



世界水谷
World Water Valley

Study on the Development of Water-Energy-Food Cooperation Between China and Central Asian Countries Under Climate Change

Deichun Huang Professor / Doctoral supervisor

Hohai University

2023.04.10





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1

Cooperation Background

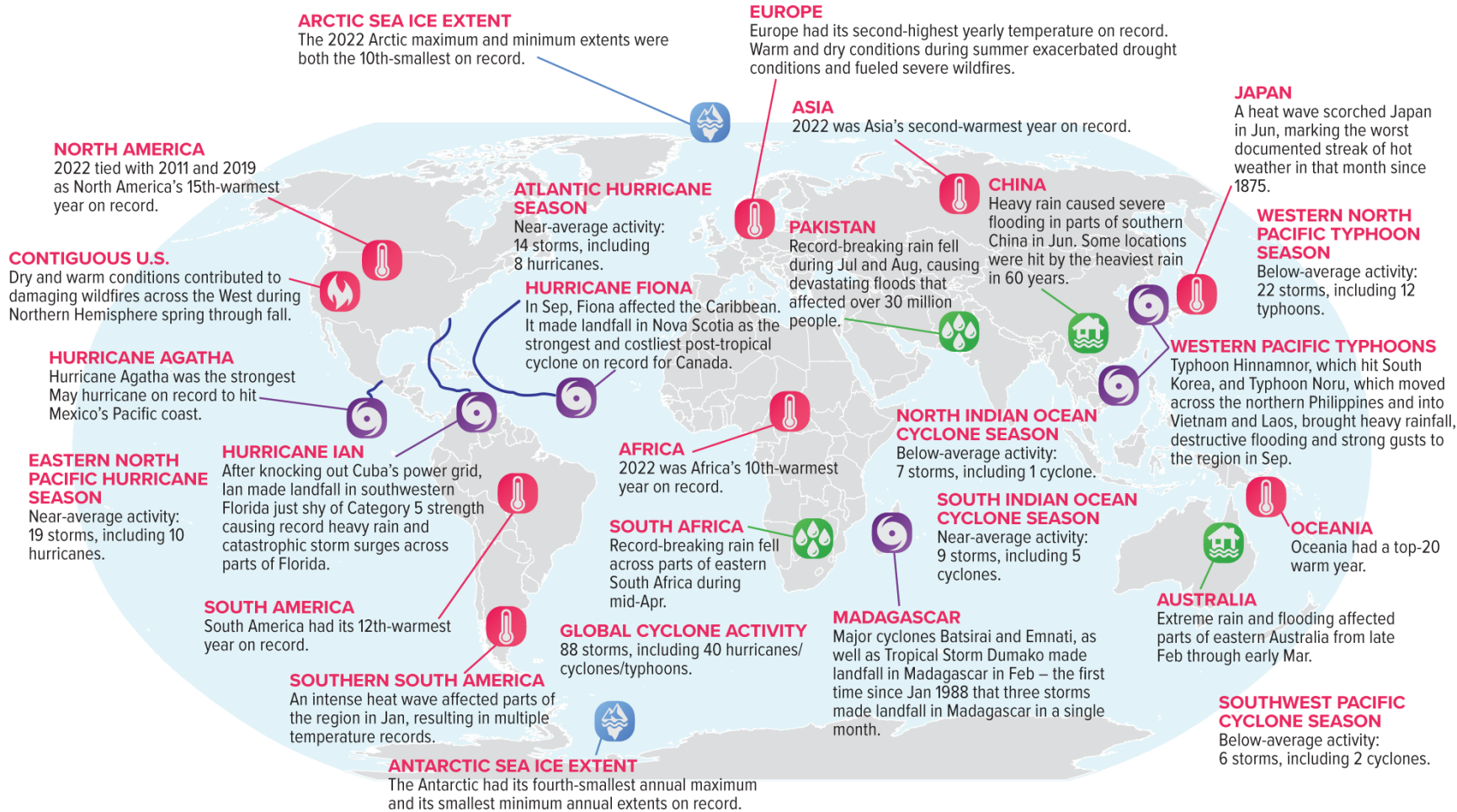
1.1 Frequent Occurrence of Major Global Catastrophic Weather and Climate Events

Selected Significant Climate Anomalies and Events in 2022



GLOBAL AVERAGE TEMPERATURE

The Jan-Dec 2022 average global surface temperature was the sixth highest since global records began in 1880.



1.2 Climate Change Threatens Water-Energy-Food Security

water

It leads to uneven spatial and temporal distribution of water resources.

Increasingly frequent and severe droughts, floods and typhoons exacerbate uncertainty in water resource allocation, bringing about corresponding changes in the energy and food sectors.

energy

It leads to mismatch between energy supply and demand.

