



INTERNATIONAL RESEARCH CENTER OF BIG DATA  
FOR SUSTAINABLE DEVELOPMENT GOALS  
可持续发展大数据国际研究中心

# Big Earth Data in support of environmental SDG indicators

Lei Huang, Yu Chen

CBAS

Oct 25, 2023

# Who We Are---CBAS

International Research Center of Big Data for Sustainable Development Goals



**Our Vision in Brief:** open data, accessible technology, shared ideas and knowledge

- *An Expert Committee & An International Advisory Committee of*
  - *46 Leading Experts from*
    - *12 Countries*

- *Five Scientific & Operational Branches of*
- *190 Scientists & Staffs*
- *232 Graduate Students*
- *86 Guest Researchers*

**International Research Center  
of Big Data for Sustainable  
Development Goals**



可持续发展大数据国际研究中心  
INTERNATIONAL RESEARCH CENTER OF BIG DATA  
FOR SUSTAINABLE DEVELOPMENT GOALS



# Our Capability in Facilitating SDG Implementation



## Facilitating SDG Implementation

### Infrastructure

- SDG Big Data Platform

### Data & Products

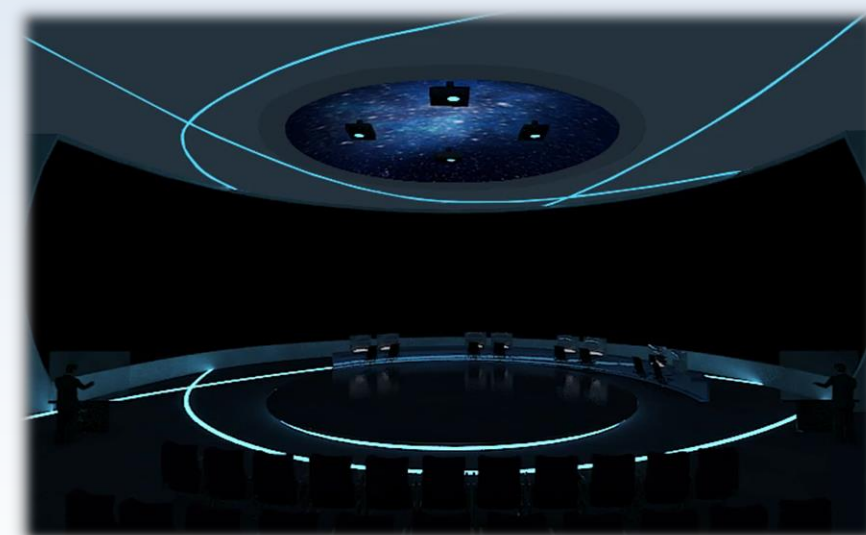
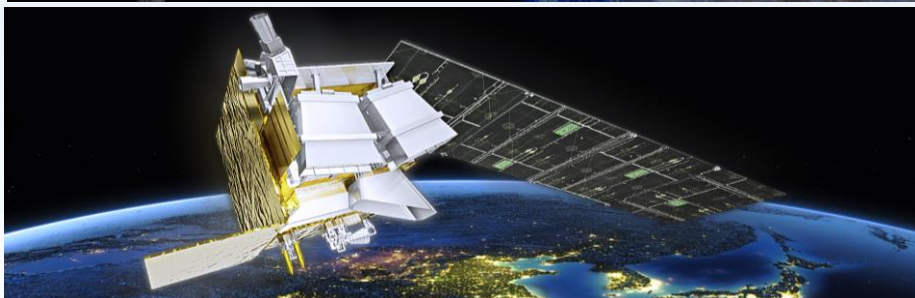
- Data Products
- SDGSAT-1

### Knowledge

- Scientific Reports

### Partnership

- Build global network



# Sharing Knowledge through Scientific Reports

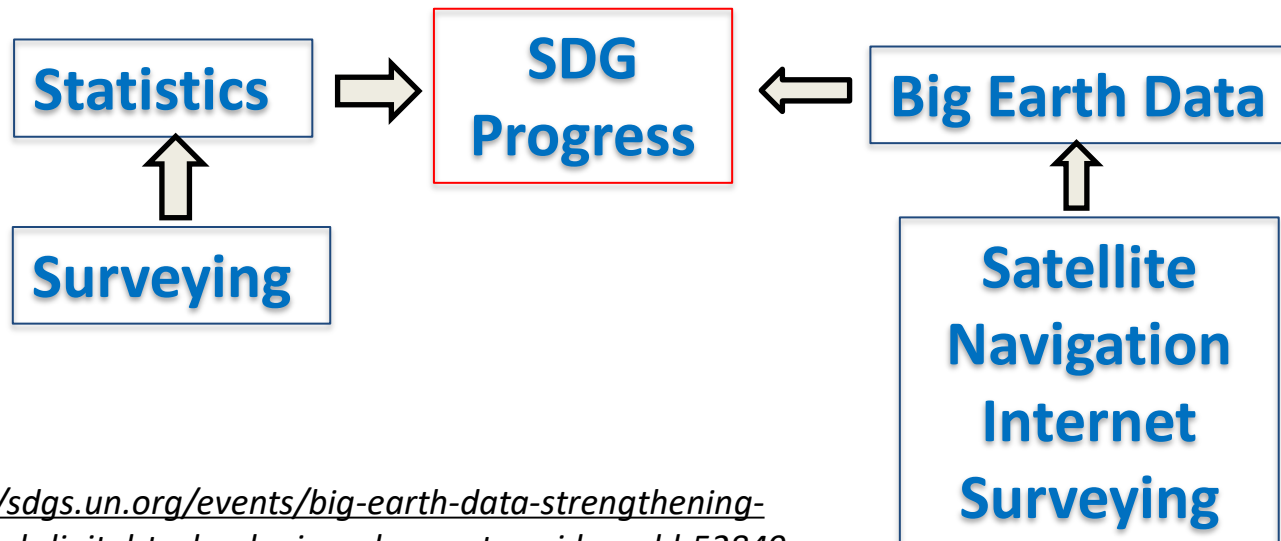


*The Big Earth Data in Support of SDGs Reports have been released annually since 2019*

- ◎ **147 Case Studies** to provide decision support
- ◎ **116 Data Products** to fill in data gaps
- ◎ **79 Innovative Methodologies** to monitor SDG progress



