Ensuring Food Security under Climate Crisis (IGES)

Increasing resilience of China cropping systems to climate change through technology innovations

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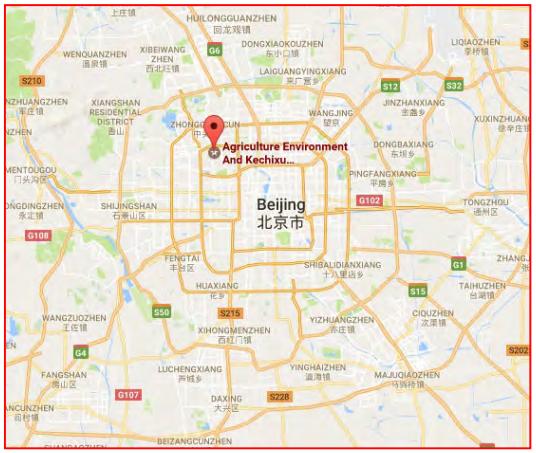
IEDA at a Glance

Institute of Environment and Sustainable Development in Agriculture (IEDA CAAS)

- Established in 1953, non-profit national organization.
- Ranked 1st among agro-environment research institutes in China (2010)
- 196 full-time staffs, including 91 professors and associate professors, 83 with doctoral degree. 70% are below 45 years old.
- Adress--12 Zhongguancun S St, Haidian District, Beijing, China



THE UNIVERSITY OF SYDNEY

IAEA

ICARDA

IWMI International Water Management Institute

ICRISAT

Research Fields and Innovation Groups

- Climate Change Impact and Utilization of Agricultural Climate Resources
- Agricultural disaster prevention and mitigation

Agriculture meteorology

- Rehabilitation of Degraded and Polluted Farmland
- Clean Agricultural Watershed Construction

Agriculture Ecology

Environment Engineering

- Environment Engineering for Horticulture
- Environment Engineering for Livestock

- Bio-water saving and Dry Land Agriculture
- Water productivity and Water Environment