The original energy supply system is difficult to adapt to the new demand changes, and many parts of the world are in different degrees of energy difficulties under seasonal and regional persistent high and low temperatures and other meteorological conditions.

food

It leads to reduced food production. Climate change has a particularly serious impact on agricultural development, with floods and droughts leading to a global reduction in food production, triggering a food crisis and contributing to higher food prices.

Currently, the systemic linkage risks of the water-energy-food security caused by climate change need urgent attention.

1.3 Climate Change Threatens Water-Energy-Food Security in Central Asia



Water



The typical continental climate with highly uneven distribution of water resources and climate change exacerbates water scarcity.



Energy



In addition to fossil energy sources there are also abundant renewable energy sources, and renewable energy sources such as hydro, wind, solar and geothermal energy are highly dependent on the climate.

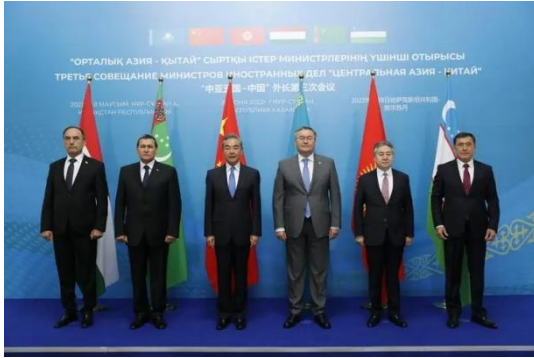


Food



The reduction of food production due to climate change and the reduction of arable land area due to heat and drought aggravate the food crisis in Central Asia.

1.4 “China+Central Asian” Cooperation Mechanism Opens a New Era of Mutual Relations



On July 16, 2020, the first video meeting of the foreign ministers of China + Central Asian countries was held. The parties unanimously decided to **establish a mechanism for China+ Central Asia foreign ministers** to hold regular meetings, join hands to address challenges and seek common development and prosperity.



On May 12, 2021, the second meeting of the Foreign Ministers of China + Central Asia was held, which adopted the “Memorandum on the Construction of the Meeting Mechanism of the Foreign Ministers of China + Central Asia”, which will **identify key areas of cooperation, formulate common action plans**, and provide a stronger mechanism for China's collective cooperation in Central Asia.



On June 8, 2022, China+Central Asia held the third meeting of foreign ministers and **agreed to establish the mechanism** of China + Central Asia Summit . The meeting also **adopted four outcome documents**: the Joint Statement on the Meeting of the Foreign Ministers of China + Central Asia, the Roadmap for the Implementation of the Consensus of the Video Summit between China and the five Central Asian countries, the Initiative on Deepening China + Central Asia Connectivity Cooperation, and the China + Central Asia Data and Information Technology Initiative, China+Central Asia Security Cooperation Initiative".



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2 / Research Foundation

◆ Major Project of National Social Science Foundation of China

Research on the Coordinated Development and Security Strategy of WEF under the Green Development Strategy (19ZDA084)



Chief Expert:
Dechun Huang
Business School of Hohai University



Subproject I: Study on the connotation of water-energy-food synergy development era and security strategy needs under green development
Director: Junfei Chen **Business School of Hohai University**



Subproject II: Theoretical study on the characteristics and mechanism of water-energy-grain synergistic development system under green development
Director: Xiufeng Wu **Nanjing Hydraulic Research Institute**



Subproject III: Study on the construction of China's water resources-energy-grain synergistic development model under green development
Director: Haiwei Zhou **Business School of Hohai University**