Big Earth Data in Support of SDGs (2019, 2020, 2021, 2022, 2023)



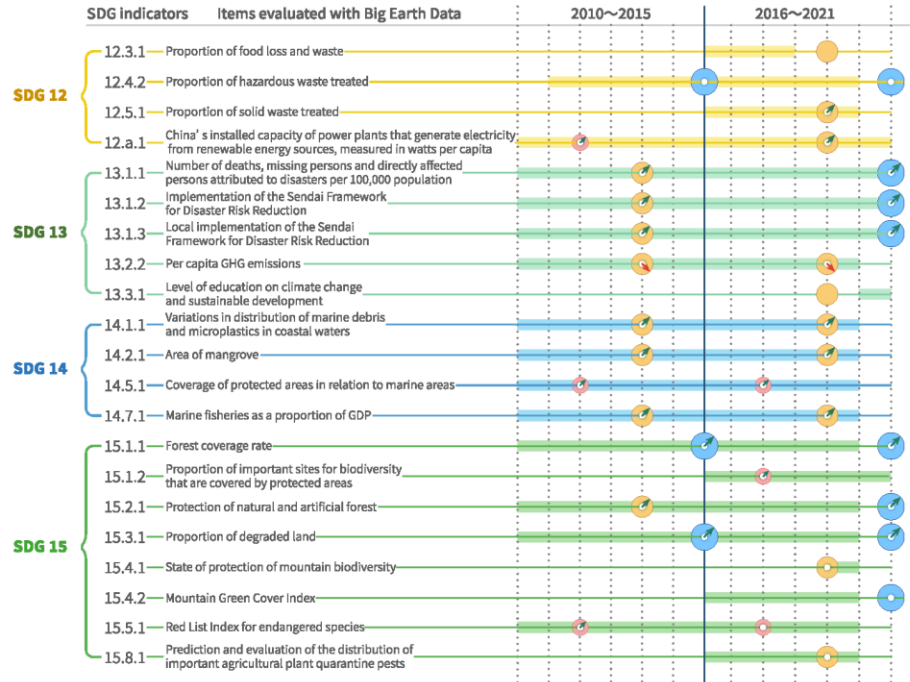
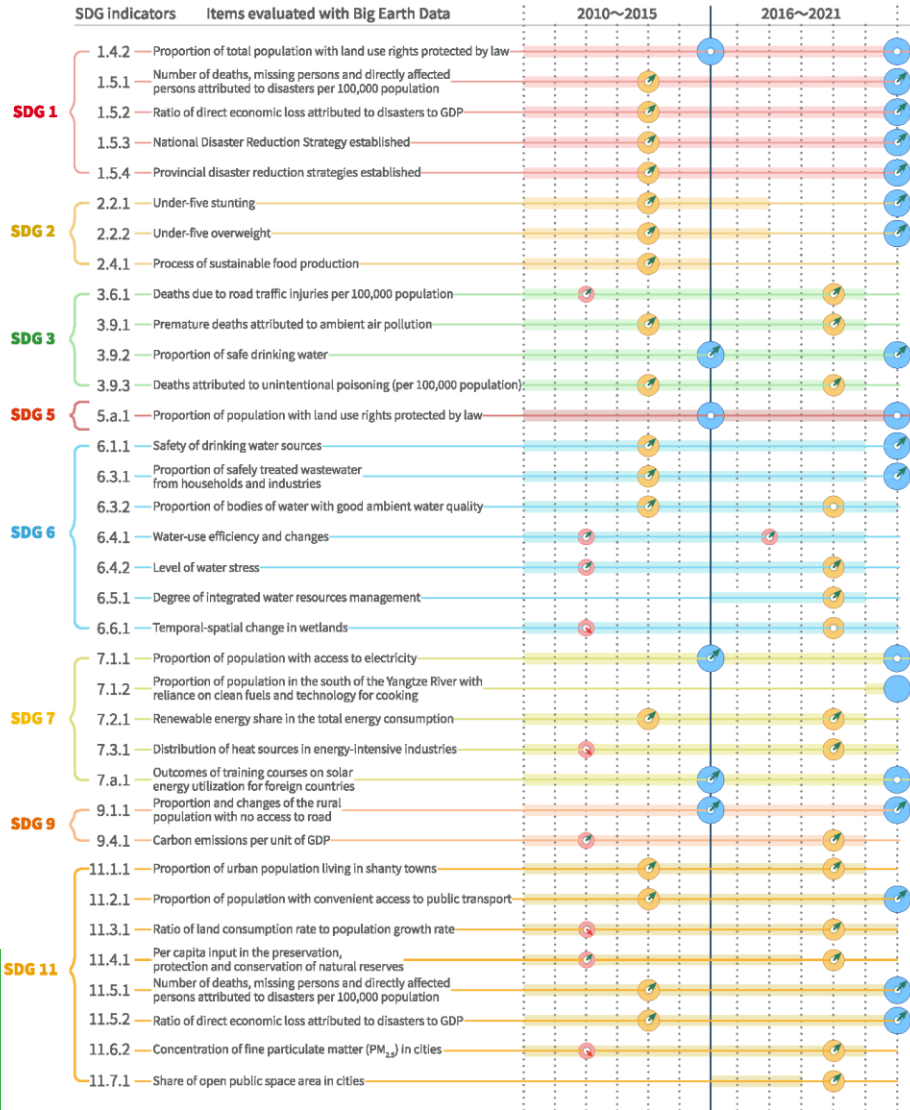


# Midterm progress of environmental indicators in China



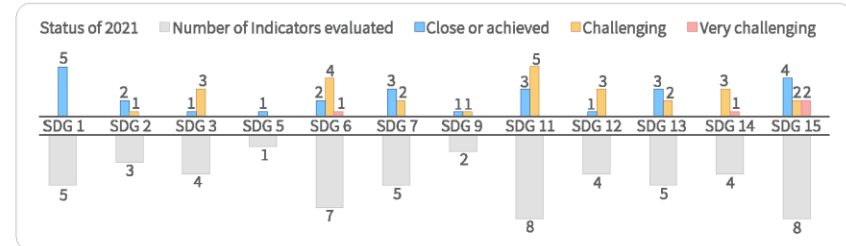
➤ All of the 92 environmental indicators have been evaluated;

➤ Half of them are close to or have achieved the 2030 targets.



