

# Integrating Knowledge in Global Education - UN University Approach

Srikantha Herath  
Academic Director  
Institute for Sustainability and Peace  
United Nations University  
07th February, 2013

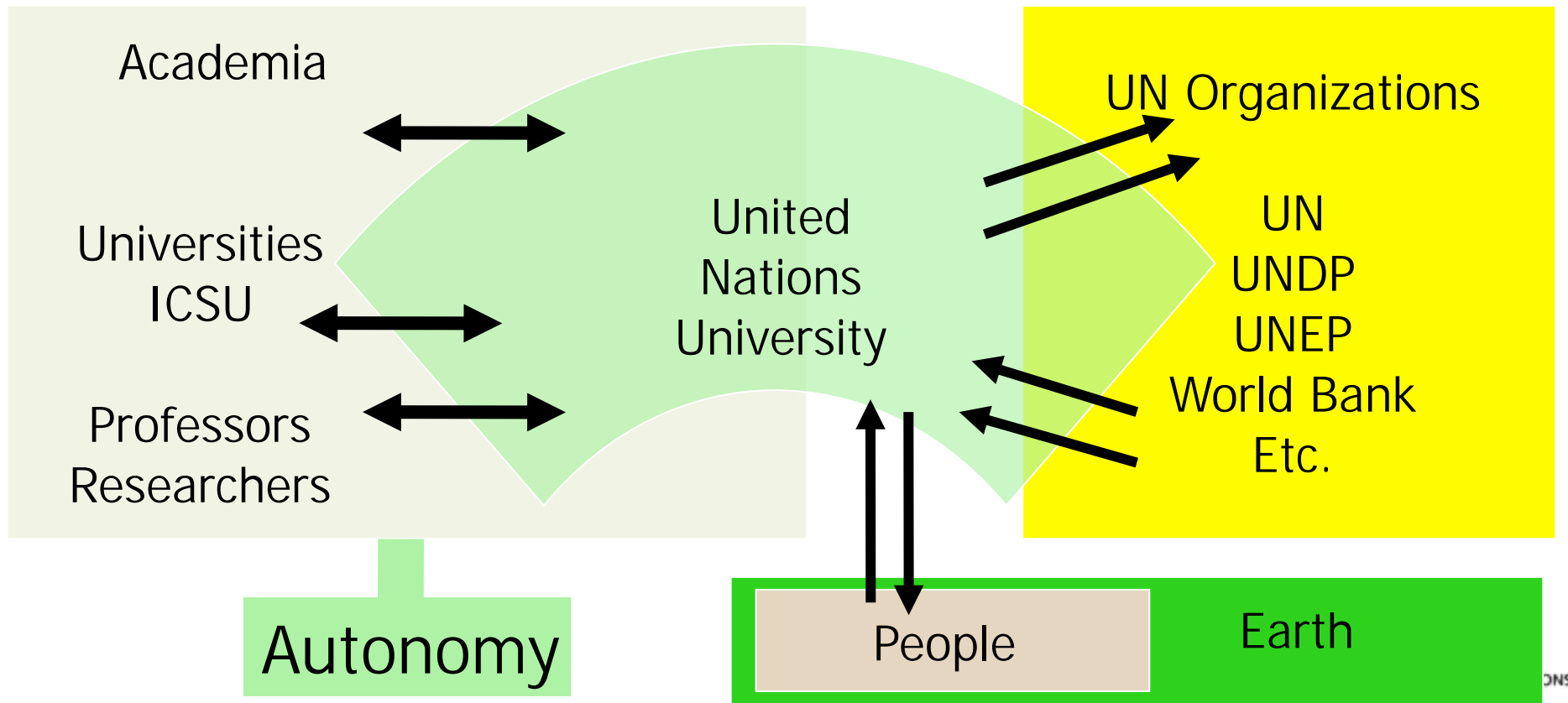


# Outline

- UNU
- Sustainability Challenge and ISP
- Knowledge Integration
  - Disciplinary
  - Regional, institutional
  - Research and practice

- International community of scholars engaged in research, postgraduate training and the dissemination of knowledge

*The UNU was established by the General Assembly on 6 December 1973. The UNU started its activities in 1975 at its headquarters in Tokyo.*



DNS

UNU-ISP

# UNU WORLDWIDE



- ◎ **16 UNU Centers** ---world wide (ISP, EHS, WIDER, INWEH,etc.,)
- ◎ **22 Associated Institutions** (AIT, ITC, *GFMC* etc.,)
- ◎ Cooperating Institutions
- ◎ **International Operating units**
- ◎ Joint research projects with a **network of faculty**
- ◎ **Financed** by voluntary contributions - host countries and research grants

# Sustainability Challenge

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- Compartmentalized knowledge however leads to crisis situations
- Gains in one sector can affect other sectors adversely
  - Low cost Energy for development --> Climate Change
- We need a holistic approach to problem solving by integrating knowledge and methods from different disciplines.
  - ***Sustainability Science:***
  - ***Sustainable Science seeks a complimentary truth to ‘science’ to support ‘Sustainability’ of earth system***
  - ***Not only knowledge generation, but also consequences of knowledge application to earth system sustainability***



# UNU-ISP Background

- Established in January 2009, integrating the former UNU *“Environment and Sustainable Development”* and *“Peace and Governance”* programmes

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Environment and Sustainable  
Development



