



Monsoon Asia Integrated Research for Sustainability — Future Earth

2003-2019

International Project Office, MAIRS-FE

Oct 2019

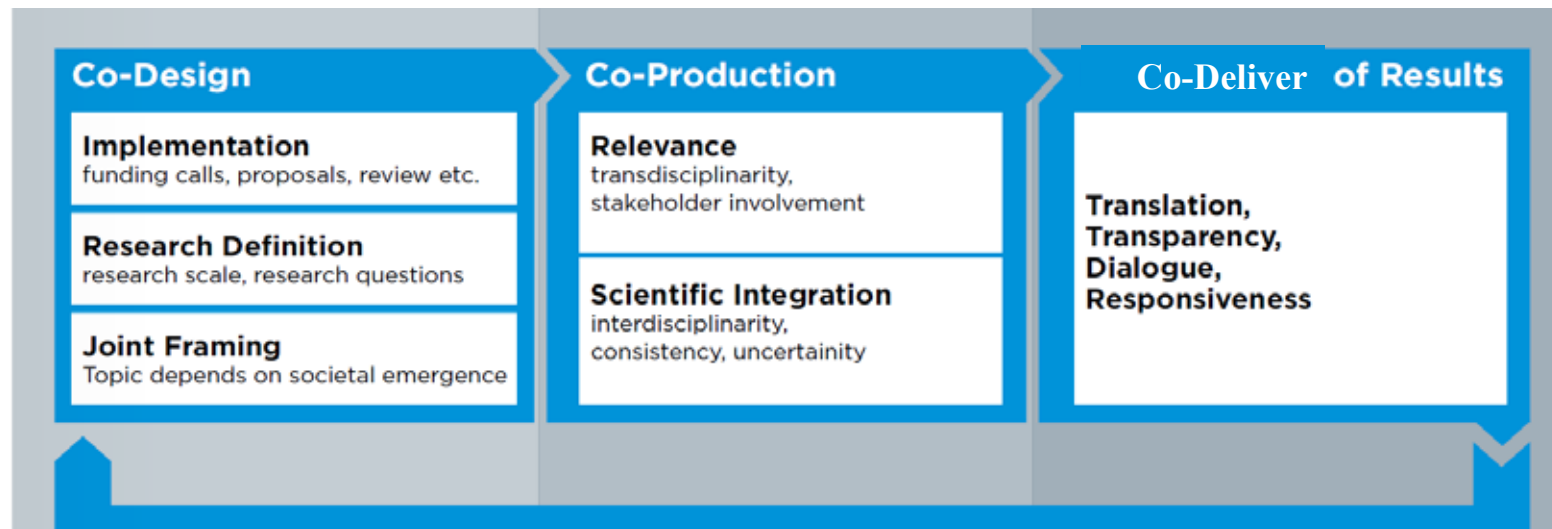


United Nation: In 2015, countries adopted the 2030 Agenda for Sustainable Development and its 17 **Sustainable Development Goals (SDGs)**.



Future Earth is a global research programme designed to provide the knowledge needed to support transformations towards sustainability.

It builds on more than three decades of global environmental change research through the World Climate Research Programme (**WCRP**), the International Geosphere-Biosphere Programme (**IGBP**), **DIVERSITAS** and the International Human Dimensions Programme on Global Environmental Change (**IHDP**).