● Very challenging ● Challenging ● Close or achieved ● Improving ● Stable ● Worsening

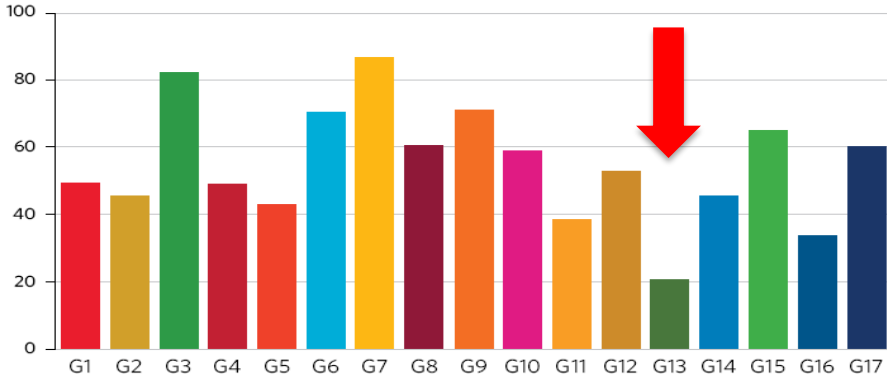
The length of bars in dark indicates the years covered by data during the period of 2010-2021



# Method and data sources--Take SDG 13 as an example



Proportion of countries or areas with available data since 2015, by Goal (percentage)



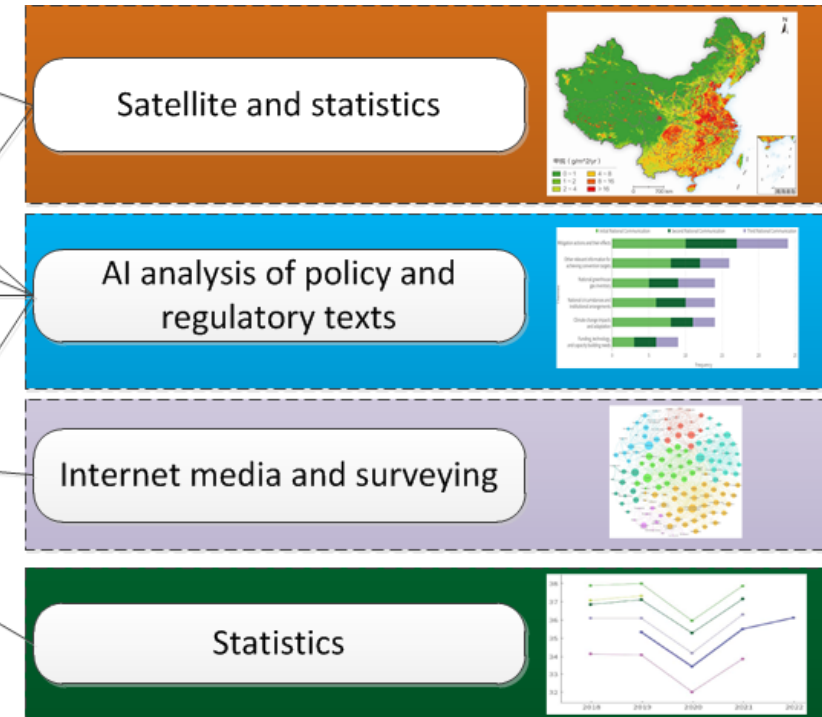
SDG 13 Climate Action is the most data-deficient among all 17 SDGs (UN SDG report 2022)

We evaluated all of the 8 indicators in SDG 13 using different sources of data

SDG 13 Climate Action

- SDG 13.1.1 Population loss/affected in disasters
- SDG 13.1.2 Nation disaster reduction strategy
- SDG 13.1.3 Local disaster reduction strategy
- SDG 13.2.1 National adaption strtegy
- SDG 13.2.2 GHG emission
- SDG 13.3.1 Climate change education
- SDG 13.a.1Funding for climate change
- SDG 13.b.1National adaption strategy