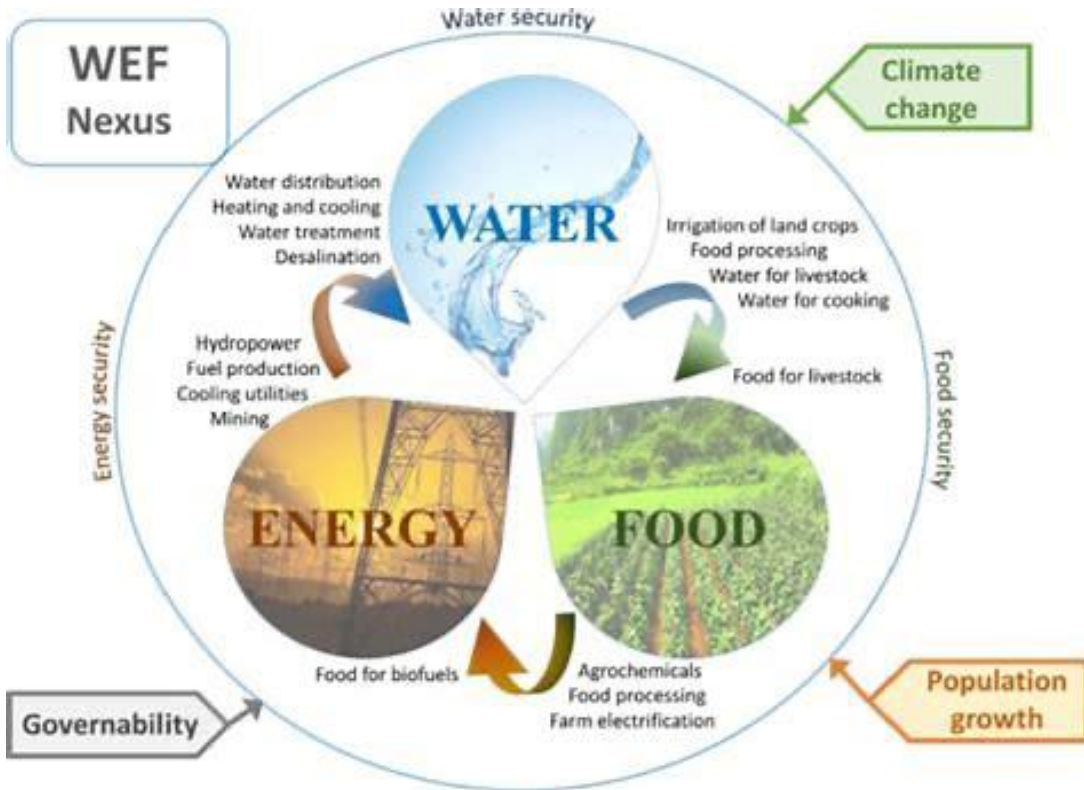


Subproject IV: Research on China's Water-Energy-Food Security Strategy and Intelligence Monitoring under Green Development
Director: Yousheng Zhang **Energy Research Institute National Development and Reform Commission**



Subproject V: Application and Policy Suggestions of Water-Energy-Food Synergistic Development and Security Strategy under Green Development
Director: Changzheng Zhang **Business School of Hohai University**

2.1 Water-Energy-Food Nexus



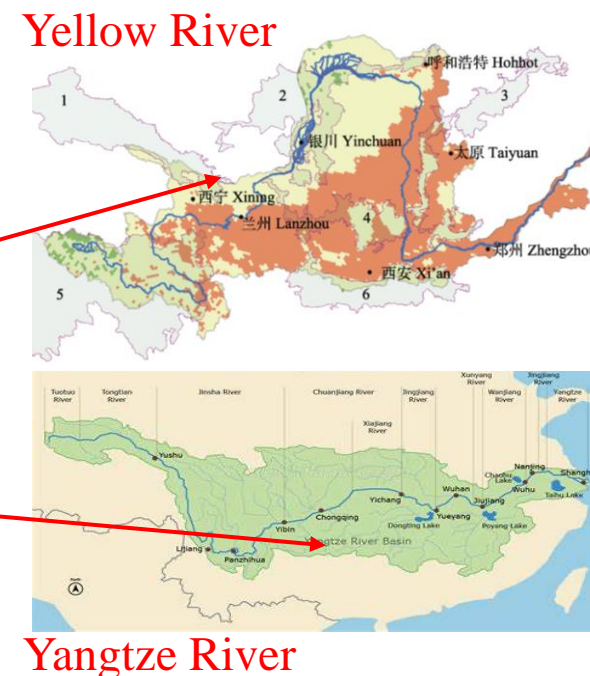
WEF Nexus

In the complex environment of climate change, economic growth and population growth, WEF influence and restrict each other in the process of production, consumption and management. There are complex relationships among the three resources.