water environment

Aro-Nano Technology

- Multi-function Nano-material and its application in Agriculture

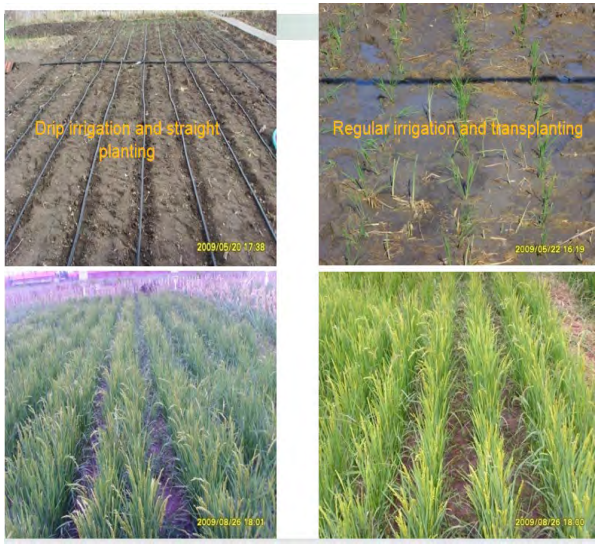
Climate Change Impacts

- More evidences in recent years

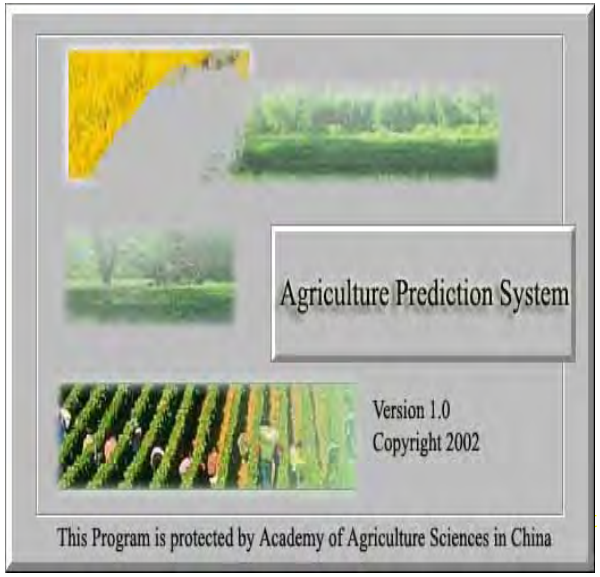
Methods

Crop + Climate Crisis

Crop Field Experiment

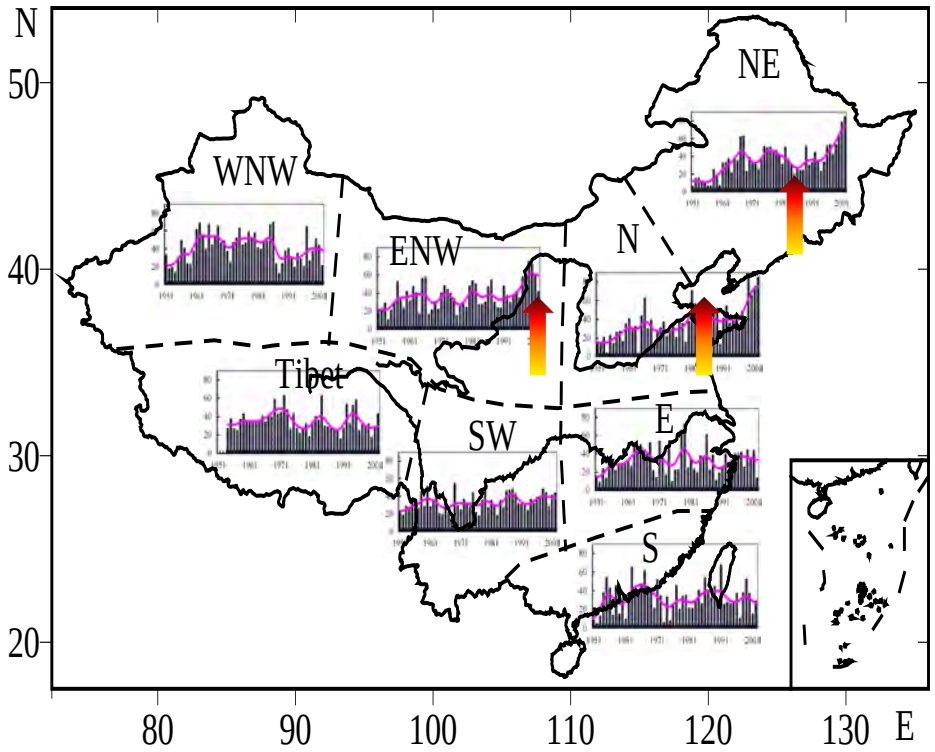


Regional Crop Model

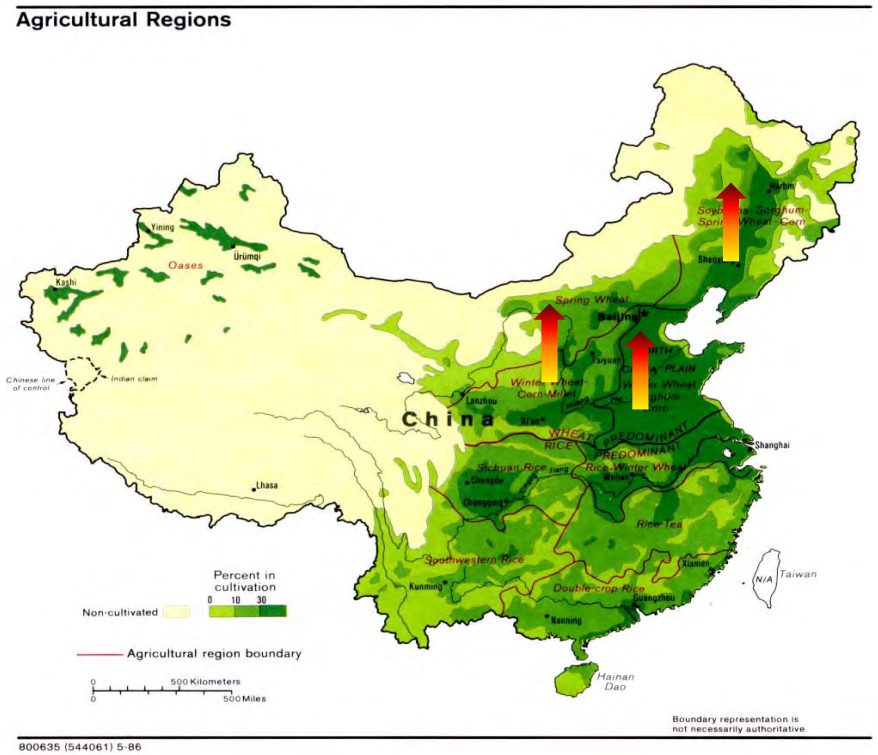


FACE Exper. Facilities

Climate Extremes



Drought trends and distribution



Crop Planting systems in China

Water saving measures

Hole irrigation 孔灌

furrow irrigation 沟灌

Anti-leakage ditch 防渗灌

Conservation tillage 保护性耕作

Adaptation measures demonstration

Conservation agriculture

New crop variety

- **Water conservation infrastructure construction**
- **Mulching technique—straw, plastic films**
- **……**

Innovation Technology on Adaptation