Great challenge      Challenge      Close to be achieved



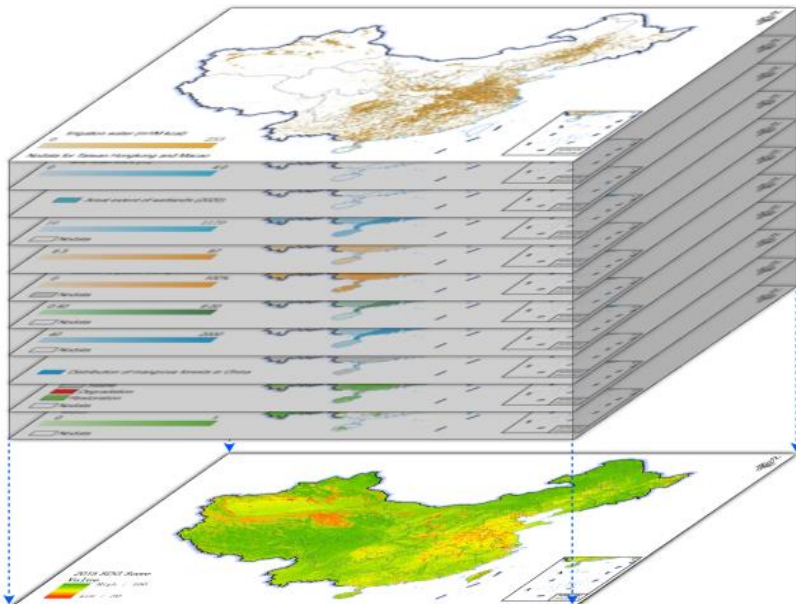


# Midterm progress – spatial temporal information

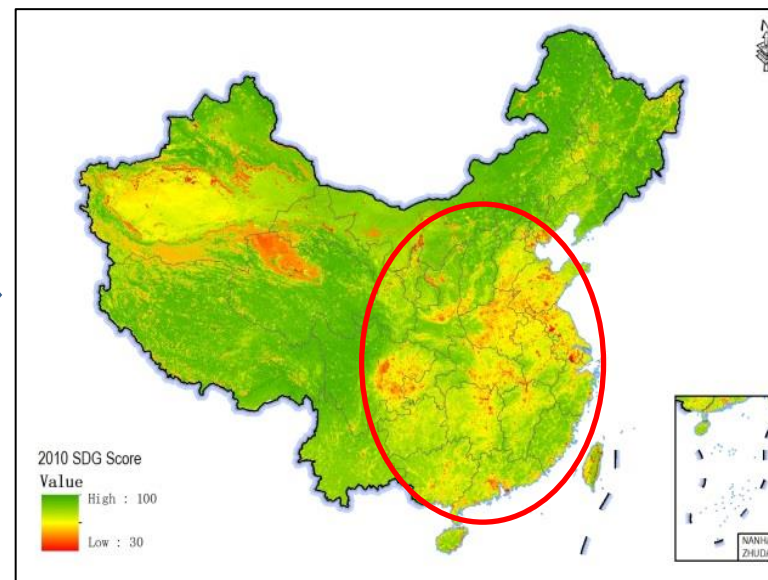


- The indicators with spatial-temporal information are integrated together, to evaluate the spatial imbalance and temporal change of the indicators.
- The changes are clear during 2015-2022, especially in the southern and eastern parts.
- The spatial temporal information also shows the nature characteristic of different regions, and provide the spatial-based solution to promote local SDGs.

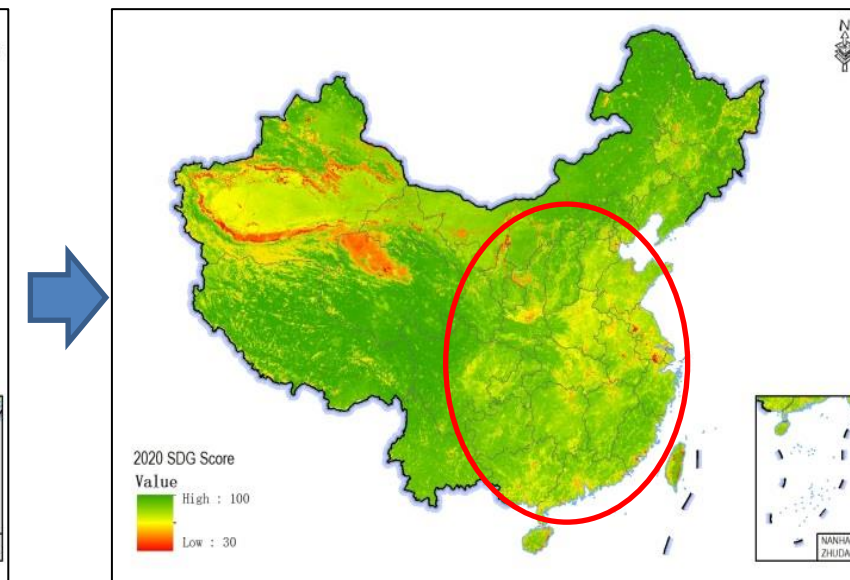
Integration of different indicators



SDG State in 2015 of China



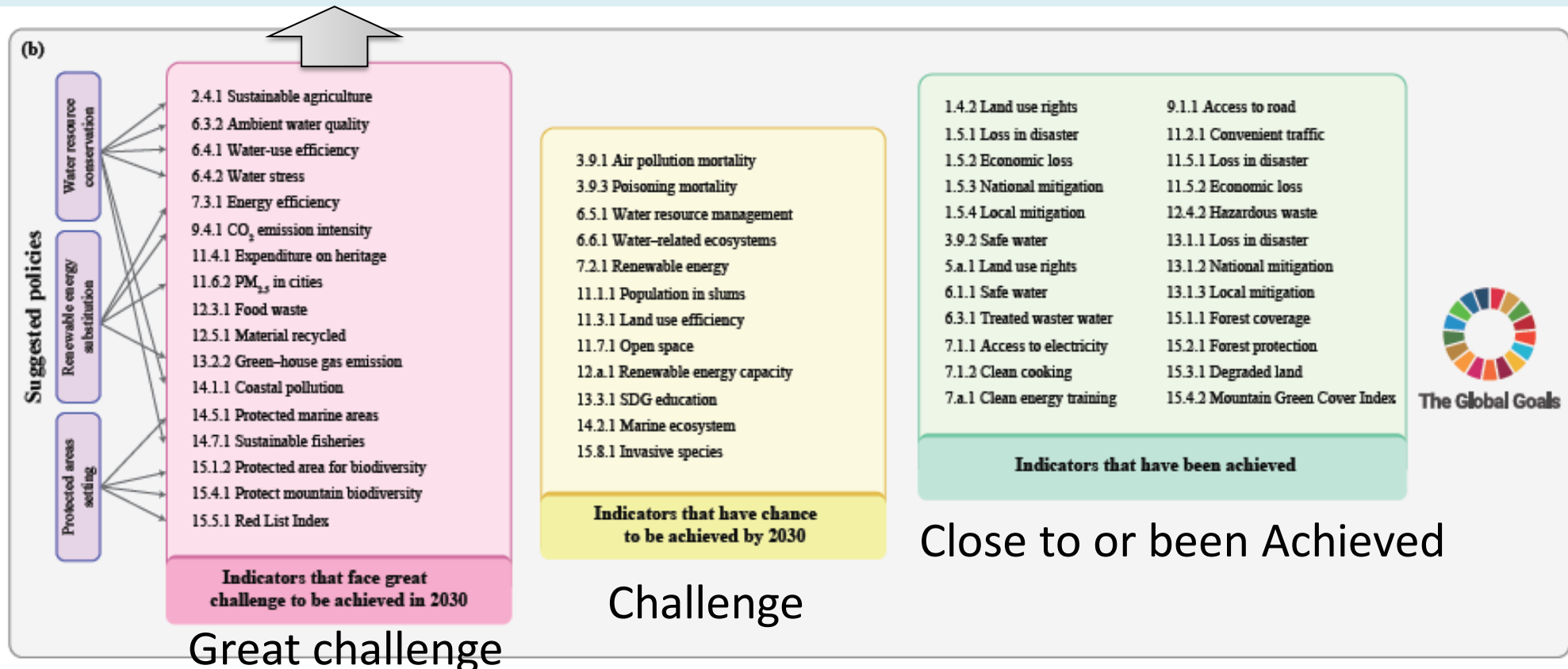
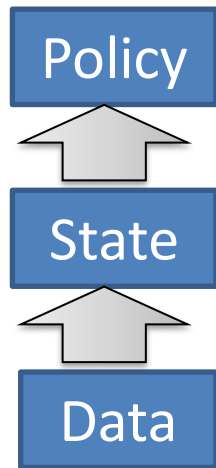
SDG State in 2022 of China



