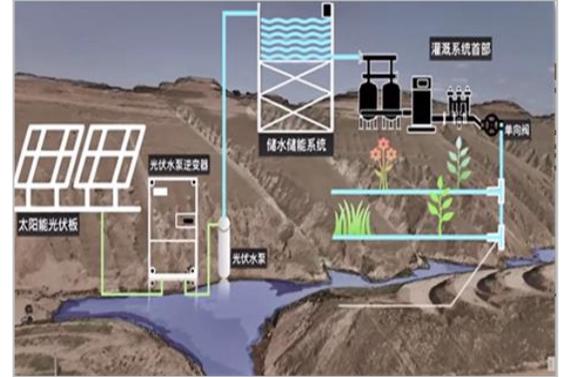


High-tech Solutions for Dryland Farming



Dr. Junliang Fan

SCO Demonstration Base for Agricultural Technology Exchange and Training



To ensure food security and mitigate climate change!



上海合作组织农业技术交流培训示范基地
SCO Demonstration Base for Agricultural Technology Exchange and Training

Contents

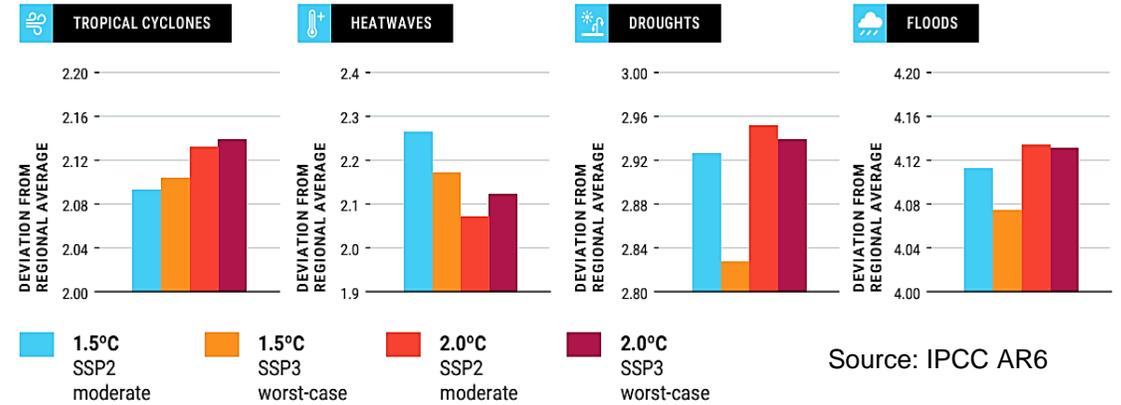
- **Dryland farming and climate change in the Asia-Pacific region**
- **Examples/cases of high-tech solutions for dryland farming**
- **Recommendations and way forward**



Dryland farming and climate change in the Asia-Pacific region

Member States and Associate members of ESCAP

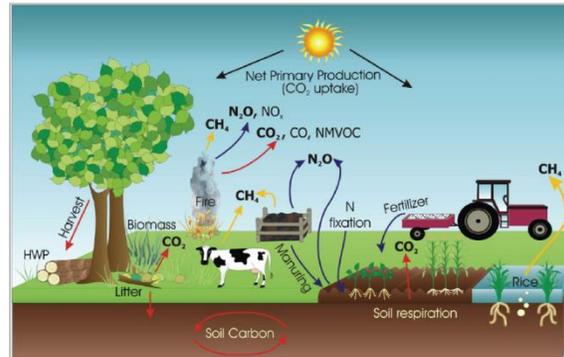
60% of global population (~4.8 bn)
Largest agricultural production share



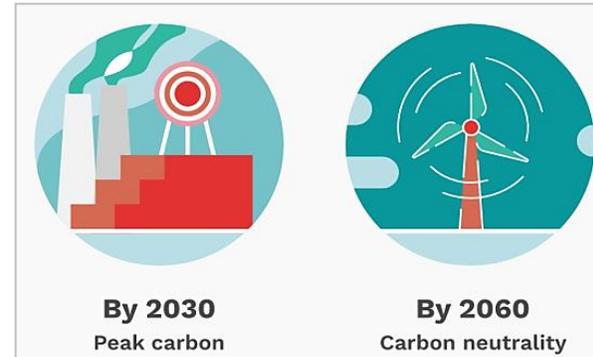
Differential impacts of extreme weather events in the APR