A global network of researchers
and innovators

Global hubs 5

9 Knowledge-action
networks*

Global
research
projects

20

5 Regional centers
and offices

ca. 20

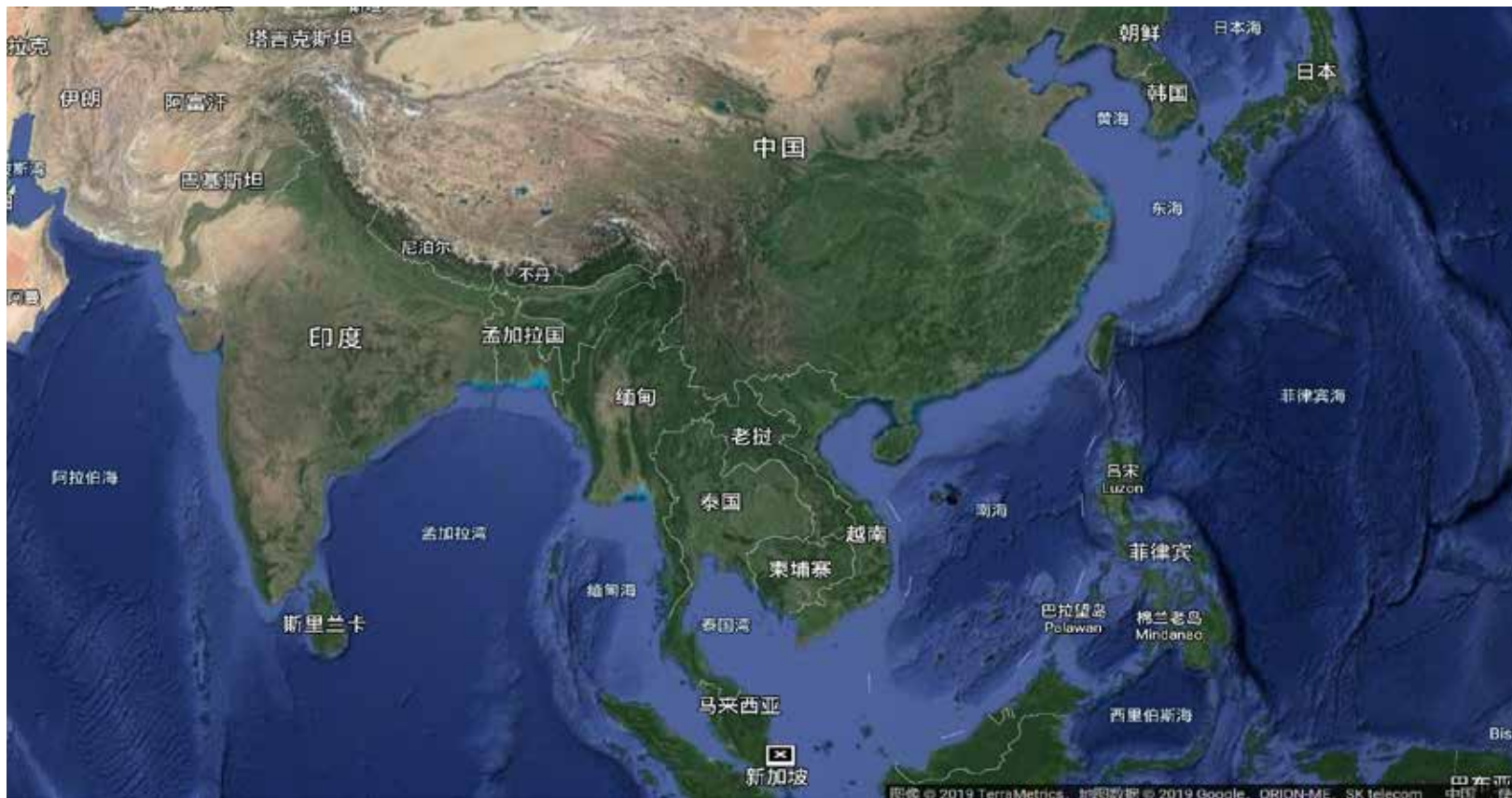
National
networks

Connecting to international platforms
10+ global policy partnerships, such as the United Nations Framework
Convention on Climate Change



* As of September 2018

Monsoon Asia is the countries and regions under the influence of Asia Monsoons, such as the Indian Monsoon affecting the Indian subcontinent, and the East Asian Monsoon affecting China, Korea and Japan. **High population density and vulnerable to Environmental Change: food, water, energy, pollution, natural disasters.**





1. The concept of an integrated Asian monsoon system was originally proposed by Asian scientists (e.g. Fu, 1996).
2. From the earth system science point of view, the Asia monsoon system is a coupled physical/biological/chemical/social system (Fu, 1998, 2000).
3. The Monsoon Asia Integrated Regional Study was proposed by Earth System Science Partnership (ESSP) and became the first IRS project under its leadership in 2003.
4. The first planning meeting of Monsoon Asia Integrated Regional Study was held in Bangkok in March of 2003 when the acronym of MAIRS was coined.