# Midterm progress – Policy suggestions



- Strictly implement water resource conservation and protection (for indicator 6.4.2, 6.4.1, 6.3.2, 14.1.1, and 14.7.1).
- Continue to increase the substitution of renewable energy for fossil energy (for indicator 7.2.1, 12.a.1, 7.3.1, 9.4.1, 13.2.2, and 11.6.2).
- Set up more protected areas to improve marine and terrestrial biodiversity (for indicator 14.5.1, 15.1.2, 15.4.1, 15.5.1).

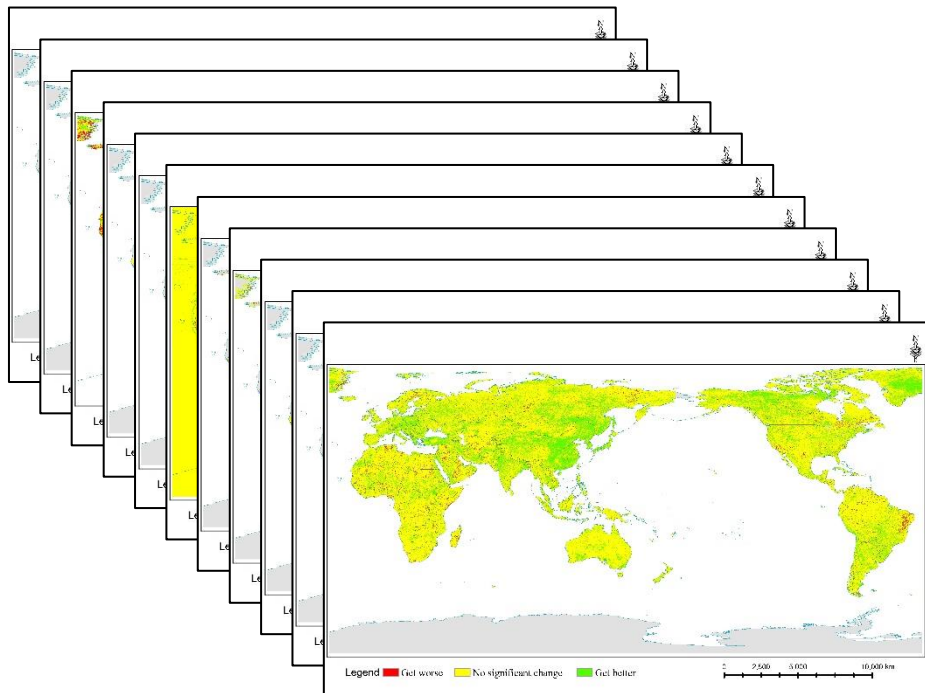




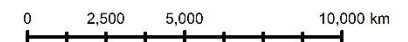
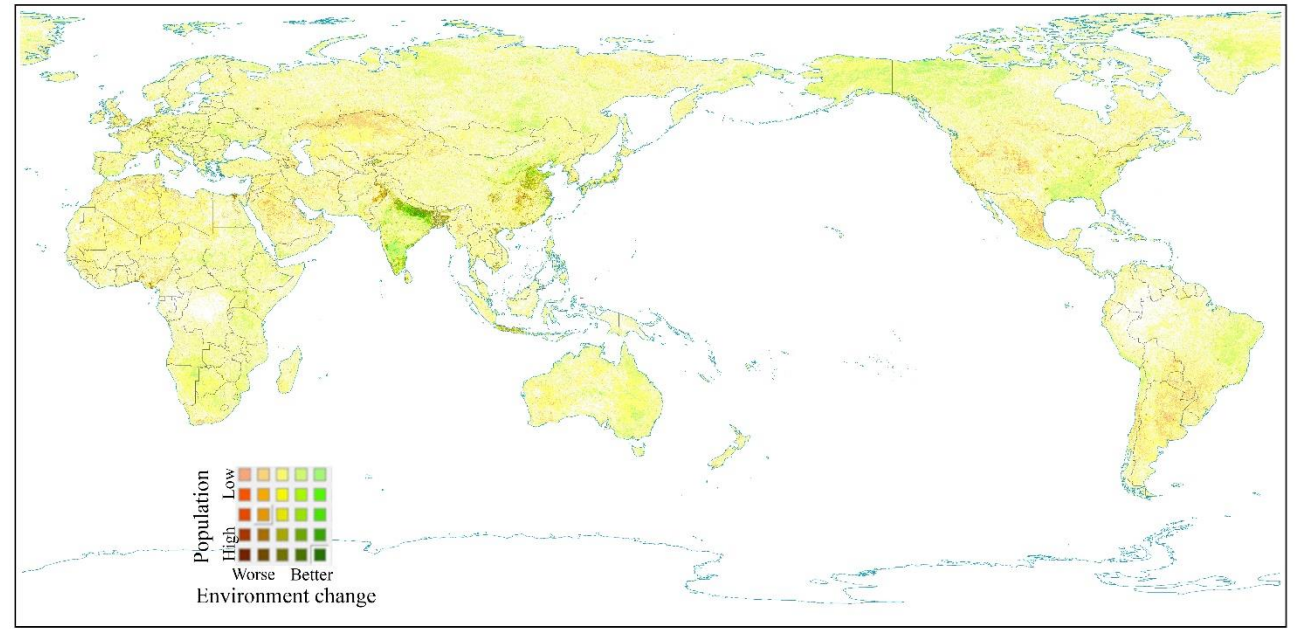
# Global environmental changes and stress



- By integrating various environmental indicators, we are trying to analyze the global environmental state and trends since 2015;
- We are also analyzing the environmental stress from population, economic growth;