Rice breeding in Northeast China : Not only concentrate on higher yield, but also need consider the ability of cold-resistance and grain filling rate.

Innovation Technology on Adaptation

Innovation Technology on Adaptation

Solar Energy

Sprinkle irrigation on grassland

Intelligent managements of climate environments

Papaya in multi-span greenhouse

Maize field management

Internet of Things, Big date, Cloud Calculation

Vegetable in solar greenhouse

Apple orchard monitoring

Adaptation measures categories

Farmer level

- Film mulching
- Water cellar
- Alternative crops
- Water saving technology
- Apply new technology
- ……

Government level

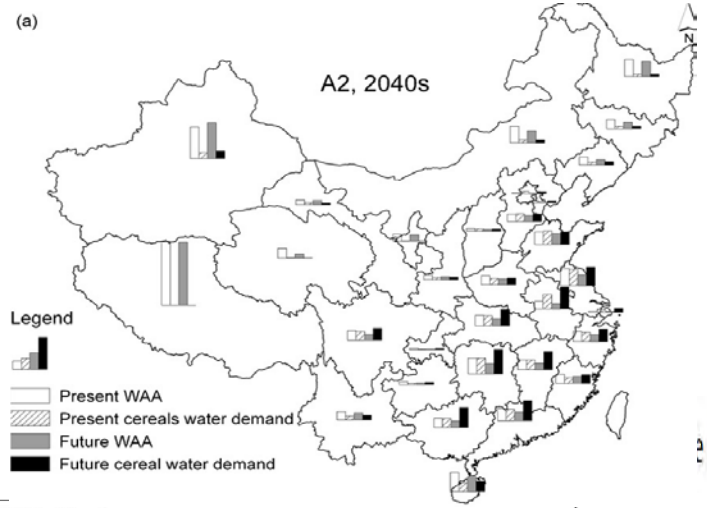
- Research and development
- Water diversion projects
- Early warning system
- Raising public awareness
- Stimuli policies
- ……