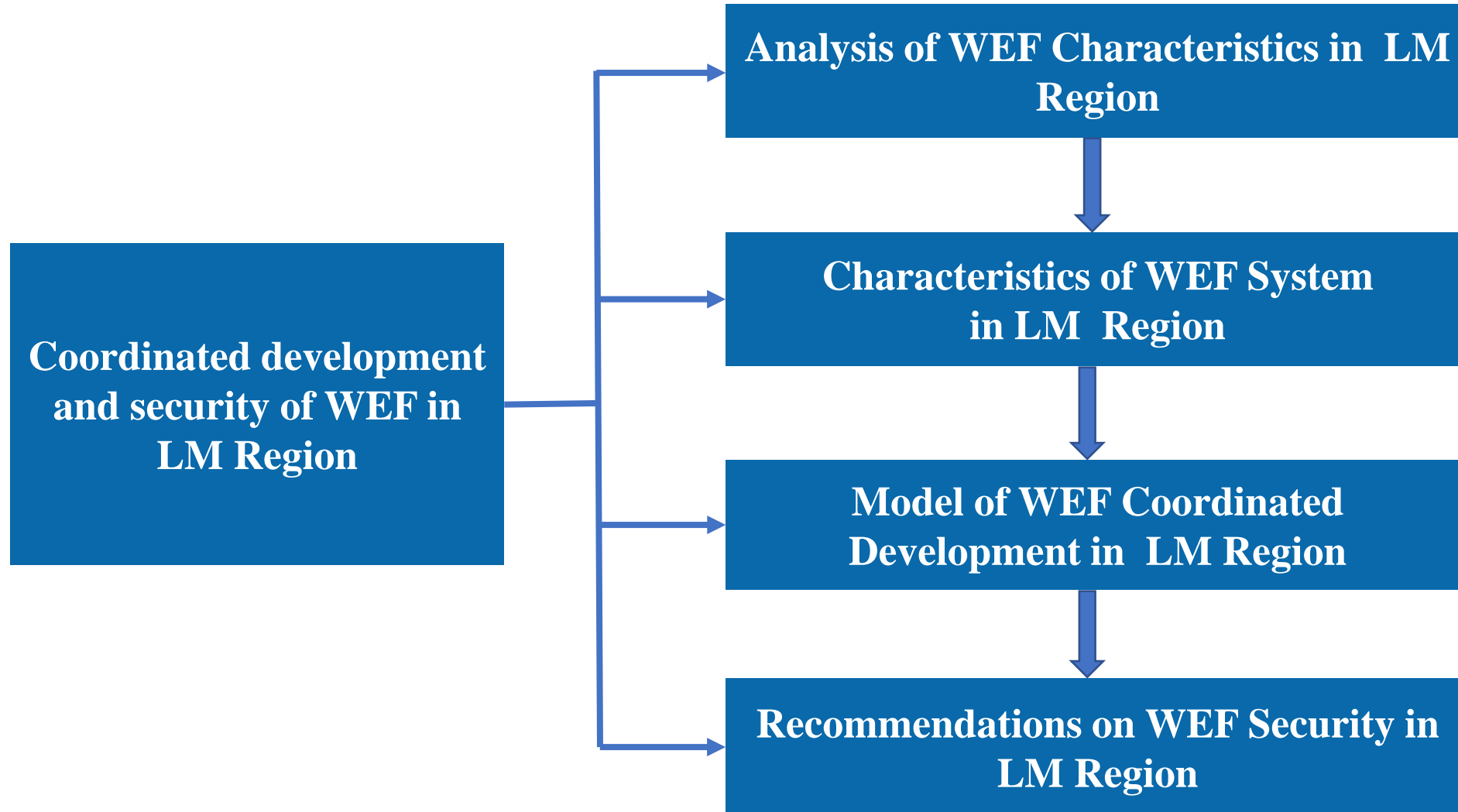
2.2 Application Study of Water-Energy-Food



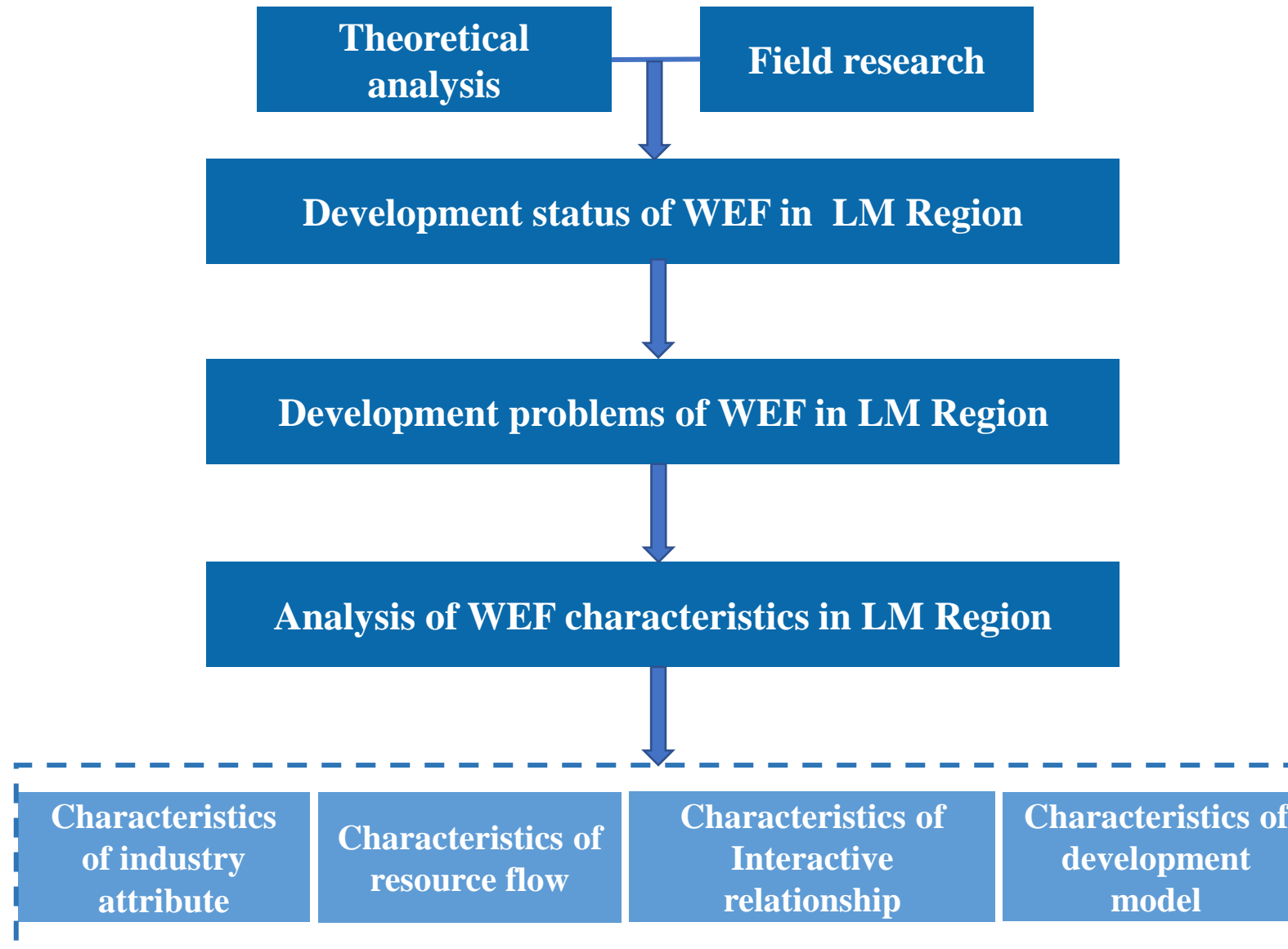
- **Downstream application of Yangtze River Basin:** High intensity of regional "water-energy-food" flows and contradictory problems in the relationship between the three, which seriously restrict high-quality development
- **Upper and middle reaches of the Yellow River Basin:** Highly consumptive and rough development region in the northwest, water-energy-food disharmony, unsustainable and inefficient problems, and fragile ecological
- **Lancang-Mekong River Basin Application:** "Water" is the natural link between the basin countries, and the risk of water-energy-food security is prominent.