Global SDG state of 20 environmental indicators 



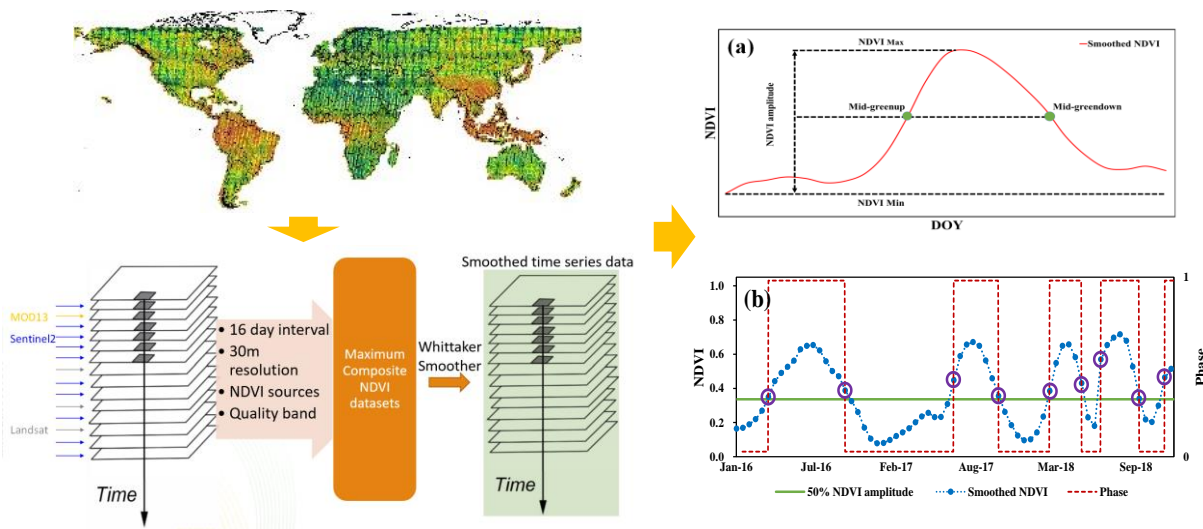


# SDG 2 Zero Hunger



## SDG 2.4.1 Cropping intensity and gaps

- In 2020, most of the global cropland is single cropping, and **only 14.4% is double cropping.**
- If we can fully unleash the potential of the cropland, it is **expected to increase 0.23 billion tonnes of grain,** equivalent to 6.4% of the current **global** production.



Flow chart of methodologies



Single cropping Double cropping Triple cropping or above

Global cropping intensity

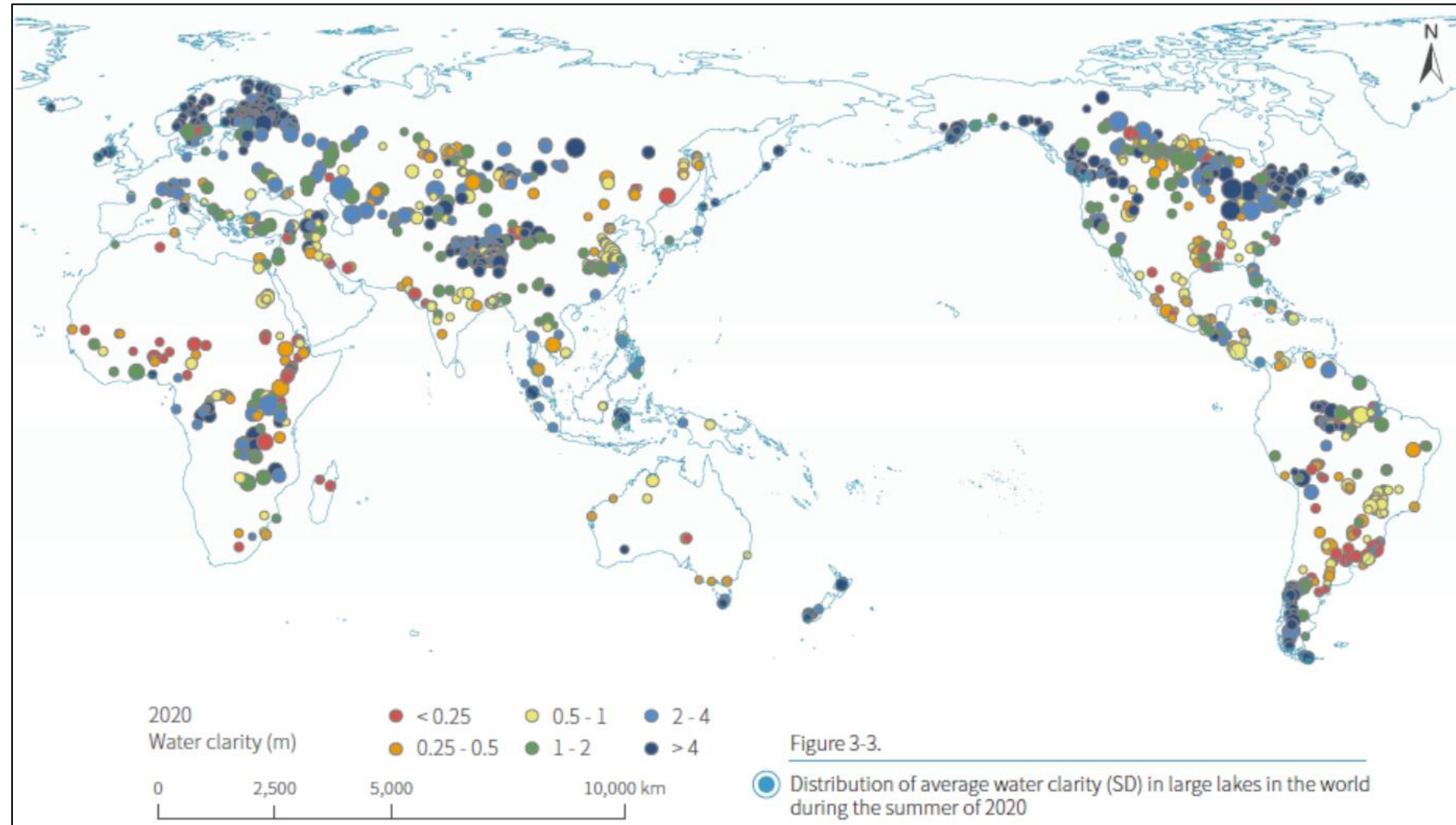


# SDG 6 Clean Water and Sanitation



## SDG 6.3.2 Surface water bodies quality

- Compared with 2015, an overall **increasing trend in the clarity** of large lakes in the world was observed in 2020;

