International Virtual Workshop on Water-Energy-Food Nexus During Ninth G20-MACS-2020

Climate Smart Practices for Crops Production with Minimum Water and Energy Inputs in Northern China

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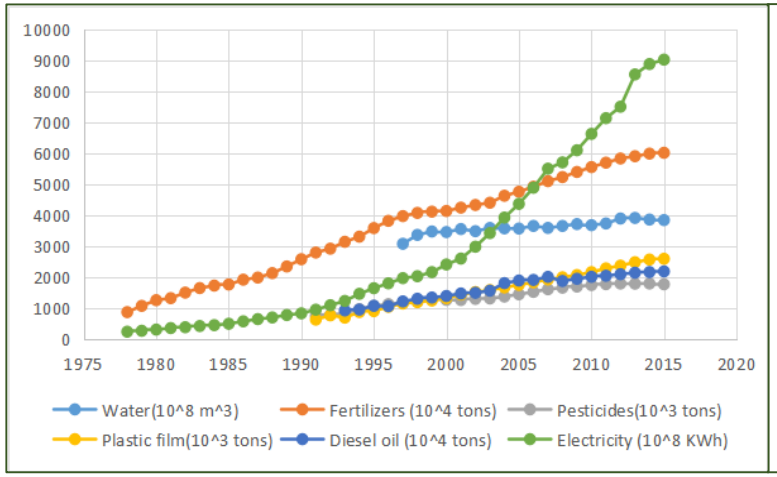
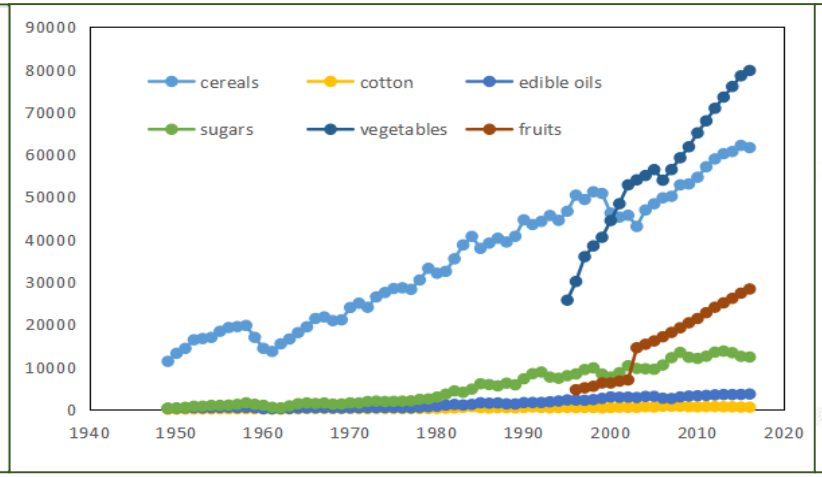
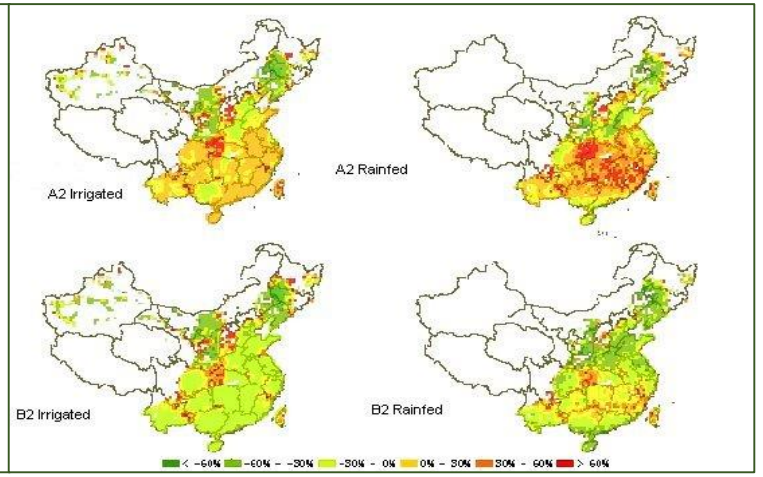
Outline

- The challenges to feed increasing population
- Climate smart practices for sustainable crop production
- Successful stories in northern China

The challenges to feed increasing population in China







(Unite 10^4 tons)

