

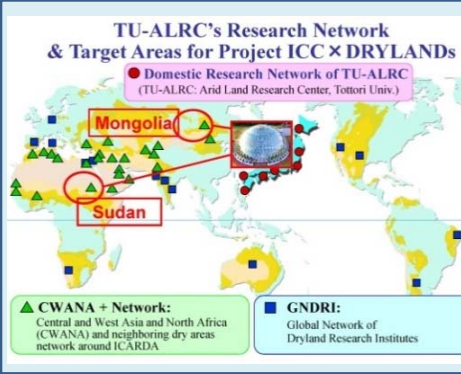


**[Motivation of the Project]**

- **Drylands are home to 35 % of the global population**, but major parts of them are now in unstable state such as Arab Spring, having a world-wide influence. One chief cause of it must be in poverty and food shortage due to their fragile environment. Furthermore, we can expect an increase of the fragility due to climate change. We aim to contribute better life in drylands by a development of adaptation technologies.
- **Drylands play an important role in global food security.** One example is most wheat consumed in Japan is imported from drylands. We aim to contribute more tough food security through the project.
- **UNCCD.** Japan is a member of UNCCD. We aim to contribute it in aspects of science and technology, and development of human resources through a promotion of interdisciplinary and international joint researches.

**[Past Activities]**

- **Project Asian Dust:** Assessment and control of dust emission in degraded drylands of East Asia
- **Project Marginal Region Agriculture:** Development of crop husbandry technology in marginal rainfed environment using dryland plant resources toward sustainable improvement in global marginal regions



**Implementing Body: TU-ALRC, the Center for Dryland Science of JURC (Joint Usage/Research Center) of Japan's MEXT (Ministry of Education, Culture, Sports, Science & Technology)**

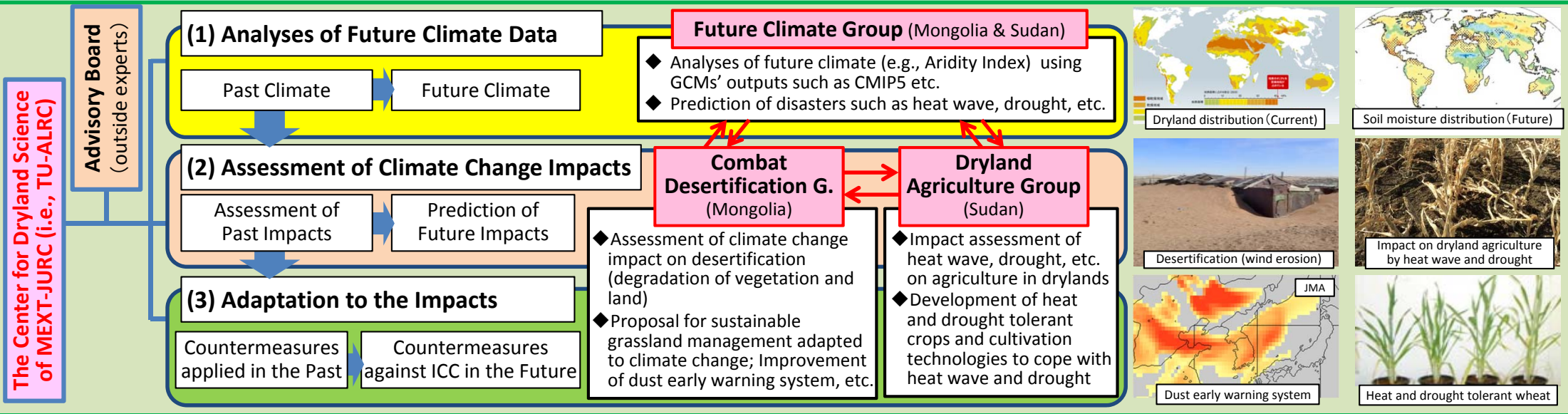
- International joint researches utilizing TU-ALRC's research network
- Check and evaluation by the advisory board
- Public offering Joint researches related with climate change and dryland sciences under the MEXT-JURC system (Japanese organizations only)

**[New Challenges]**

- **Project ICC x DRYLANDS:** Assessment of climate change impacts (ICC) on desertification and agriculture in drylands, and development of adaptation technologies