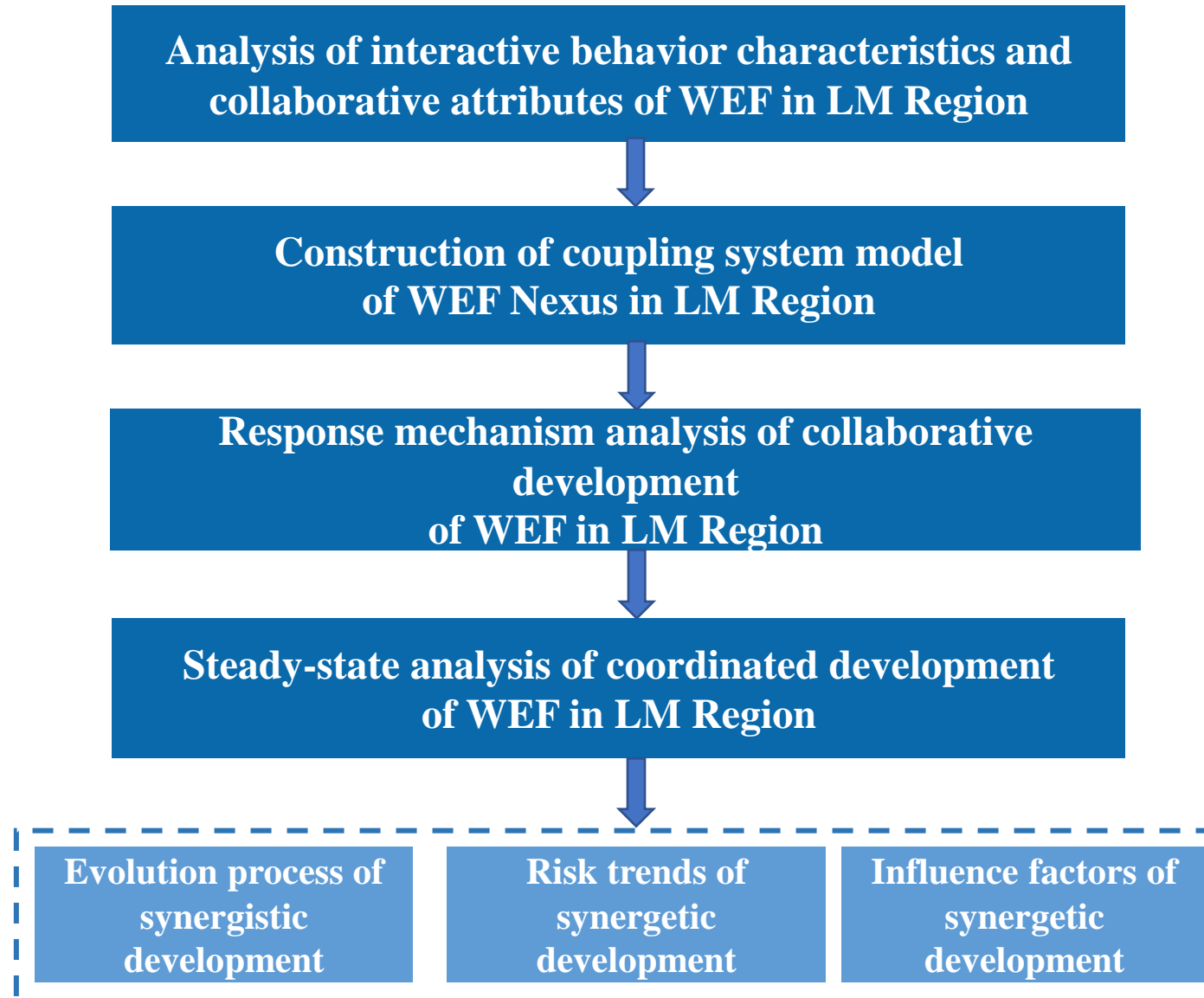
2.3 Ideas for Water-Energy-Food Research in LM Region



