

# A brief introduction of adaptation in China

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# **Agricultural adaptation in China**

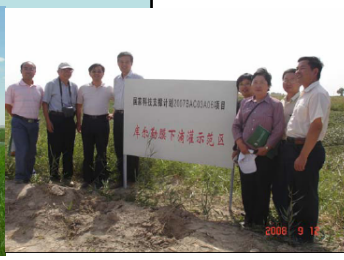
➤ **Two important tasks of agriculture development in China**

**1) To increase a thousand billion kilograms of grain in the future ten years to fulfill the needs of population growth**

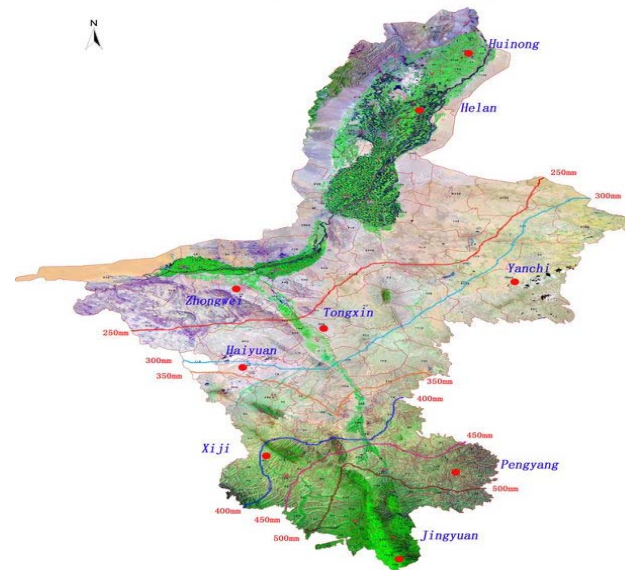
**2) To realize the commitment that energy consumption of capita GDP decrease 40% to 45%, announced by Chinese government**

# 适应示范 Adaptation Demonstration in China

Demo. areas	Heilong jiang	Heihe basin, GS	Tailanhe basin, XJ	Naqu Tibet	Qinghai-Tibet Railway
CC Risk	Cooling dec. getting dryer	Water consuming increase for oasis	More water coming now and will decrease	Grassland dryer, lake level rise	permafrost layer thawing by warming
Adap. Target	Go benef, avoid disaster	Water saving & cultivat	Saving water and ecolog. protect	Protect grassland ecology	to minimise the amount of heat
Poten. Adapt.	Structure adjusting	Low consuming technology	Integrated water management	pasture animals with water use	insulation and cooling systems
Adp. Asse.		300 million m3		4 times of passture	1 °C
Demon.	700 hm2 x 4	20 hm2 land	10 reserv. 60 hm2 land	sprinkled Irrigat. 12hm2	Project design in railway