**Overseas Collaborative Organizations**

- **Mongolia:** Information and Research Institute of Meteorology, Hydrology and Environment (IRIMHE)
- **Sudan:** Agricultural Research Corporation (ARC), Sudan Meteorological Authority (SMA)



**Expected Achievements**

- **Academic Effect:** Assessment of climate change impacts on drylands, and development of adaptation technologies (e.g., heat tolerant crop)
- **Social Impact Effect:** Contribution to UNCCD; sustainable development in drylands; Food security; Mitigation of damages from sand-dust storm, etc.
- **Improvement Effect:** Improvement of adaptation technologies developed in TU-ALRC; Promotion of interdisciplinary and international joint researches

Groups and their Roles			FY2017 (FY H29) April 2017– March 2018	FY2018 (FY H30) April 2018– March 2019	FY2019 (FY H31) April 2019– March 2020	FY2020 (FY H32) April 2020– March 2021	FY2021 (FY H33) April 2021– March 2022	
<b>Future Climate Group</b> [FCG]	<b>Analyses of Future Climate and Climatic Hazards (Heat Wave, Drought, etc.)</b>	<ul style="list-style-type: none"> <li>Analyses of future climate (e.g., Aridity Index) using GCMs' outputs such as CMIP5 etc.</li> <li>Prediction of disasters such as heat wave, drought, etc.</li> </ul>	(Core Research)					
			<div style="border: 1px solid black; padding: 5px; text-align: center;">Analyses of Future Climate</div>	<div style="border: 1px solid black; padding: 5px; text-align: center;">Prediction of Climatic Hazards</div>				
			<div style="border: 1px solid black; padding: 5px; text-align: center;">Joint Research</div>	<div style="border: 1px solid black; padding: 5px; text-align: center;">Joint Research</div>	<b>Proposal of Combat Desertification &amp; Dryland Agriculture Technologies Adapting to ICC</b>			
<b>Combat Desertification Group</b> [CDG]	<b>Assessment of Climate Change Impacts and Adaptation to them</b>	<p><b>[Assessment]</b></p> <ul style="list-style-type: none"> <li>Assessment of climate change impact on desertification (degradation of vegetation and land)</li> </ul> <p><b>[Adaptation]</b></p> <ul style="list-style-type: none"> <li>Proposal for sustainable grassland management adapted to climate change; Improvement of dust early warning system, etc.</li> </ul>	(Core Research)					
			<div style="border: 1px solid black; padding: 5px;"> <b>Assessment of Climate Change Impact on Desertification</b>  <small>(Past &amp; Present) Review, Field Survey</small> </div>	<div style="border: 1px solid black; padding: 5px;">           Estimation of Future Climate Impact         </div>		<div style="border: 1px solid black; padding: 5px;"> <b>Improvement of Combat Desertification Technologies</b>  <small>using FCG's results (sustainable grassland management, dust early warning system)</small> </div>		
			<div style="border: 1px solid black; padding: 5px; text-align: center;">Joint Research</div>	<div style="border: 1px solid black; padding: 5px; text-align: center;">Joint Research</div>				
<b>Dryland Agriculture Group</b> [DAG]	<b>Assessment of Climate Change Impacts and Adaptation to them</b>	<p><b>[Assessment]</b></p> <ul style="list-style-type: none"> <li>Impact assessment of heat wave, drought, etc. on agriculture in drylands</li> </ul> <p><b>[Adaptation]</b></p> <ul style="list-style-type: none"> <li>Development of heat and drought tolerant crops and cultivation technologies to cope with heat wave and drought</li> </ul>	(Core Research)					
			<div style="border: 1px solid black; padding: 5px;"> <b>Assessment of Climate Change Impact on Dryland Agriculture</b>  <small>(Past &amp; Present) Review, Field Survey</small> </div>	<div style="border: 1px solid black; padding: 5px;">           Estimation of Future Climate Impact         </div>	<div style="border: 1px solid black; padding: 5px;"> <b>Improvement of Countermeasures against ICC</b>  <small>using FCG's results (Packaging: Development of heat- &amp; drought-tolerant crops, and cultivation technologies)</small> </div>			
			<div style="border: 1px solid black; padding: 5px; text-align: center;">Joint Research</div>	<div style="border: 1px solid black; padding: 5px; text-align: center;">Joint Research</div>				

Joint researches will be public offered, but only to Japanese universities and research institutes.

