:

- **Falling groundwater table**
- **Soil deterioration**
- **Non-point pollution**
- **Rising ecological stress & loss of biodiversity**
- ...

Institution, Policy and Investment: **Food security**

1. “Store Grains (Food) in Technology” Strategy since 2015

- Enhancing **R&D innovation institution and investment**, particular **biotech** and **digital tech**
- **Public agri. R&D expenditure**: USD\$ 4.1 billion (in PPP) in 2015, ranking the top in the world, and has continued to increase significantly since 2015

2. “Store Grains (Food) in Land ” Strategy since 2015

- **Set a red line** of cultivated land: **1.8 billion mu (120 million ha)**
- **Improve soil quality program**: the **Construction of High-Standard Farmland** (highly resilience to drought and flood, water saving, stable and high yield, and ecological friendliness, ¥ 1500~3000/mu or US\$ 3200~6500/ha), **2/3 of land by 2030.**

3. Legal institutions to ensure the implementation of the strategies and policies by all levels of governments and the rest of all stakeholders (e.g., **Food Security Law** in 2020, **Anti-Food Waste Law** in 2021, etc.)

• ...

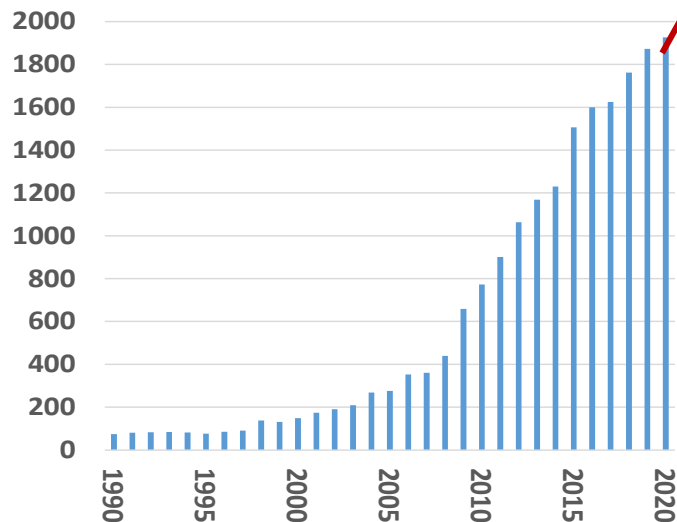
Institution, Policy and Investment: **Greener**

1. **Grain for Green Program - converting the sloped farmland to forest/grass land in past 20 years:** > 500 million mu (34 million ha)
2. **Protecting Natural Forest Resource Program by completely stopping commercial logging in past 20 years:** 2966 million mu (198 million ha, or 64% of China's forest area)
3. **Grassland Ecological Compensation Program to reduce grazing intensity through compensation in past 10 years:**
Covered all grassland rich provinces
4. **Programs for sustainable agriculture since mid-2010s:**
 - Zero-growth of chemical uses through S&T and subsidy program
 - Agricultural land rotation, fallow conservation and recovery of degraded land
 - Comprehensive utilization of crop straw and animal manure
5. **Green agricultural development since 2017**
 - **2017:** Plan to set up **Institutions** and **Incentive** Systems
 - **2018:** The **Technical Guidelines** on Green Agricultural Development in 2018-2030
 - **2021:** The **Green Agricultural Development Plan** in 2021-2025

Future directions

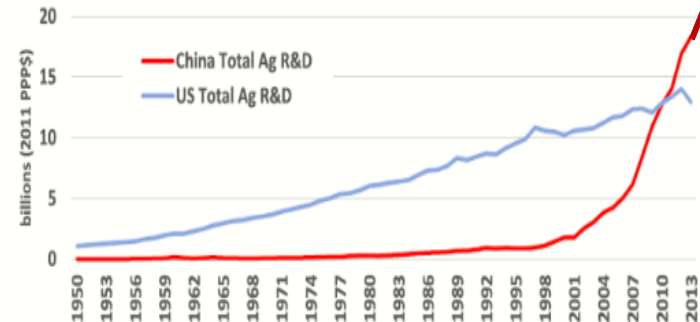
- To improve food security and agricultural sustainability, **the political commitment in Institutional reforms, Policy supports and Investments in agriculture (IPIs)** is essential.

Government budget for agriculture
(billion yuan in 2008 prices)

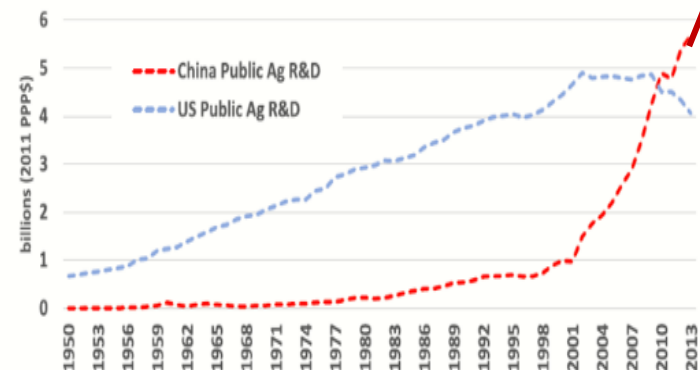


Total and Public Agricultural R&D Spending in
China and the **United States**, 1950–2013

Panel a: Total (public and private) agricultural R&D spending



Panel b: Public sector agricultural R&D spending



Future directions

- With appropriate IPIs, rapid and greener growth as well as food security can be achieved, which will also can significantly contribute to **biodiversity & agri. ecosystem.**
- **Questions:** What are **appropriate IPIs** in each stage of development and what are **implications for biodiversity**? How to **inform policy makers** these IPIs and make them be implemented? -- **Scientific evidence + Policy dialogue**