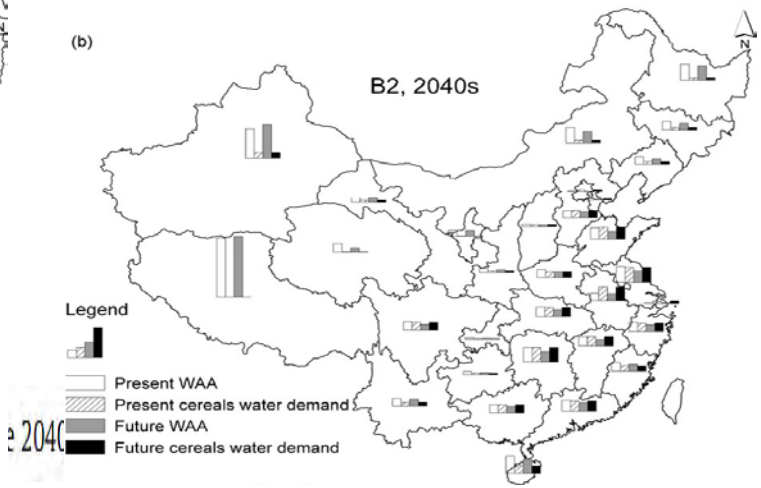
Appraise options

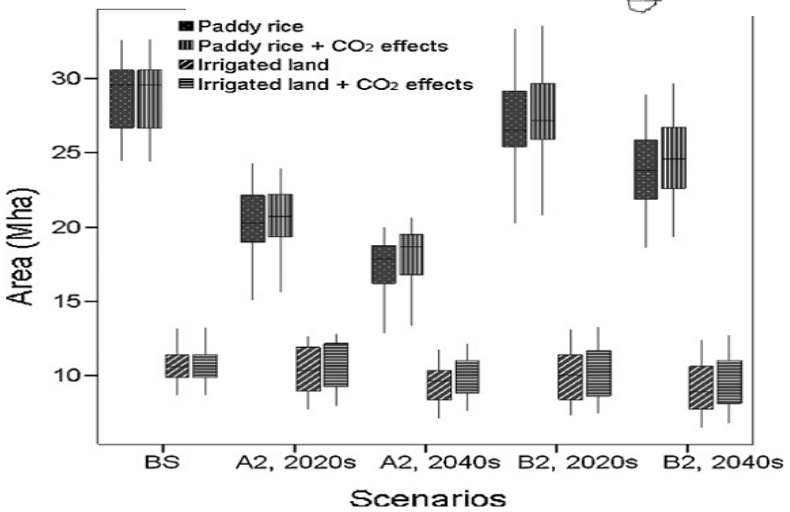
Multi-Criteria Analysis of adaptation measures

Criteria and Indicator
Win-win options Does option address current climate variability *and* future climate change?
Existing risk management Is the option consistent with existing risk management activities?
Cost effectiveness Can costs and benefits of option be easily determined?
Adaptive flexibility Does the option focus on narrow range of future scenarios, or allow flexibility?
Unintended impacts Potential negative spin-off impacts beyond targeted activity?
Practical considerations Is the option practical and feasible for implementer?
Knowledge level How certain we are in predicting a particular change in hazard and its impact?
Policy Coherence Does option reflect local and national DRR / adaptation plans or studies?