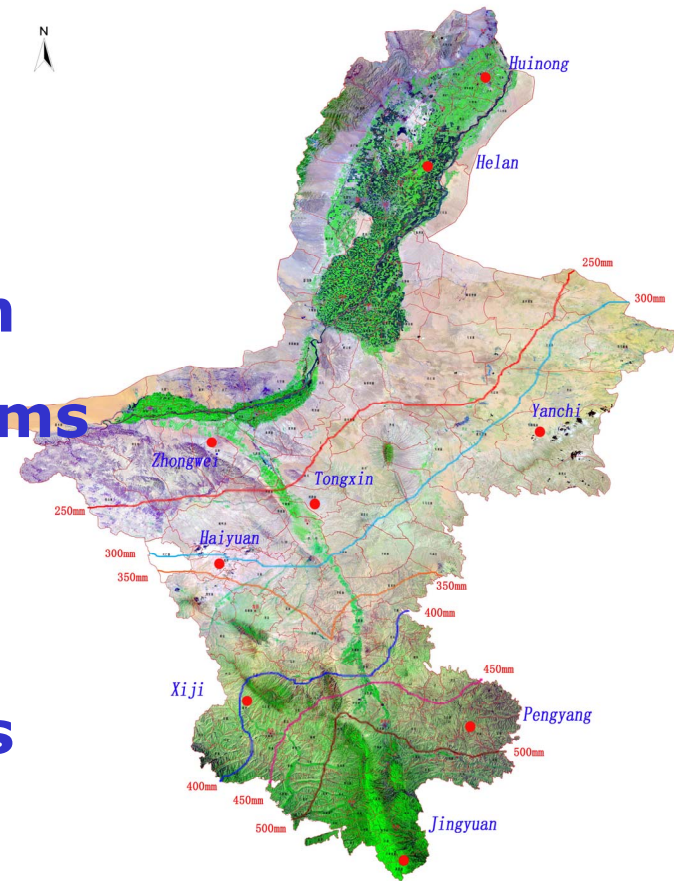


# Agricultural adaptation in Ningxia



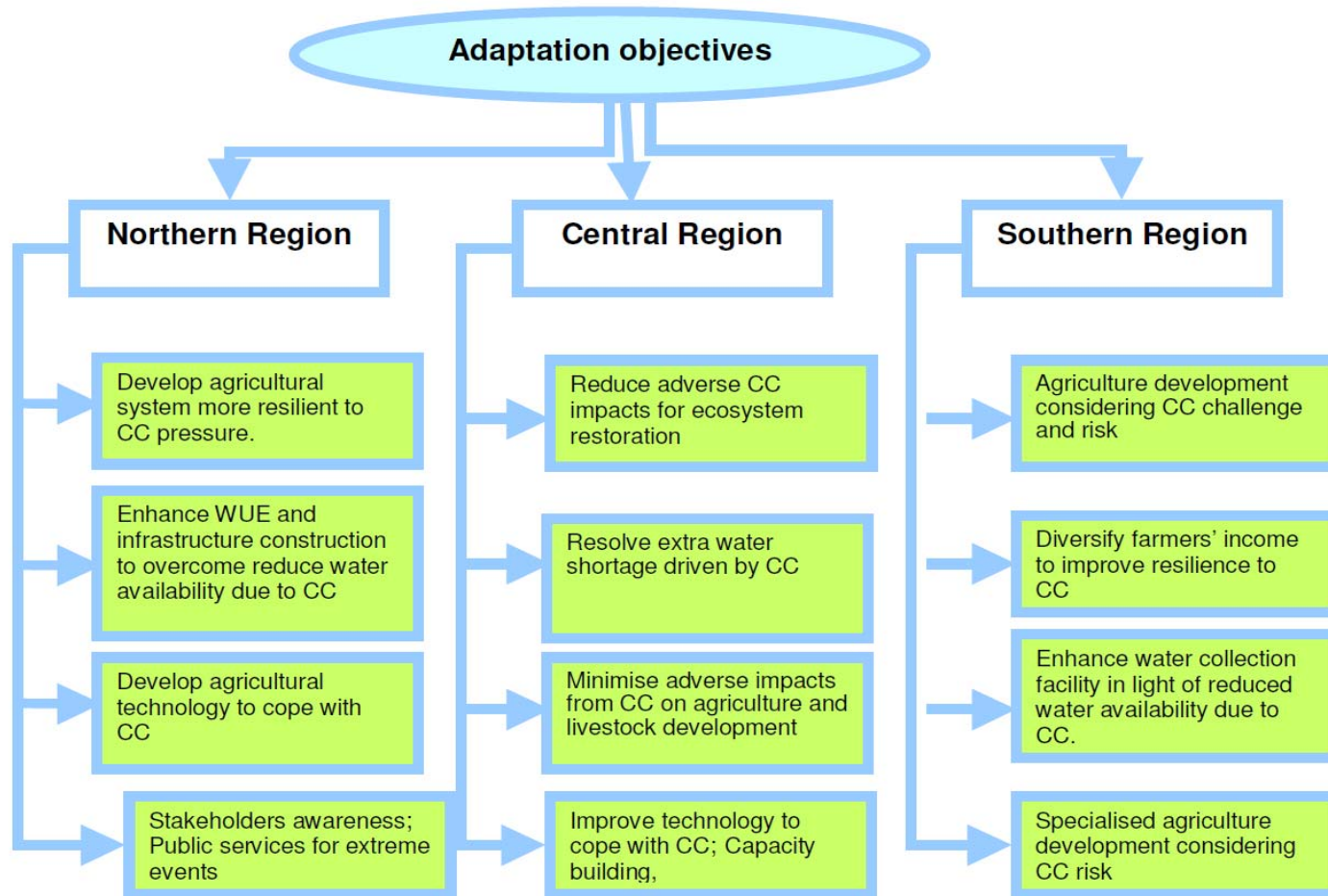
# Background

- **Ningxia Autonomous Region:**  
located in northwest China
- **Arid to semi-arid, annual precipitation is from 180-620mm**
- **Range of different farming systems**
  - Northern irrigation area
  - Middle arid area
  - Southern rainfed mountainous area
- **High levels of rural poverty**