INTRODUCTION



Scope

Monsoon Asia: South, southeast and east Asia

- ✓ The monsoon rainfall is the main water resource
- ✓ A region with high frequency of climate related disasters
- ✓ A region with the most active human development and pollution level
- ✓ Human activities here will have significant impacts on environment, **not only regionally but also globally**

Vision

Aim: advance understanding of the interactions between the human and natural components of the overall environment in the monsoon Asian region, and implications for the global earth system.

Focus: cross-cutting global change issues related to the unique Asian monsoon climate and topography.

Link: between researchers and stakeholders & across the diverse cultures and societies of Asia.



INTRODUCTION

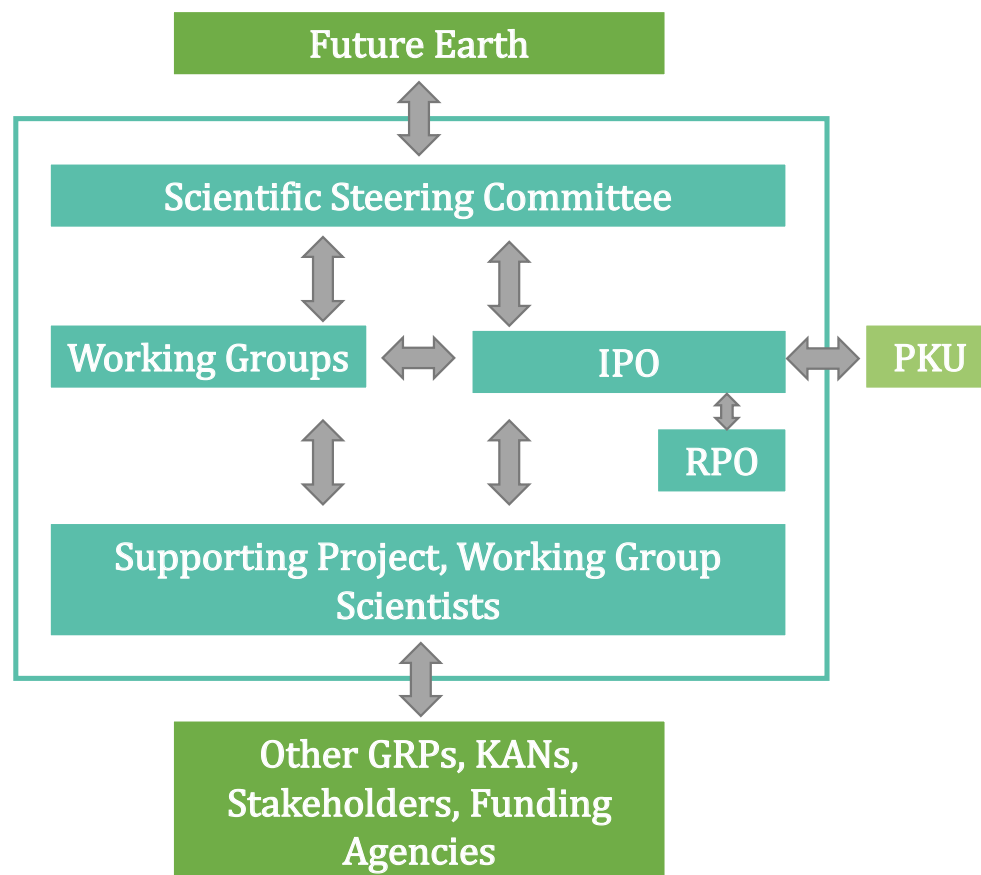
Guide, support and sponsors

SSC: MAIRS consortium is guided by a Scientific Steering Committee(SSC).

IPO: supported by an international project office(IPO).

Sponsors: Chinese Academy of Sciences(CAS), Institute of Atmospheric Physics, CAS (IAP), Peking University, Future Earth(FE)

MAIRS Structure





LEGACY

- **MAIRS-FE**

- Formally endorsed by Earth System Science Partnership in 2013.