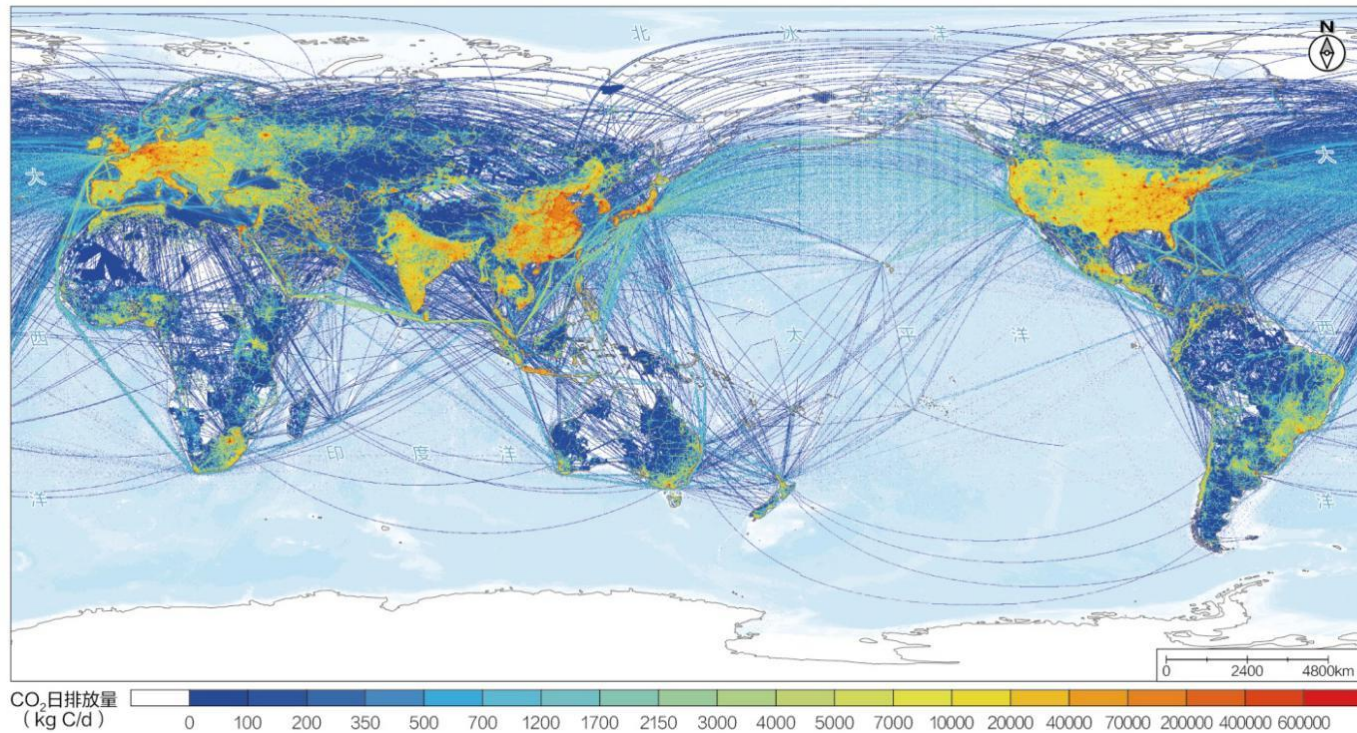




# SDG 13 Climate Action



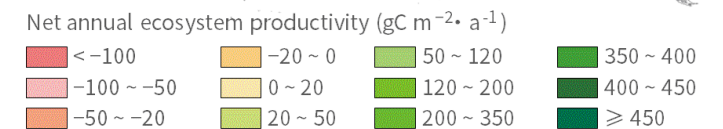
## SDG 13.2.2 Carbon emission and sink



↑ Global carbon emission in 2022

- Global human-induced carbon emissions rebound to the pre-pandemic level in 2021, and then further increase by 1.5% in 2022.
- **Global carbon sink (terrestrial NEP)** showed a **significantly increased** trend from 2000 to 2020 (0.05 Pg C/a,  $p < 0.05$ ).

