

## Progresses of MAIRS Dryland Study in East Asia

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Monsoon Asia Integrated Regional Study (MAIRS) is an international climate change research program which is focused on integration between physical and social sciences. Asian dryland region includes the large area of arid and semi-arid regions in east Asia and south Asia where is much vulnerable to climate change and human perturbation. In the same time, semi arid East Asian region is the northern of monsoon system. In MAIRS science plan, research questions are addressed as follows:

- a, How does global warming affect the regional climate, water cycle, aridity trend, desertification processes and provision of ecological goods and services over semi-arid Asia?
- b, How do human-induced land cover changes affect the regional climate, water conservation and nutrient-content of the soil, land degradation, the structure and function of terrestrial ecosystems and the frequency of dust storms?
- c, What will be the global consequence of changing the long distance transport of dust aerosols, such as the carbon cycle in oceans?
- d, What are the social and economic consequences of the further deterioration of semi-arid environmental systems, such as concerns related to human health, food and water security and economic development? How does human society adapt to such changes in vulnerability in order to achieve sustainable development of the region?

By now, MAIRS Dryland Study is structured into 4 task teams: Climate change dynamics; dryland observation; land surface modeling; coupled human-environment systems.

### 1) climate change dynamics

The study of climate dynamics would recognize the role of large-scale climate variations and changes as drivers of the natural and human systems in the dryland areas of monsoon Asia.

### 2) Dryland coordinated observation network

The MAIRS observation activities would help focus and enhance the various observation programs being carried out across the dryland areas of monsoon Asia. A major role of MAIRS is to synthesize the results from these activities to provide a foundation for the activities on natural and human systems.

### 3) Asian Dryland Models Inter-comparison Project

The goal of this group is evaluating and improving land surface models (LSMs, energy and water) & terrestrial ecosystem model (TEMs, carbon) through offline model intercomparison using data obtained at Asian dryland, towards better reproduction and prediction of landsurface state using improved models, and necessary capacity building.

### 4) Coupled Human-Environment systems

The main objective of this group is to incorporate resilience concepts into climate response and sustainable development strategies in the dryland systems of the Asian steppe by enhanced stakeholder involvement across a multiple set of decision makers from local pastoralists to policy makers in the national government

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