GROUP ON EARTH OBSERVATIONS

GEOGLAM
Global Agricultural Monitoring

WG5 Agriculture and Food Security

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Agriculture was successful in 20th century

	1961	2003	
• Wheat	1.1 t/ha	2.9 t/ha	(2.7 times)
• Rice	1.9 t/ha	4.0 t/ha	(2.1 times)
• Corn	1.9 t/ha	4.7 t/ha	(2.4 times)

• Population	3 billion	6.3 billion	(2.1 times)

• Labor (hrs/ha)*	1,750hrs	250hrs	(1/7th)

FAO statistics * Case of Japan

1 ha = 2.5 acre

But its sustainability is being terrified

because the success depended on high input of chemicals and high resource consumption, causing

- **Serious impacts on environment**
  - Water pollution, soil degradation
  - Water and land shortage
- **Low energy use efficiency**
- **Food safety and reliability issues**

In addition, climatic change and frequent extreme weather events are now destabilizing crop productivity

Agriculture in 21st century

- **Food demand is still increasing while facing water/land shortage, environmental degradation and climatic change**
  - Population growth by 200,000 per day
  - Usage of crops for bio-fuel and diet transition to meat

- **For real sustainability of food production, a paradigm shift from maximization to optimization is needed for**
  - Sufficient productivity
  - Profit performance
  - Low impact on environment
  - Sustainable resource management
  - Food safety
  - Robustness and best management against climatic change

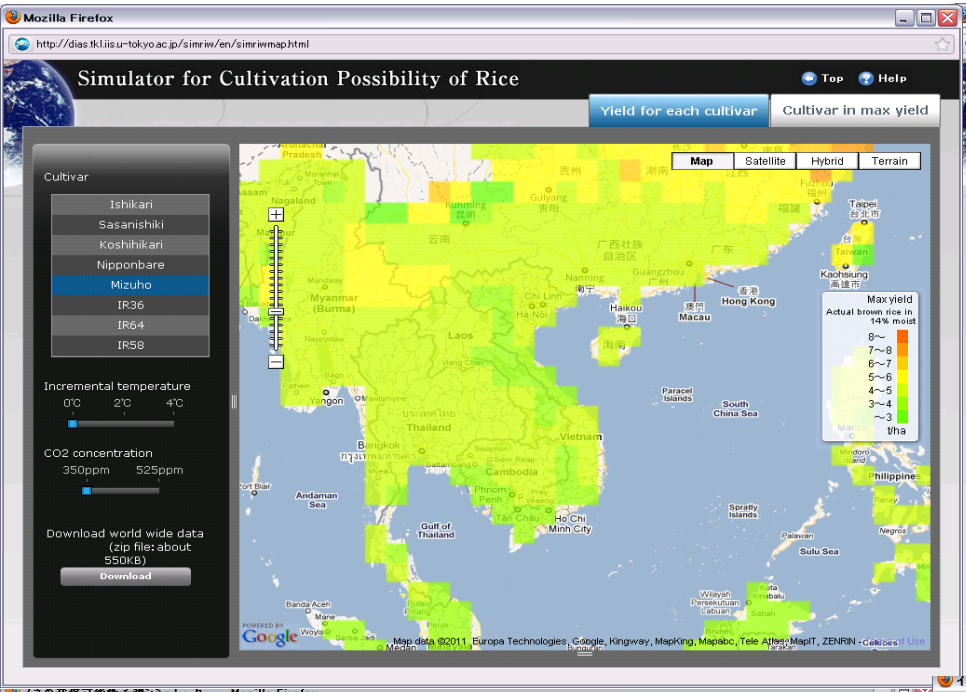
For such optimization, earth observations are essential