8% Arable land
6% Renewable fresh water
32% Fertilizer

19% Cereals
30% Meat
38% Vegetables & fruits

20% Population (1.40 billion, 2020)

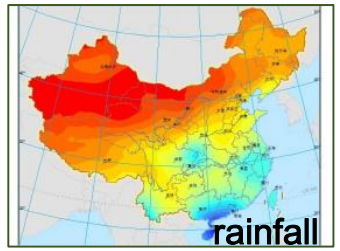
Arable land ↓ ~10-15 10^4 ha/a
Temperature warming rate ↑ 0.22℃/10a
Available fresh water 360~370 billion m^3

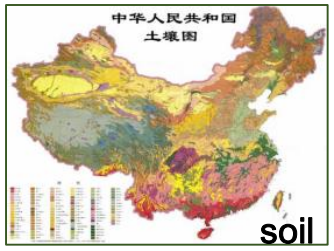
1.45 billion Population? (2030)

Climate Smart Practices

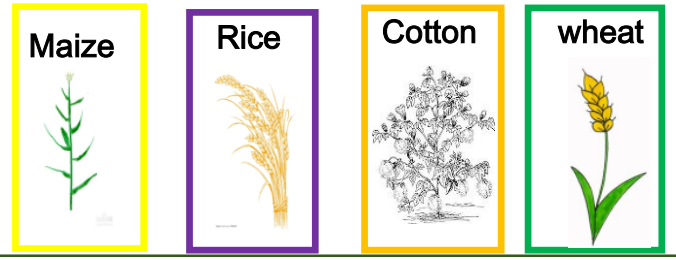
Climate smart practices for sustainable crop production