## Advisory Board

- **Ken Yoshikawa**  
Prof. Emeritus, Okayama Univ.  
President, JAALS
- **Tsugihiko Watanabe**  
Project Prof., Kumamoto Univ.  
Chair, WG on Climate Change &  
Agricultural Water Management, ICID
- **Masao Mikami**  
Consultant, JMBSC  
SI-CAT Sub-Program Director

The Center for Dryland  
Science of MEXT- Joint  
Usage/Research Center  
(i.e., TU-ALRC)

### Abbreviations

ALRC: Arid Land Research Center, Tottori Univ.  
ARC: Agricultural Research Corporation (Sudan)  
IPDRE: International Platform for Dryland Research  
and Education, Tottori Univ.  
IRIMHE: Information and Research Institute of  
Meteorology, Hydrology and Environment  
(Mongolia)  
ICID: International Commission on Irrigation and  
Drainage  
JAALS: The Japanese Association for Arid Land Studies  
JAMSTEC: Japan Agency for Marine-Earth Science and  
Technology (Japan)  
JMBSC: Japan Meteorological Business Support Center  
MEXT: Ministry of Education, Culture, Sports, Science &  
Technology (Japan)  
NARO: National Agriculture and Food Research  
Organization (Japan)  
NUM: National University of Mongolia  
SI-CAT: Social Implementation Program on Climate  
Change Adaptation Technology  
SMA: Sudan Meteorological Authority

(1) Analyses of  
Future Climate Data

## Future Climate Group

**Kurosaki<sup>G</sup>**, Wu, Buyatogtokh (ALRC)

**Mongolia**

Gomboluudev (IRIMHE)

【 ICCD-Joint Research 】  
Tachiiri (JAMSTEC, ALRC<sup>V</sup>)

**Sudan**

Imad (ARC)  
Ahmed (SMA)

- Project Leader: Yamanaka
- Project Sub-Leader: Kurosaki

- ◆ Analyses of future climate (e.g., Aridity Index) using GCMs' outputs such as CMIP5 etc.
- ◆ Prediction of disasters such as heat wave, drought, etc.

(2) Assessment of  
Climate Change Impacts

## Combat Desertification Group

**Vegetation Modeling**

Shinoda<sup>AJ</sup>, Kong (Nagoya Univ.); Nandintsetseg (NUM)

**Dust Modeling**

Kurosaki, Buyantogtokh (ALRC), Tanaka(MRI), Sekiyama<sup>AJ</sup> (MRI)

【 ICCD-Joint Research 】

Sasaki (Yokohama Nat. Univ.)

**Vegetation Field Survey**

**Kinugasa<sup>G</sup>**(ALRC<sup>IV</sup>);  
Yoshihara<sup>AJ</sup> (Mie Univ.);  
Gantsetseg (IRIMHE);  
Munkhtsetseg (NUM)

**Dust Field Survey**

Kurosaki, Wu,  
Buyantogtokh (ALRC);  
Ishizuka<sup>AJ</sup> (Kagawa Univ.);  
Gantsetseg, Jugder,  
Baljinyam (IRIMHE)

- ◆ Assessment of climate change impact on desertification (degradation of vegetation and land)
- ◆ Proposal for sustainable grassland management adapted to climate change; Improvement of dust early warning system, etc.

## Dryland Agriculture Group

**Crop Modeling**

**Tsubo<sup>G</sup>** (ALRC)

【 ICCD- Joint Research 】  
Iizumi (NARO)

**Crop Breeding**

Tsujimoto, Yasir (ALRC); Izzat (ARC); Iwata (Univ. of Tokyo, ALRC<sup>V</sup>)

**Crop Management**

Amani (ARC); Tsuji (ALRC<sup>IV</sup>)

- ◆ Impact assessment of heat wave, drought, etc. on agriculture in drylands
- ◆ Development of heat and drought tolerant crops and cultivation technologies to cope with heat wave and drought