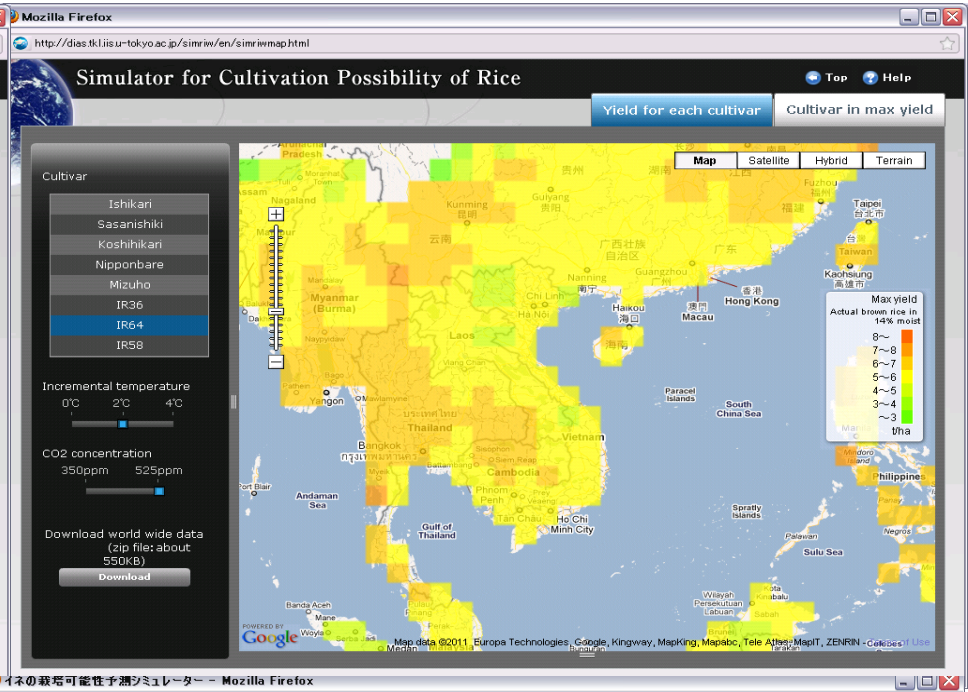
- **Crop monitoring and yield prediction**
  - Crop models
- **Assessment of available resources**
  - Water and arable land
- **Monitoring of agro-meteorological conditions**
  - Precipitation, solar radiance, soil moisture, temperature
- **Assessment of agricultural damages/risks by**
  - Flood, drought, heat, coldness, etc.
- **Best policy making/governance and farm managements for optimization**
  - Global level and regional level best policy
  - Farm level site-specific best management practice

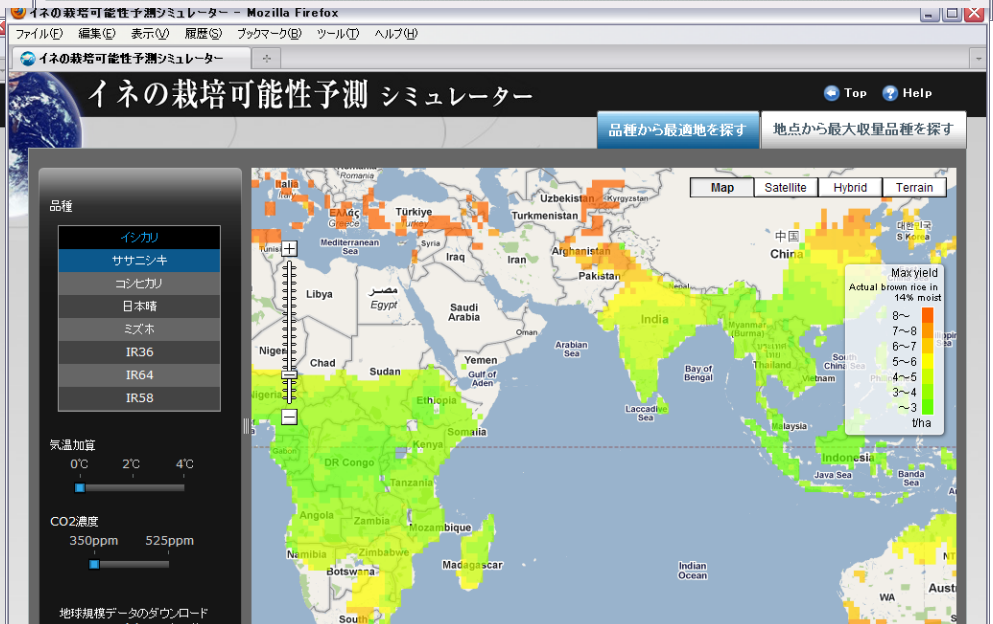
For such observations, we need

- **Enhancement of the observations for agricultural purposes**
  - Water supply potential, soil moisture, solar radiation, etc.
- **Mutual complements of satellite and ground observations**
  - Wide, uniform and simultaneous observation by satellite
  - Ground truth by land surface monitoring
- **Models and data integration**
  - Agricultural cloud to share data and applications
  - Platform to exchange data seamlessly
- **Development of institutional framework in agriculture to collaborate among different domains for global and regional best practices**

Global scale rice productivity simulation model







Working Group Discussion Themes

- **Best practices of earth observations for sustainable and optimized food production for green growth**
  - Development of collaboration scheme within GEO as well as with other international projects including FAO AFSIS and WMO CAgM.
  - Clarification of short-term and long-term goals
  - Integration of satellite and ground agricultural observations
  - Capacity building and knowledge sharing
  - Provision of comments and suggestions to the GEO GLAM project work plan from Asia Pacific region, especially for rice crop monitoring


Thank you very much