①Climate, resources and enviroment





②Climate resilient cropping system

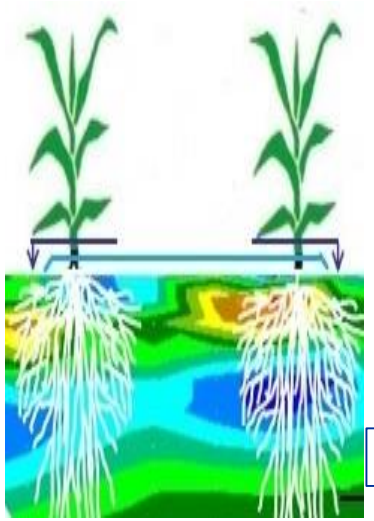


—Breeding high resistent variety to climate change

Drought resistent wheat varieties

Maize varieties with high yield

③ Key solutions to crop production



Canopy

Surface mulching

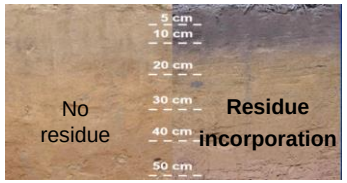
Healthy soil

Intercropping/Rotation

Optimized planting density

Plastic film mulching

Straw mulching

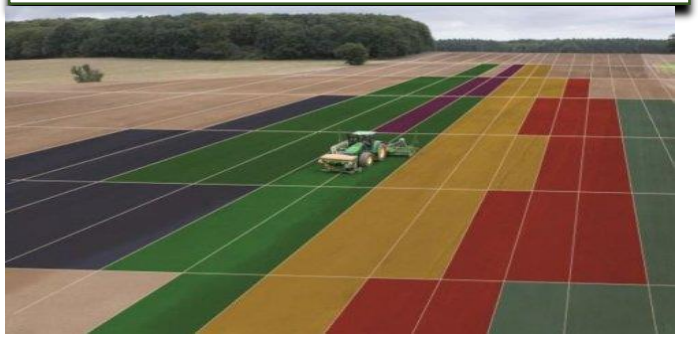


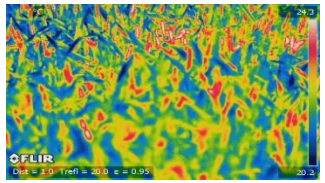
Organic input

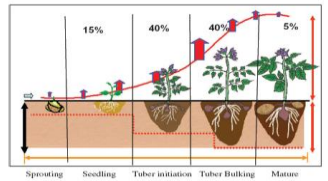
Conservation tillage

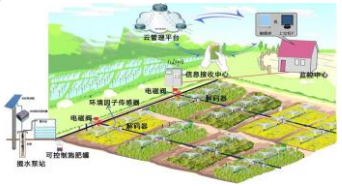
Standardization

④Sustainable crop production system





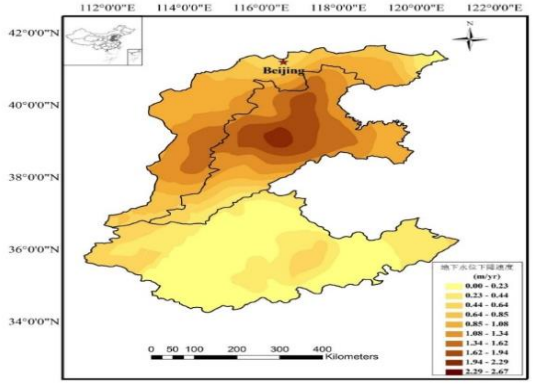




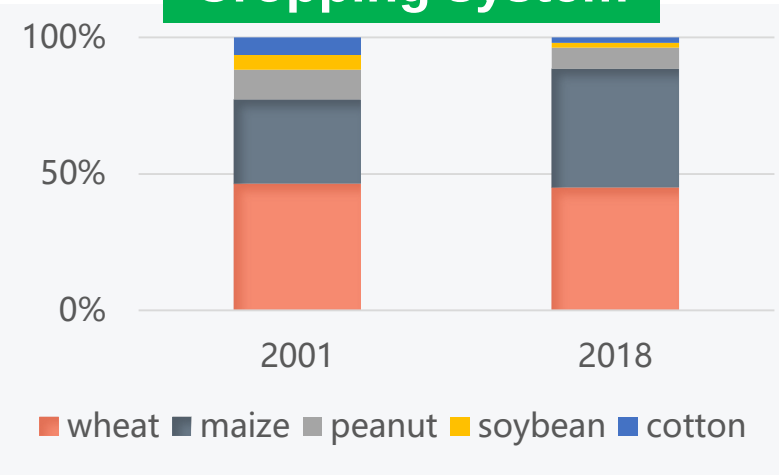
ICT for precise water and nutrients management

Successful story in North China Plain- Nonfully irrigated wheat

Challenges



Cropping system

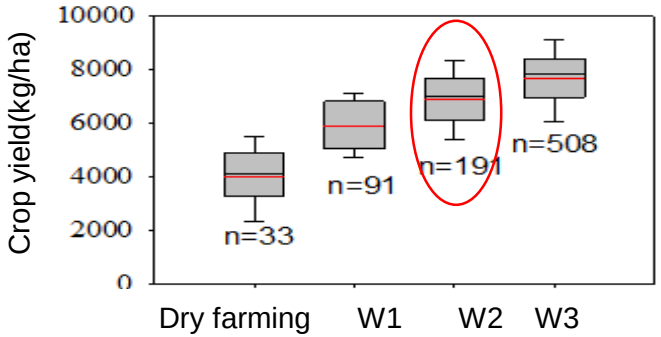


Irrigation water ↓ **750 m³/ha**

Electricity for pumping water ↓ **30%**

Winter wheat WUE ↑ **~10%**

Climate smart practices



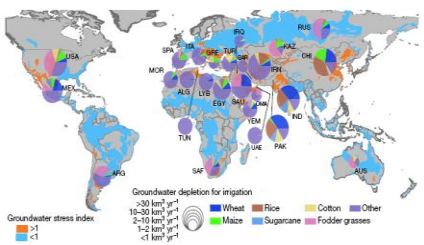
Deficit irrigation to reduce water and energy inputs

Fertigation to increase resource use efficiency

Return straw in field to improve soil health

Successful story in Northeast China-Controlled Irrigated Rice and Conservation Tillaged Maize

Challenges



Cropping system

Water and Electricity	↓ >35.0%
Rice yield	↑ 6.4%
Rice WUE	↑ 39.1%

Climate smart practices

Intercropping to improve light and water use efficiency

Maize//soybean with straw mulching preventing soil erosion

Rice alternated wetting and drying to save water and improve quality

Successful story in Northwest China- Drip Fertigated Cotton with Plastic Mulching

Challenges

Cropping system

Yield	↑ 20%-30%
water and fertilizer	↓ 30%-50%
Electricity for pumping water	↓ >30%

Climate smart practices

Integrated Machinery for seeding and dripers and mulching

Precise fertigation for water and nutrients supply

Machinery for harvesting plastic film and driper

THANK YOU

Your valuable comments and suggestions are highly appreciated