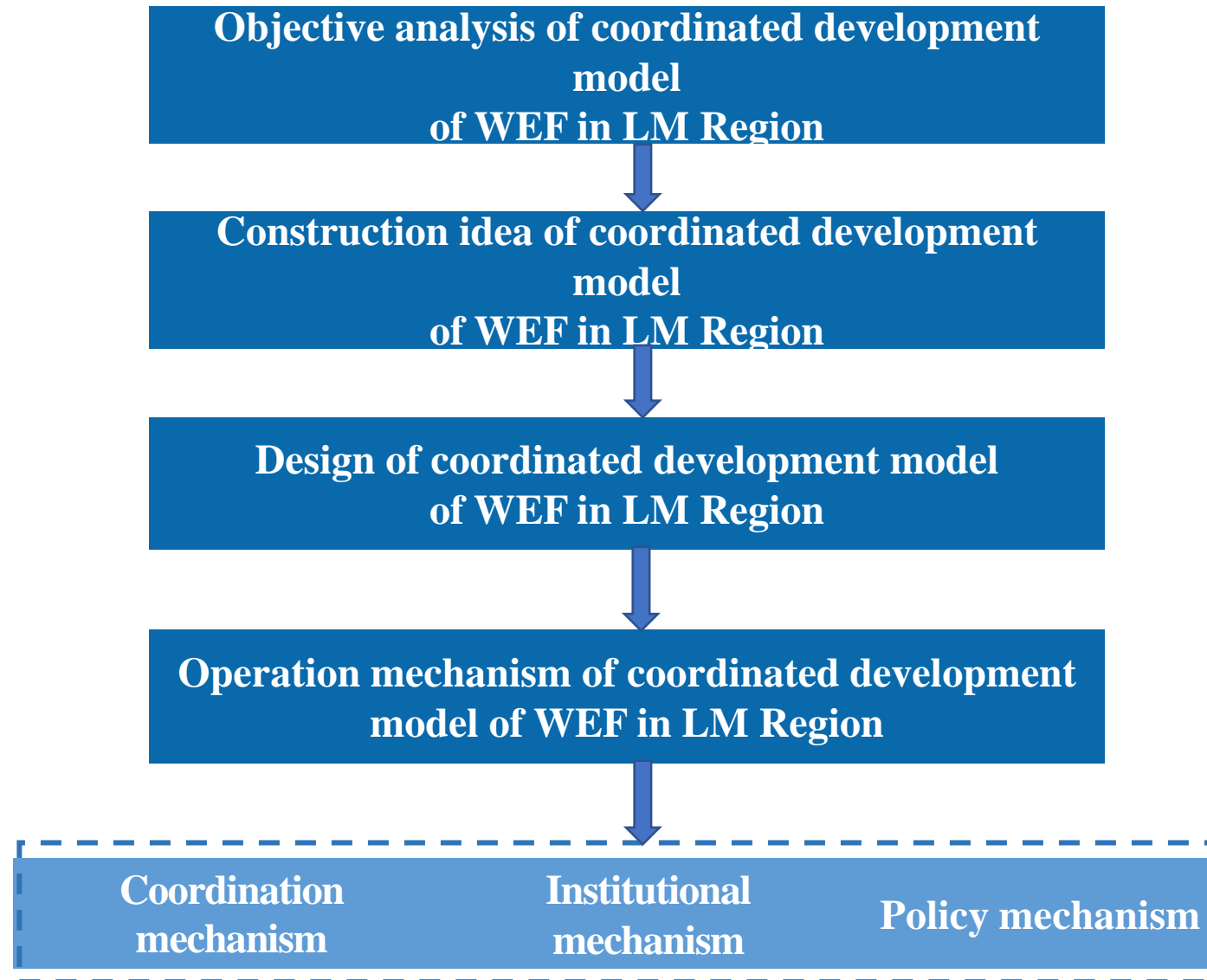
2.3 Analysis of Water-Energy-Food Characteristics in LM Region