Drought impact on agriculture



GHG emissions from agriculture



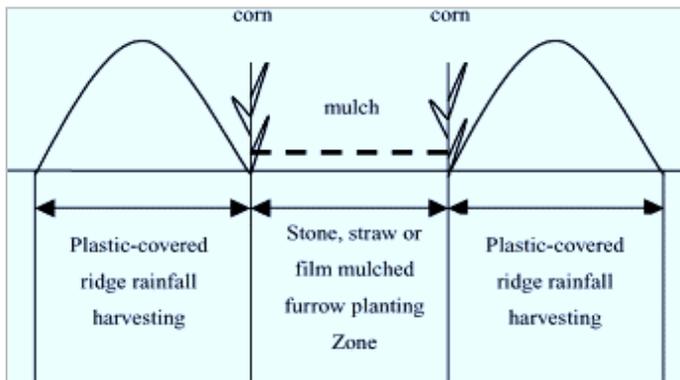
China's "dual carbon" goals



Agricultural green production



Soil water conservation by innovative mulching practices

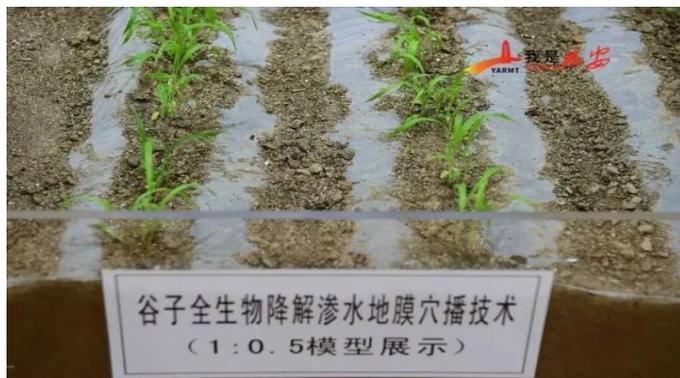


Ridge-furrow rainwater harvesting and plastic film mulching



Ridge-furrow rainwater harvesting

Efficient use of small rainfall
Increasing rainwater infiltration
Regulating soil hydrothermal conditions
Reducing soil evaporation
Improving crop production
Inhibiting weed growth



Biodegradable and permeable plastic film mulching

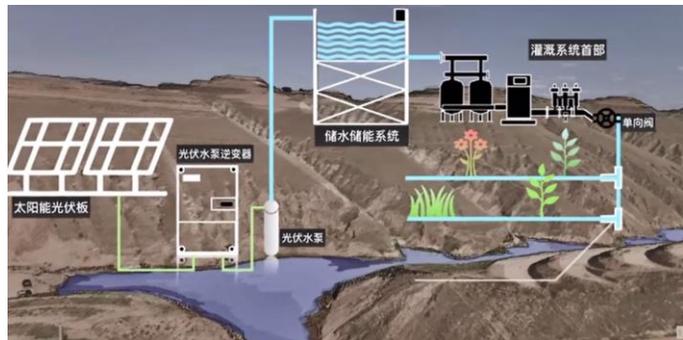


Biodegradable and permeable plastic film mulching

Efficient use of small rainfall
Regulating soil hydrothermal conditions
Reducing soil evaporation
Increasing crop production
Inhibiting weed growth
Environment-friendly (95% after a year)



Four-in-one rainwater harvesting for supplementary irrigation



Four-in-one irrigation system



Gully dam



PE expansion tank



Anti-evaporation pond



Solar-powered drip irrigation



Solar-powered sprinkler irrigation

Solar-powered pumping & irrigation
 Saving energy
 Low investment & maintenance
 Improving crop production
 Remote control