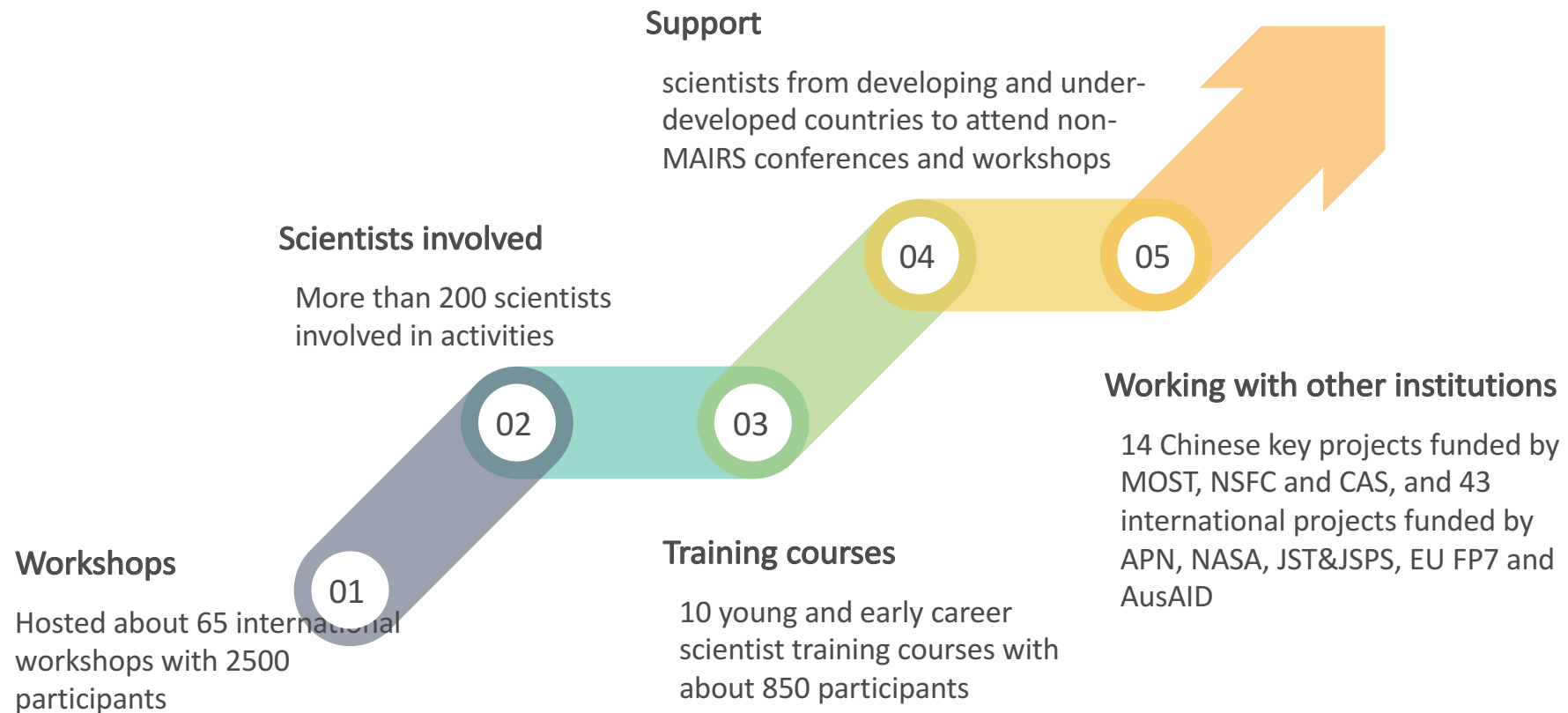
- **Research priorities**

- Human health in monsoon Asia
- Water, energy and food nexus
- Resilience to climate-related natural disasters





LEGACY





RECENT DEVELOPMENT:

Transition of MAIRS into a Future Earth's project, hosted by PKU since 2017



Vision

MAIRS aims to promote integrated regional studies across monsoon Asia, in order to

- Answer science question on
 - The resilience of the monsoon system to h activities;
 - The vulnerability of human societies to environmental change
- Promote collaboration across disciplines and regions
- Enhance scientific capacity across the region