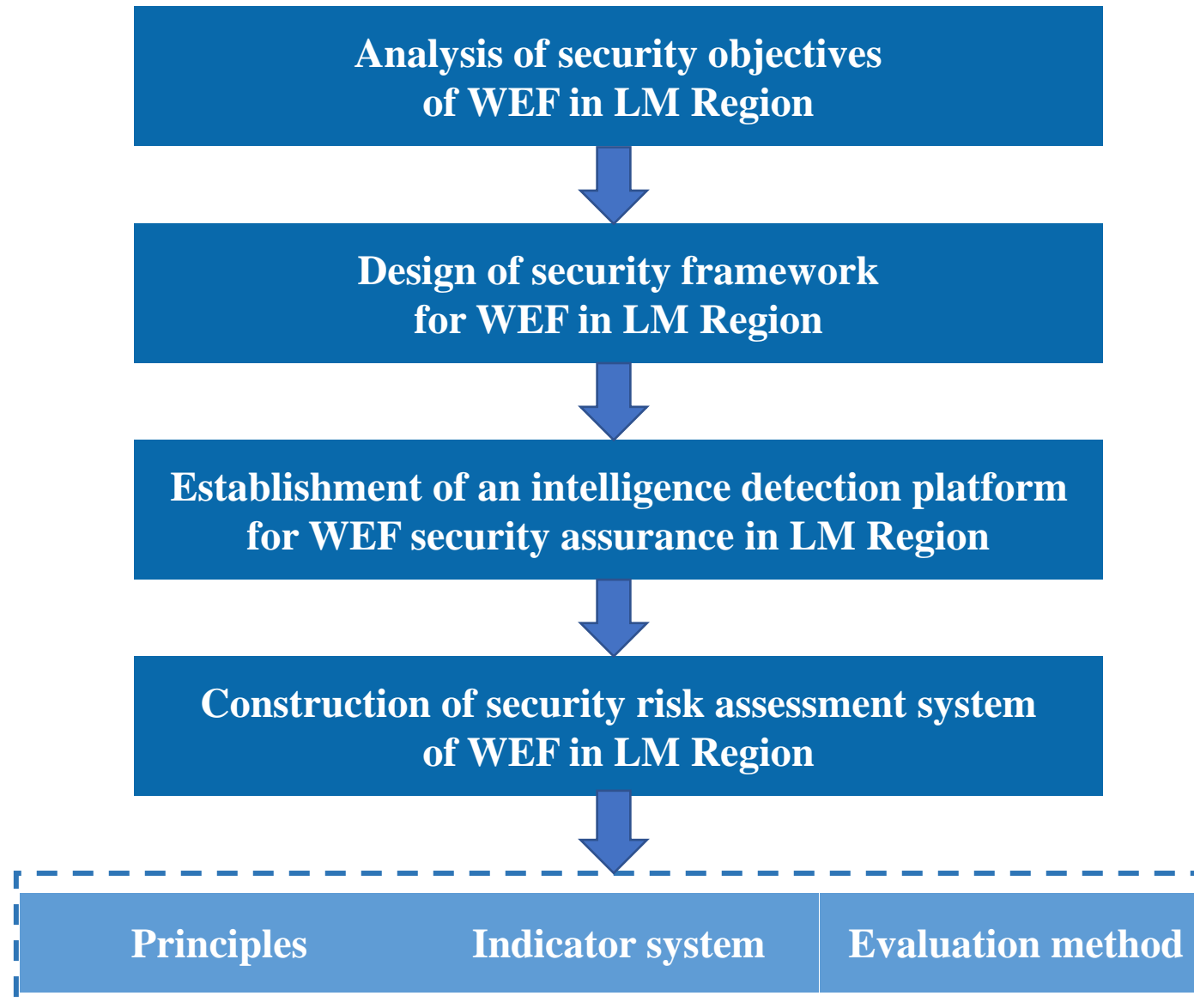
2.3 Characteristics of Water-Energy-Food Systems in LM Region