Challenges on adaptation



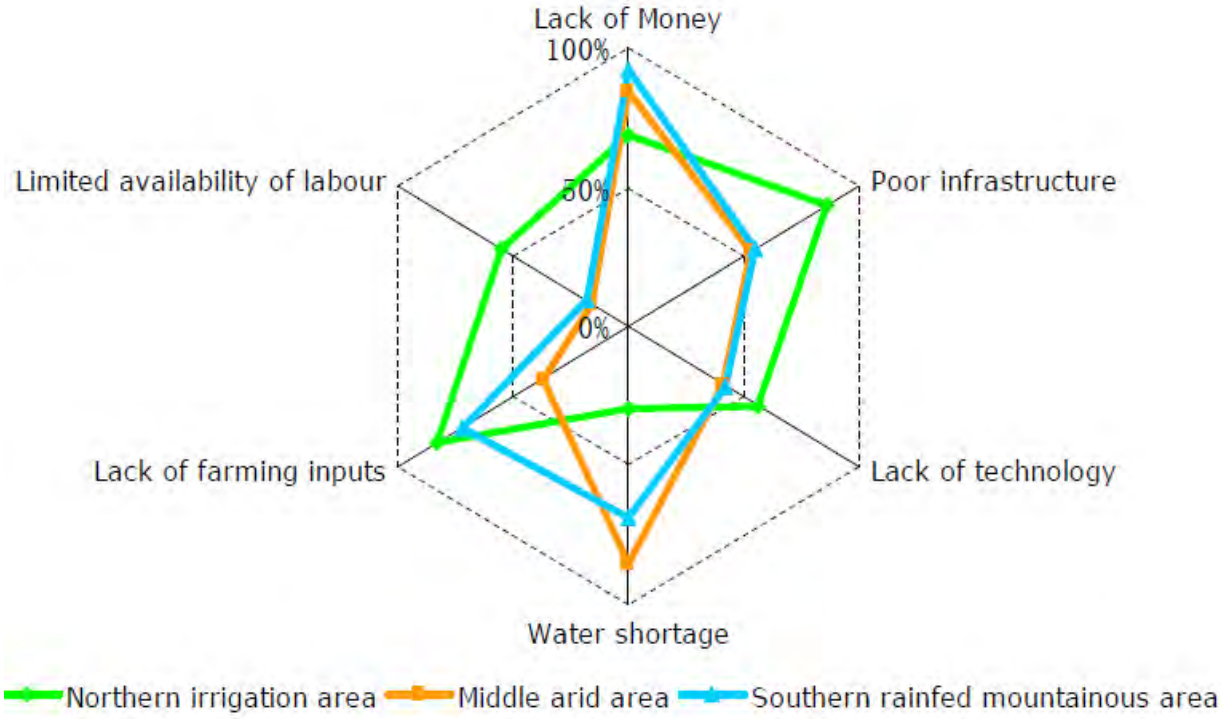




Changes in irrigation areas

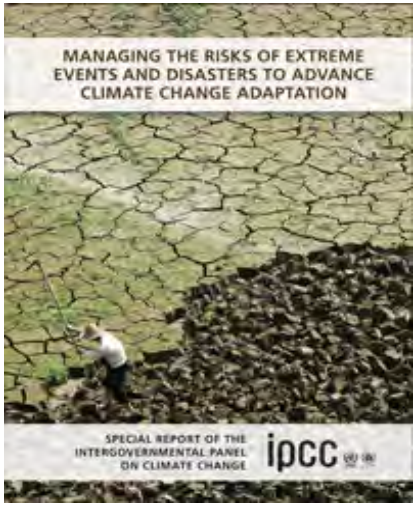
- Water scarcity
- Extreme events
- Economic conditions
- Natural resources
- People perception
- …..

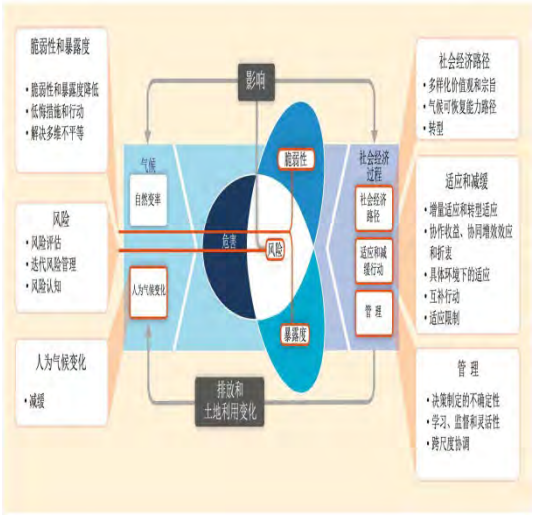
Recommendations



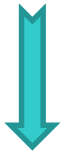
Farmers constraints on higher resilience capacity to climate crisis in NX

Experiences of international collaboration





Scientific workshop



ANSWER--What are the insights of experts on impacts and adaptation?

Concrete projects cooperation

- **Smart field management**

  via intelligent monitoring of weather and soil conditions to integrative management on crops production and nutrition.

- **Low-carbon agriculture**

  by enhancing fertilizer and water use efficiency, reducing pesticide usage and promoting conservation agriculture

- **Agriculture product value chain**

  for small-house holder farmers to diversify their products with high value and enhance accessibility to market.

Investment or fund – SSTC of IFAD, FAO, ST bilateral Programme-MOST, NSFC etc,.

Thank you!!

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Stand with farmers to sustainably increase their productivity and income!