Average → distribution of global carbon sink during 2000-2020

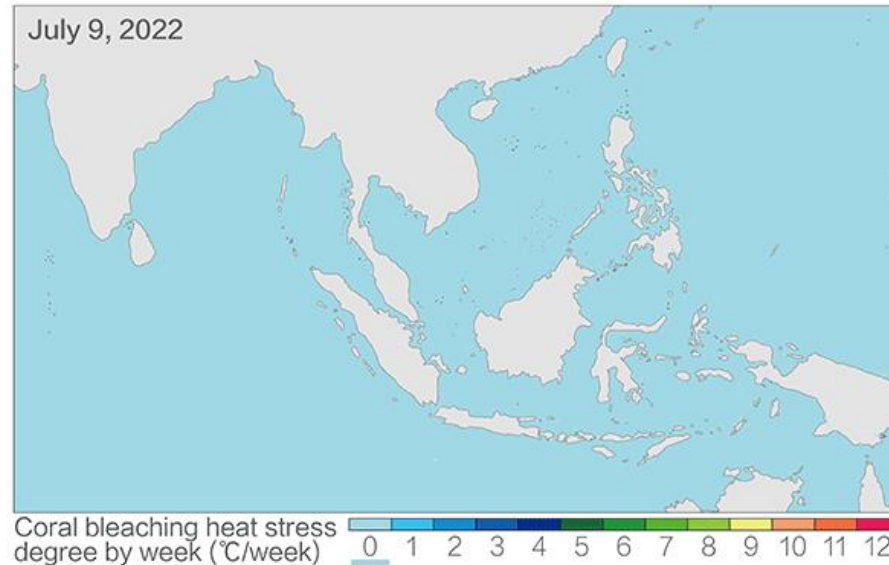




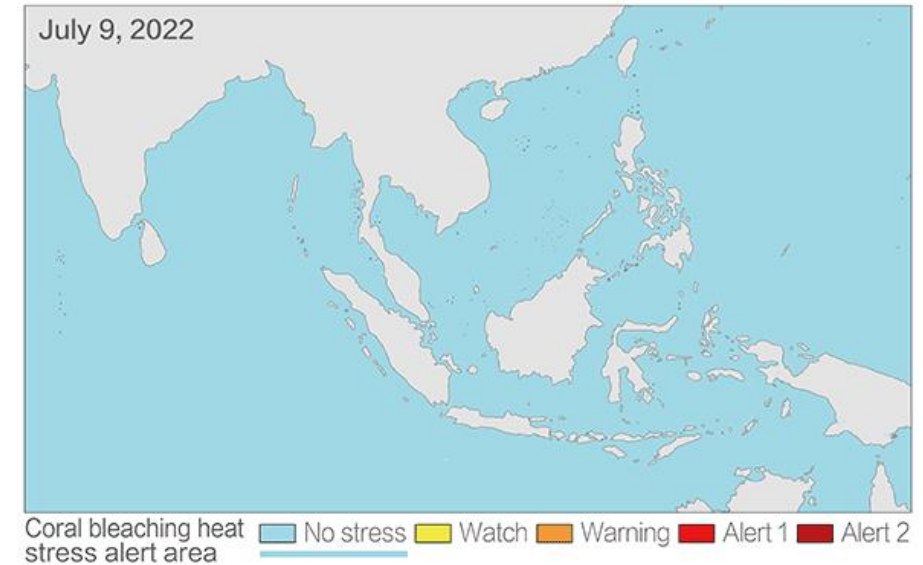
## SDG 14.2.1 Marine thermal Environment



Coral Bleaching Heat Stress Degree Heating Week



Coral Bleaching Heat Stress Alert Area



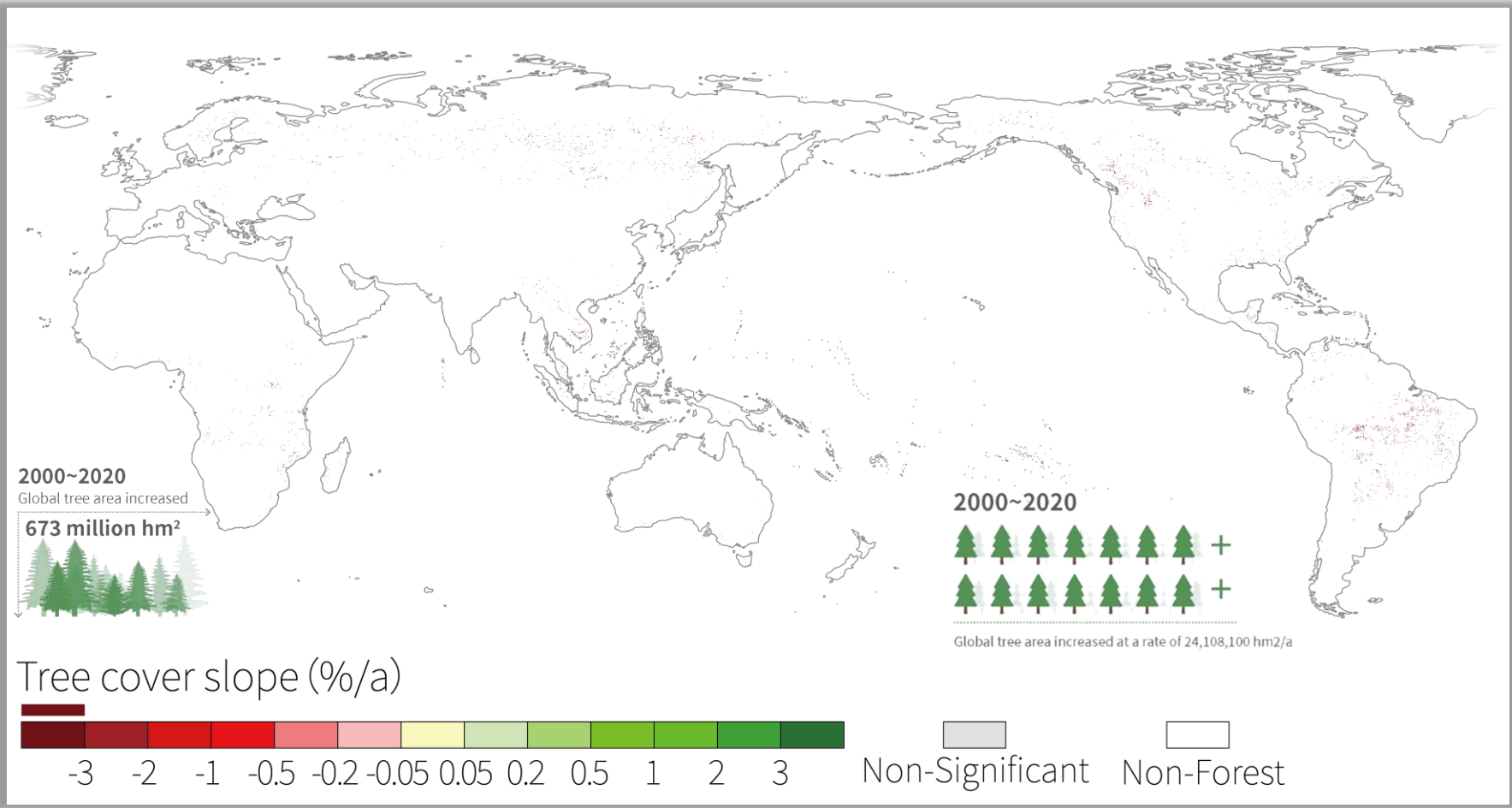
- We integrate satellite and ocean reanalysis data for a **3D coral reef bleaching thermal environment system** to provide support for regional coral reef protection.



# SDG 15 Life on Land



## SDG 15.1.1 Forest Area



- Global tree cover increased by **673 million hm<sup>2</sup>** from 2000 to 2020 with different patterns across the world.





INTERNATIONAL RESEARCH CENTER OF BIG DATA  
FOR SUSTAINABLE DEVELOPMENT GOALS  
可持续发展大数据国际研究中心

## Big Earth Data for People, Planet and Prosperity.



Scan the QR code for the full report

huanglei@radi.ac.cn