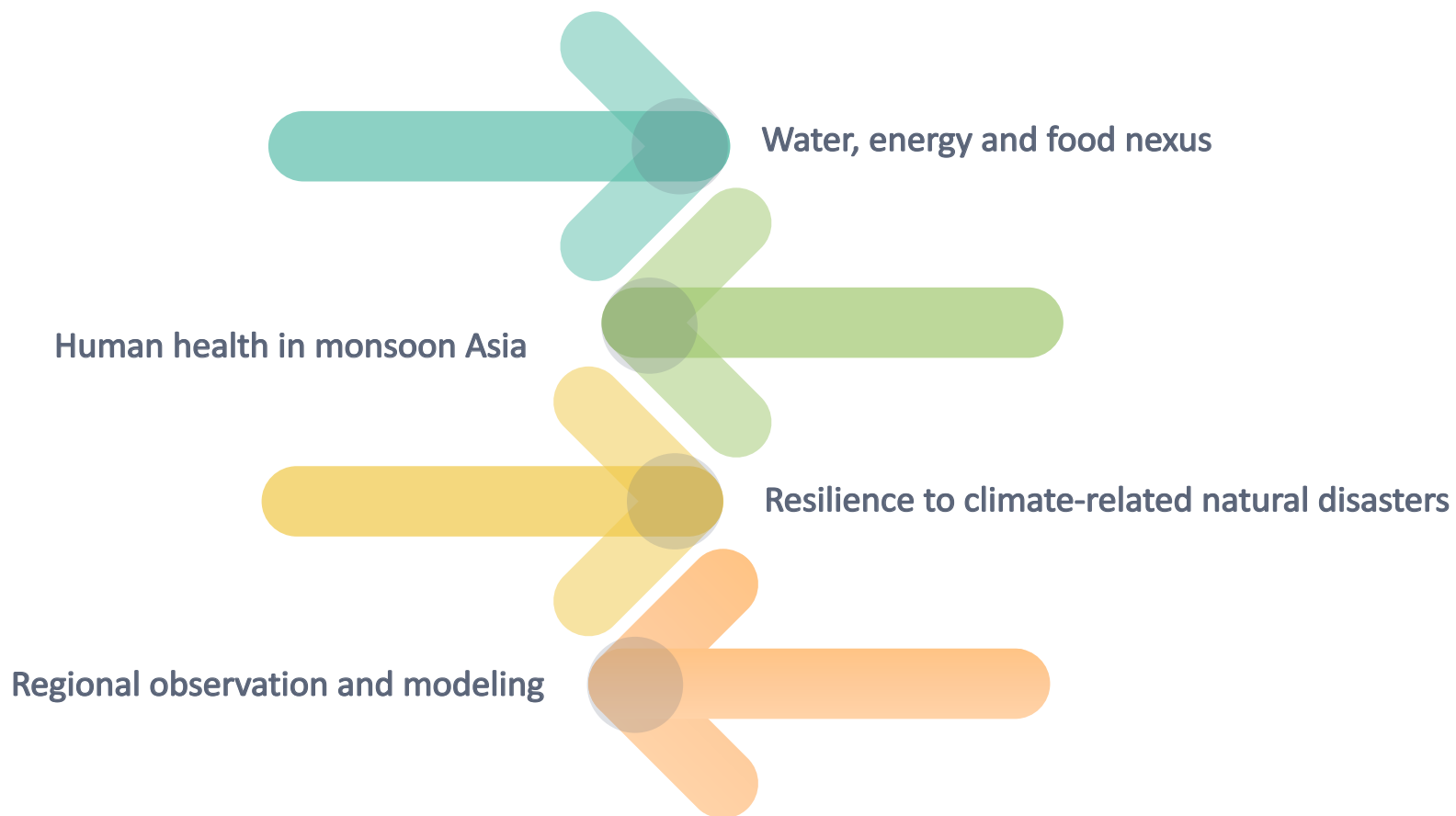
Vision

At Future Earth, we are convinced that the only way to accelerate transformations to a more sustainable and equitable planet is for the world to draw on its collective knowledge.



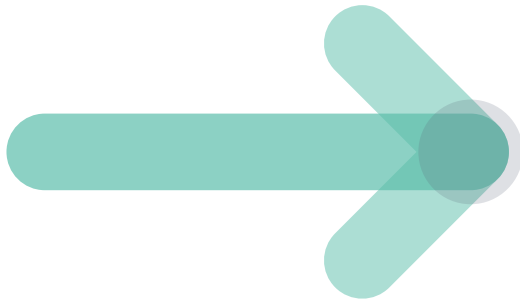


RECENT DEVELOPMENT: 4 working groups





Working groups



Aim to :

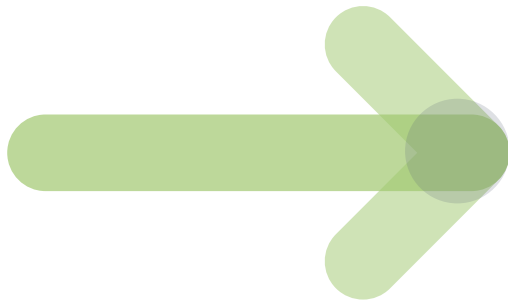
- Understand the cost and benefits at regional scale through cost and benefits analysis, including trade-offs and benefits, across sectors, communities and boundaries.