2.3 Water-Energy-Food Synergistic Development Model in LM Region



2.3 Suggestions for Water-Energy-Food Security in LM Region



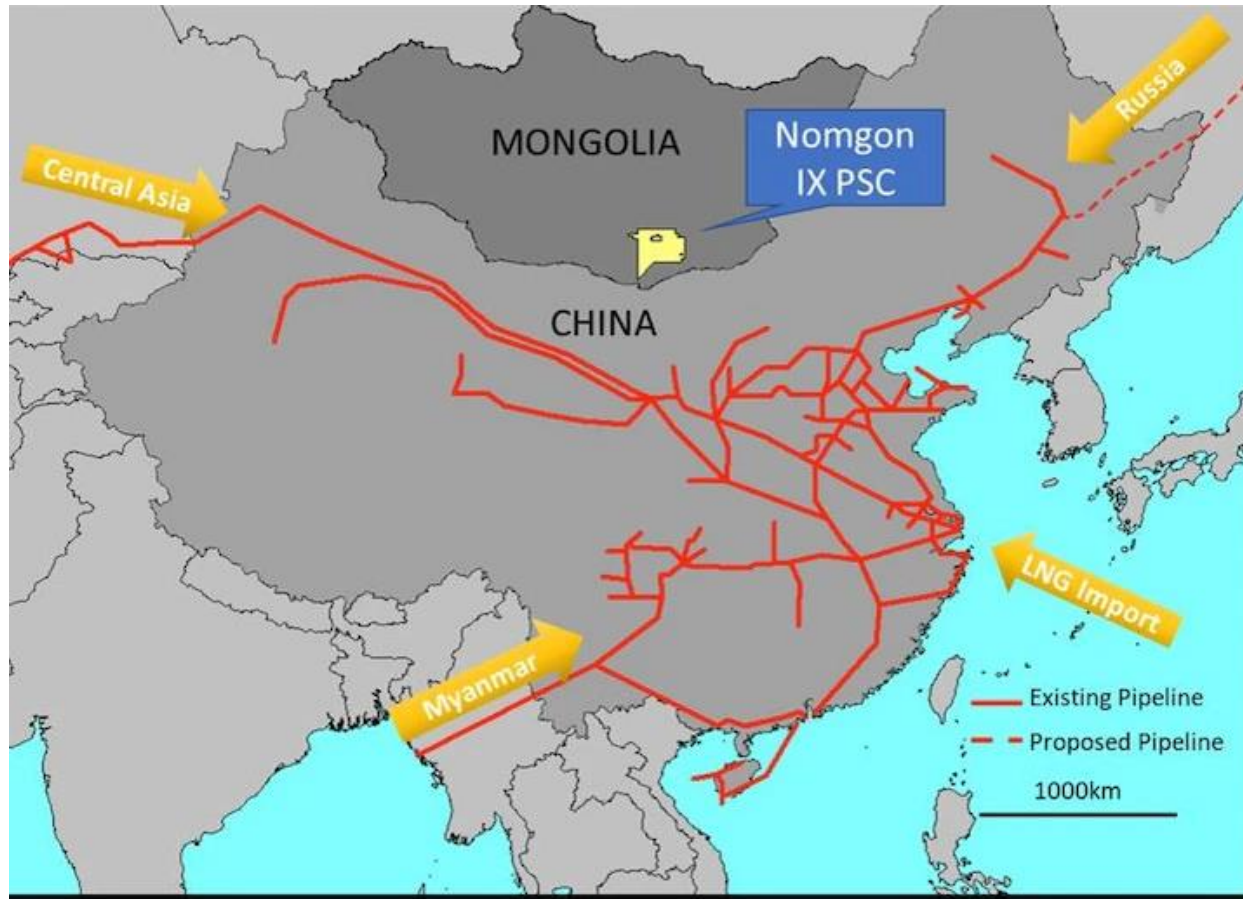


3 / Cooperation Prospects

3.1 Water Resources Cooperation between China and Central Asia



3.1 Energy Cooperation between China and Central Asia



Central Asia–China Gas Pipeline



“Fuxing” gas fields (Галкыныш)



China-Kazakhstan crude oil pipeline

3.1 Food cooperation between China and Central Asia



China-Europe Express (Central Asia) logistics channel



China-Ukraine Friendship Agricultural Technology Demonstration Center



"Belt and Road" International Cotton Industry Science and Technology Innovation Institute

3.2 Prospects for Water-Energy-Food Cooperation between China and Central Asia



Building a community of water interests through cross-border water cooperation

Grasp the core position of water in WEF in Central Asia, and under the premise of preventing and controlling water resources risks, improve the stability of the hydropower system and ensure the safety of food production



Energy



Establish an international energy cooperation system to promote energy security

Promote high-quality development of energy security, green and low-carbon energy transformation, and energy technology innovation under climate change



Food



Strengthen multilateral agricultural cooperation and promote the construction of food trade corridors

Counteract the threat of climate change to regional food production, promote high-quality development of agricultural cooperation, develop agricultural science and technology cooperation, optimize the layout of international trade in wheat, and broaden industrial cooperation channels

Promoting practical cooperation

3.3 Prospects for water-energy-grain cooperation between China and Central Asia

Coordinate the development planning and security strategy of WEF in Central Asia;

Establish data information sharing platform

Publicize the achievements of WEF cooperation and provide useful reference

Ensure the investment of WEF cooperation in Central Asia



Stabilize the supply chain and industry chain of WEF in Central Asia

Carry out WEF cooperative research and cultivate high-end talents in related fields

Research and develop core technologies for WEF and promote the application and transformation of scientific and technological achievements



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Welcome to Hohai University, Nanjing, China!