Supplementary irrigation in dry seasons with stored rainwater from rainy season

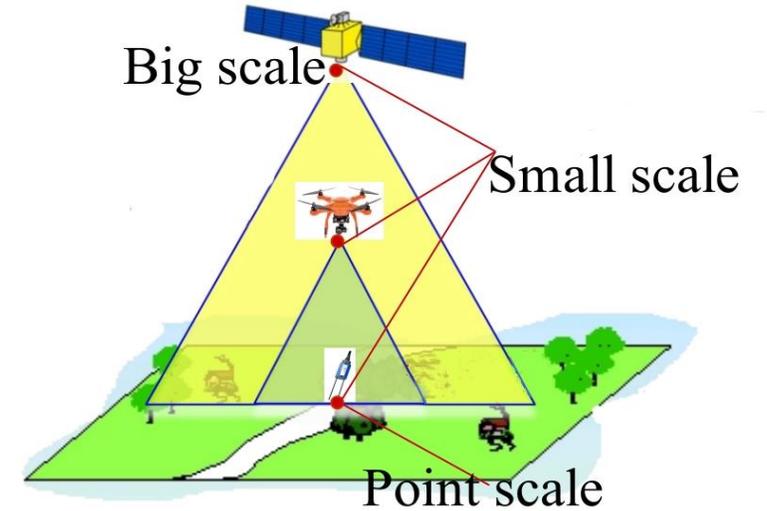
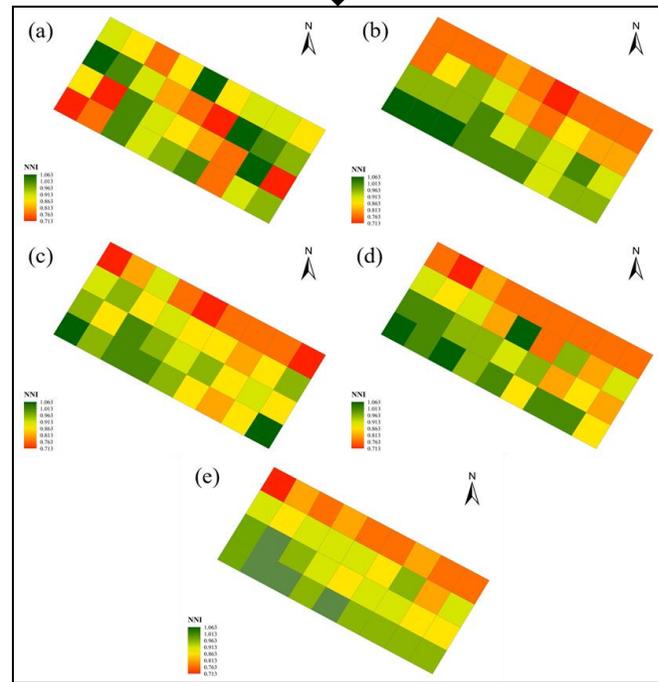
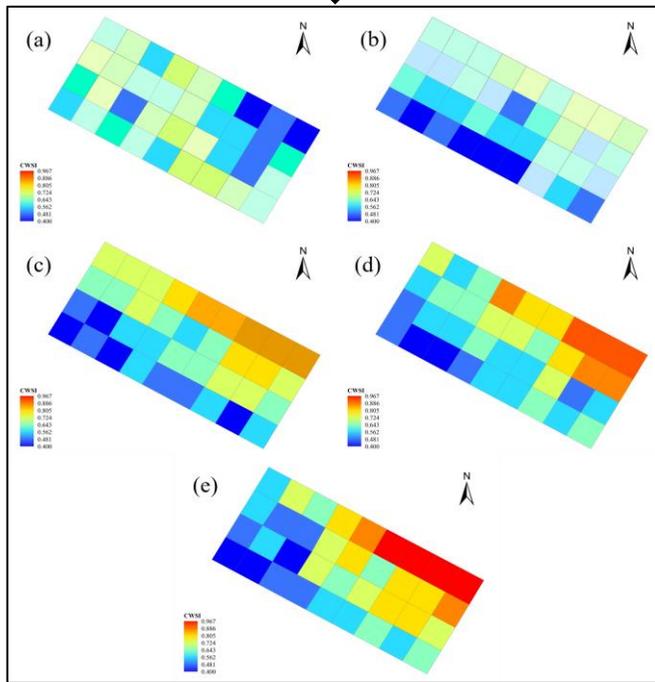
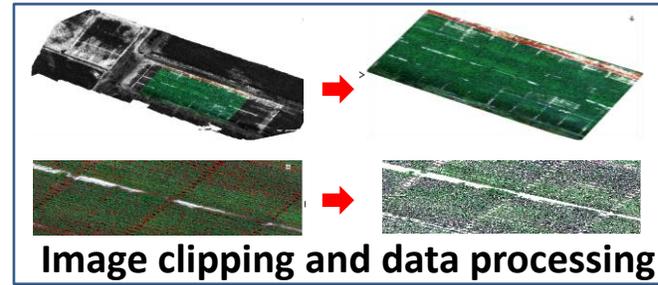
Especially suitable for regions with sloping terrain and lack of electricity



Intelligent irrigation and fertilization system



Crop water & nitrogen monitoring & diagnosis by remote sensing



Space-Sky-Earth Integration Technology

- Multispectral and thermal sensing
- Autonomous cruise
- Fast and non-destructive monitoring
- Precise diagnosis
- Large-scale application

Spatial pattern of **crop water stress index**

Spatial pattern of **nitrogen nutrition index**



Intelligent agricultural machinery in dryland farming



Digital and smart mechanization technologies



Terrain-adaptive plowing machine



Seeding machine with emergence irrigation



Drones for fertilizer/pesticide/herbicide spaying



Beidou-guided unmanned harvesting machine



Fruit-picking robot

Intelligent agricultural machinery makes dryland farming more efficient and reduces labor costs



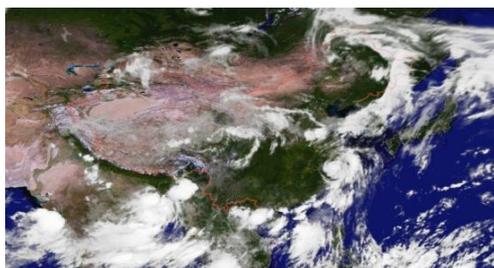
Recommendations and way forward



Increasing investment & making incentive policy



Agricultural education & extension



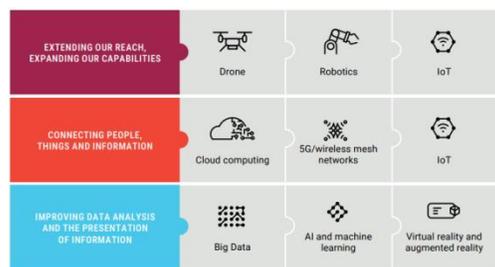
Strengthening early warning systems



Breeding climate change-ready crop varieties



Digital and smart mechanization technologies



Strengthening regional cooperation and solidarity



Thanks for your attention !

Dr. Junliang Fan

**SCO Demonstration Base for Agricultural
Technology Exchange and Training**

nwwfjl@163.com

Any questions?



上海合作组织农业技术交流培训示范基地
SCO Demonstration Base for Agricultural Technology
Exchange and Training