Water, energy and food nexus

- Climate patterns have noticeably changed, leading to more frequent floods and severe droughts that damage crops, affected fisheries and altered ecosystem services.
- WEF Nexus has become an effective way to address the complex and interrelated issues of sustainable natural resource management. It provides a conceptual approach to better understand and systematically analyze the interactions between the natural environment and human activities in order to achieve optimal management strategies to meet the UN SDGs.



Working groups



Aim to :

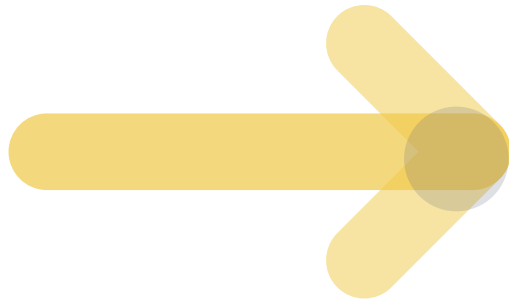
- Through regional assessment and analysis, to identify the health risk of air pollution, analyze the cost and benefits of air quality management and/or climate mitigation policies in Monsoon Asia, especially those countries with greatest health burden.

Human health in monsoon Asia

- Ambient air pollution was estimated to cause 4.2 million premature deaths worldwide per year in 2016, with the highest numbers in South and East Asia (WHO, 2018).
- In 2013, cost of exposure to ambient and indoor air pollution in South and East Asia is equivalent to 7.4 and 7.5 per cent of their GDP respectively.
- To understand and reduce health impact of air pollution at both regional and local level is very important for Monsoon Asia countries.



Working groups



Aim to :

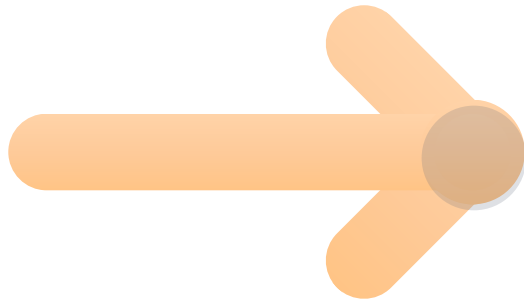
- Through study and demonstration, regional assessment and analysis, to enhance the resilience of local communities to natural disasters, associated with greater cooperation across the region to improve communication and understanding.

Resilience to climate-related natural disasters

- Asian countries are among the most at risk to climate-related disasters. From 1970 to 2014, about 6 billion people in the region were affected by disasters with floods and droughts.
- Economic losses increased by almost 15 times since 1970 while the region's GDP only grew 5 times.
- Research on mechanisms of natural disasters, on the impacts of disasters on natural and societal systems, and on responses to mitigate and adapt to disasters is relevant across monsoon Asia.