# An agricultural adaptation in Ningxia

## Sub-regional adaptation objectives



# Methods and Criteria



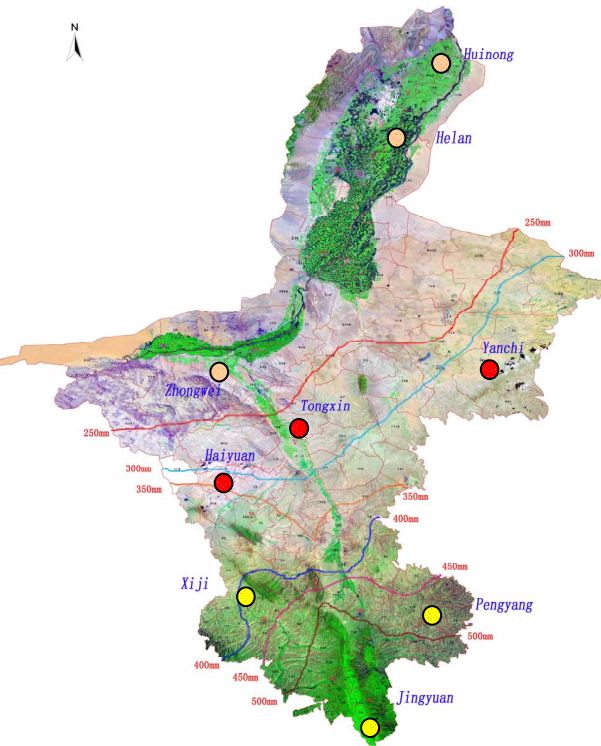
# Method

**Participatory Rural Appraisal (PRA) method used**

**Five parts are included in the questionnaire:**

- ❖ **Basic information about households**
- ❖ **General information on agricultural activities**
- ❖ **Climate variability and its impact on livelihoods**
- ❖ **Adaptation measures and their costs**
- ❖ **Farmers' views on opportunities for government support**

# Village sampling strategy



**Village sampling strategy based on agricultural system and poverty levels**

- **Three villages in each area**
- **At least 30 households in each village**
- **289 households were interviewed in 9 villages chosen, 95 in northern irrigation area, 101 in middle arid area, 93 in southern rainfed mountainous area.**

Results

# An agricultural adaptation in Ningxia

## identified adaptation options

### **Strategic and Planning**

Regional development plans and strategies (i.e. the eleventh-five year plan)

Department plans and options for addressing disasters

Improving enforcement and regulation of existing guidelines (e.g. *Grain to Green* policy)

# An agricultural adaptation in Ningxia

## identified adaptation options

### **Structural**

#### **new agricultural technology and agricultural extension services**

Practical agriculture technique training

Technology dissemination for dry land farming system

#### **Crop management practices**

Reducing spring wheat areas

Increasing potato and mulching maize areas

Slope field shift to terrace

#### **Water saving techniques**

Drought resistant varieties

Deep ploughing

#### **Poverty alleviation programmes**

Subsidize farmers who return crop land to grass or forestry

Export of labour

One million farmers training: government invest 10 million Yuan to help farmers get qualified certification for off-farm job;

.....

# An agricultural adaptation in Ningxia

## identified adaptation options

### **Non-Structural**

**Raising awareness about climate change issues**

**Strengthening appropriate programmes for vulnerability reduction (e.g. livelihood diversification)**

**Research, monitoring and data collection (e.g. improve knowledge of existing risk and vulnerability, economic costs of climate hazards)**