Working groups



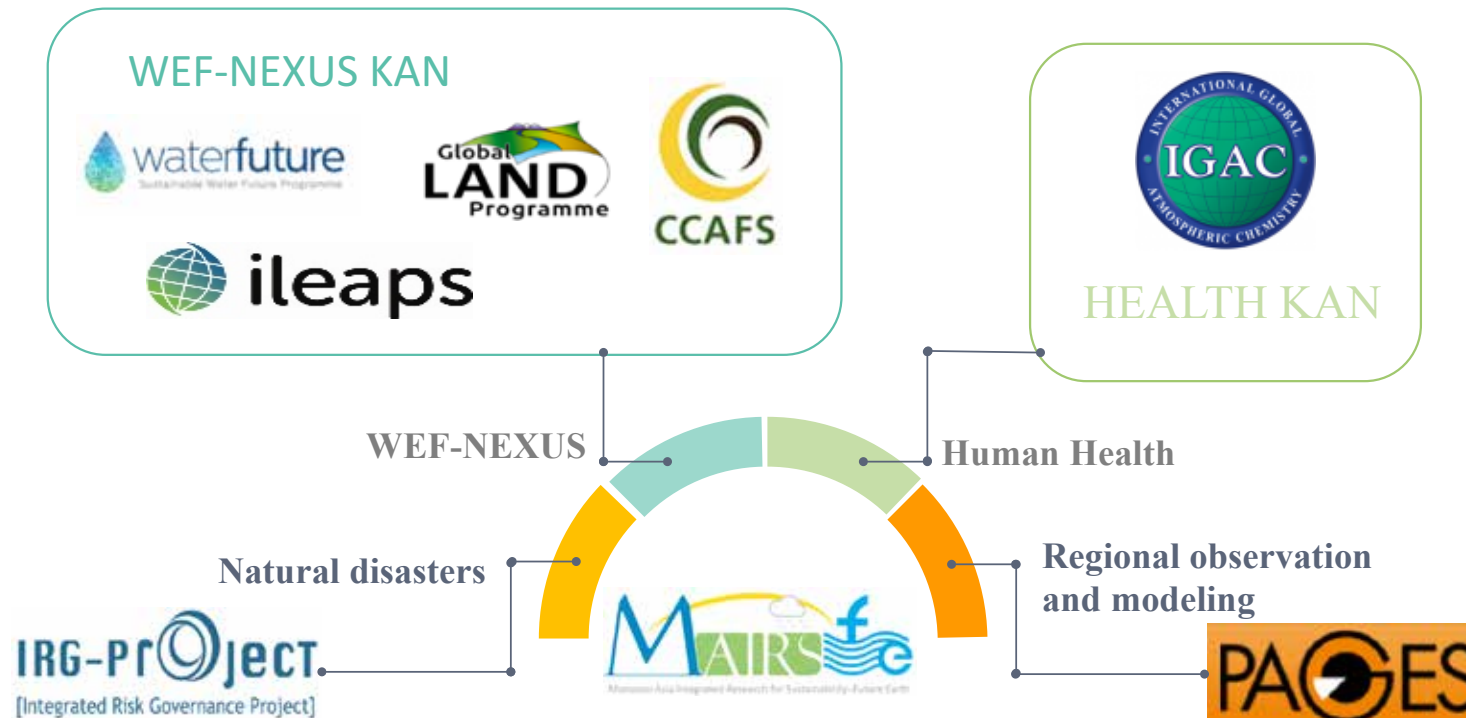
Aim to :

- Provide input on climate-related information for the three main themes of MAIRS-FE
- Promote application of modeling and research outputs
- Address gaps in observations and data exchanges

Regional observation and modeling

- There are needs for climate information and tools for the three themes, which can be well served by modeling and observation, for example, the Coordinated Regional Climate Downscaling Experiment (CORDEX) Asia, where GCMs were considered as climate system modeling. Earth System Modeling (ESM) can be also considered.

Networking - FE Community



2019 Activities

- The 2019 SSC Meeting, 21-22 May, Nanjing
- The Workshop on Food, Land, Energy and Water System in Asia, 23-25 May, Nanjing
- The 8th Congress of the East Asian Association of Environmental and Resource Economics, 2-4 Aug 2019, Beijing
- Interactive workshop with a focus on water, air, food and energy, 23 Sep, DCCC, Bangalore
- The CORDEX 2019 Side Event– 17 Oct 2019, Beijing
- The Beijing Forum - Sub-forum themed on Environment and Health, 1-3 Nov 2019, Beijing
- Regional Training Hub Activities: Asian Hub for WEF Nexus Study; Training for Clean Air (Qatar, Indian, Pakistan etc.)



Thank You

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INTRODUCTION: Approach



Co-design & Co-production

- Rooted in the local level, in collaboration with local scientists and community
- Bottom-up approach to conduct tailored research and capacity building activities based on needs
- Applied in local community and scaled up as regional solution



Multi-disciplines & Multi-stakeholders

- Focused on cross-cutting global change issues
- Established links across disciplines and between regional and global research communities,
- Engaged with government officials and community groups



Synergies

- Interaction and/or cooperation with other GRPs and KANs will result in synergies through information and data sharing
- GLP, iLEAPS, IGAC, PAGES, IRG, CCAFS, WATER FUTURE, WEF Nexus & Health KAN, CORDEX etc.