**Education, training, and dissemination about climate change risks (experts and communities)**

**Introducing / strengthening early warning systems**

**Weather forecasting**

**Build capacity to respond to climate hazards at individual and institutional level**

# An agricultural adaptation in Ningxia

## Multi-criteria analysis to priorities specific activities

Criteria	Rating
<b>Win-win options:</b> Does the option address current climate variability <i>and</i> future climate change?	1 = uncertainty                      2= based only current 3= both current and short term (3-5 years)    4 = medium to long-term (more than 5 years)
<b>Existing risk management:</b> Is the option consistent with existing risk management activities?	1= no                                      2= consistent in short term 3= consistent in long term (average change) 4= both short and long term
<b>Cost effectiveness:</b> Can costs and benefits of the option be easily determined?	1= very difficult                      2= difficult 3= easy                                      4= very easy
<b>Adaptive flexibility:</b> Does the option focus on narrow range of future scenarios, or allow flexibility of response?	1= no, irreversible                      2= limit flexible 3= flexible                                      4= very flexible and easy
<b>Unintended impacts:</b> Potential negative spin-off impacts beyond targeted activity?	1= adverse impact                      2= uncertain 3= no impacts                              4= beneficial impact
<b>Practical considerations:</b> Is the option practical and feasible for the implementer?	1= unfeasible, impossible              2= more problematic 3= relatively simple                      4= more easily
<b>Knowledge level:</b> How much certainty is there in predicting a particular change in hazard and its impact?	1= uncertainty (less 10%)              2= low certainty (10%~20%) 3= medium certainty (about 50%)      4= high certainty (more than 80%)
<b>Policy coherence:</b> Does the option reflect local and national disaster risk reduction / adaptation plans or studies?	1= only the long-term or only the medium-term needs 2= long and medium term needs 3= short term needs                      4= both above all
<b>Total score</b>	

# Adaptation measures - Drought

Plastic film



Plastic film+  
Gravel





# Adaptation measures - Drought



Water cellar



Rain water harvest

# Water saving measures



**Hole irrigation**



**furrow irrigation**



**Anti-leakage ditch**



**Conservation tillage**

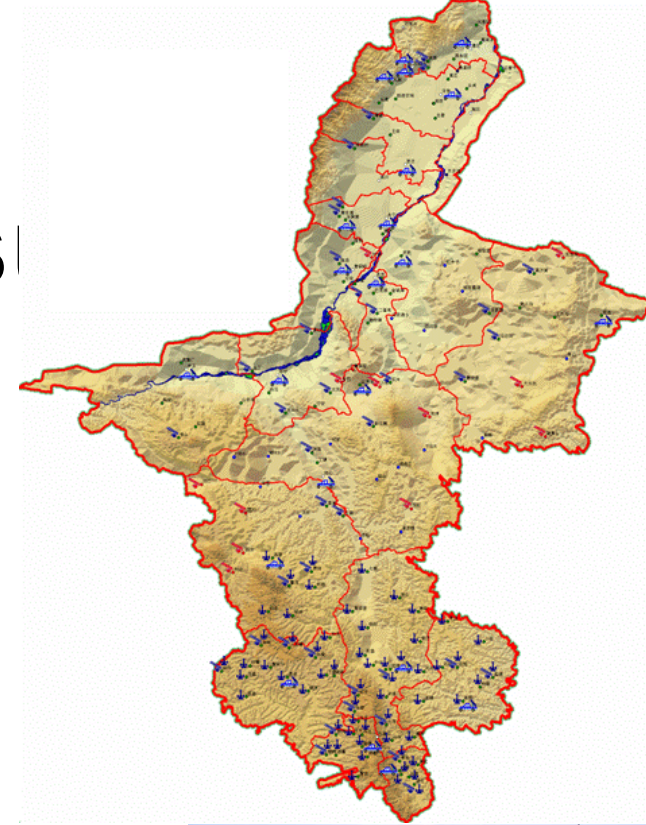
# Adaptation measures



# Adaptation meas

## ■ Government and scientific community

- Water diversion
- Drought resistance variety
- Weather modification



# Cost-benefit of some adaptation measures

Practice	Cost ¥ /ha	Benefit
Harrowing	450~750	~40% increase in yield
Film mulching	390~750	20~40% increase in yield
Gravel covering	4810	8430 ¥ /ha
Water cellar	500-1000 ¥/cellar	680-800 ¥/year saved
Terrace	3000	30-50% increase in yield

# An agricultural adaptation in Ningxia

## lessons learned

- **A good ‘entry point’ for discussions on adaptation in the long-term is through reducing vulnerability to existing climate hazards.**
- **Climate risks and adaptation priorities vary across (sub)regions and sectors.**
- **There is a need for coordinated management across sectors.**
- **Much actors constraining farmers’ adaptation.**
- **Farmers have very higher expectation for adaptation.**

# thanks

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