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International Cooperation and  
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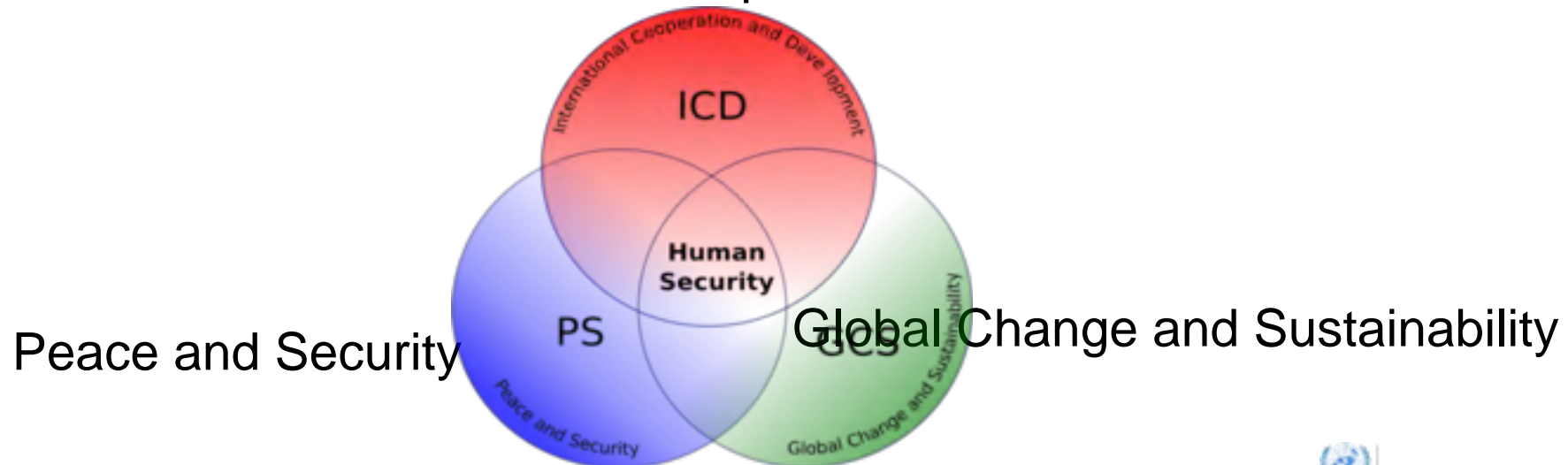
Peace and Security

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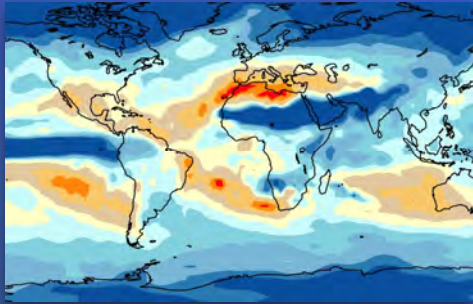
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**Climate Change**



**Managing Water Resources**



# GCS Themes

**Preserving Biodiversity**



Stephen Frink/Corbis  
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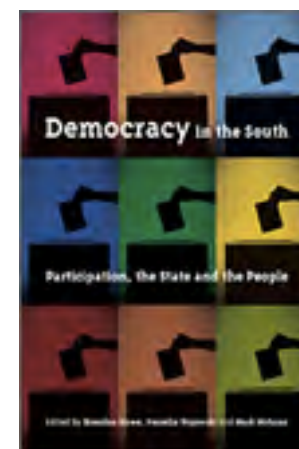
**Land Degradation**



**Reducing Impact of Disasters**

China - July 10

# Research: **Peace and Security Section** Sustainable Peace Building

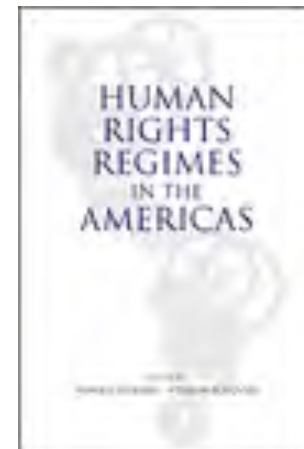
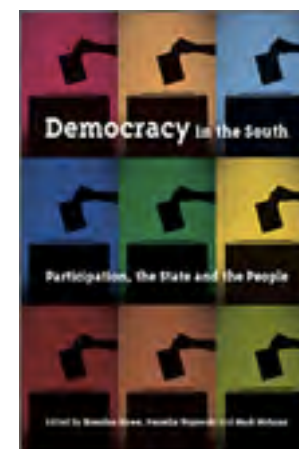




# Research: **Peace and Security Section**

## Sustainable Peace Building

- Post-Conflict Countries and Foreign Investment

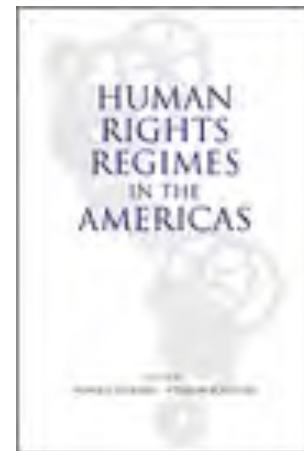
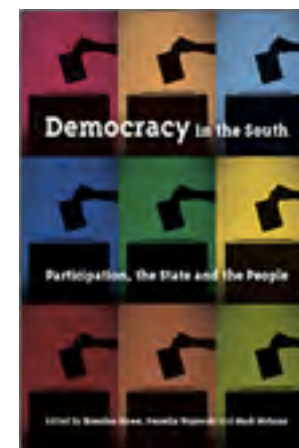


UNITED NATIONS  
UNIVERSITY  
UNU-ISP

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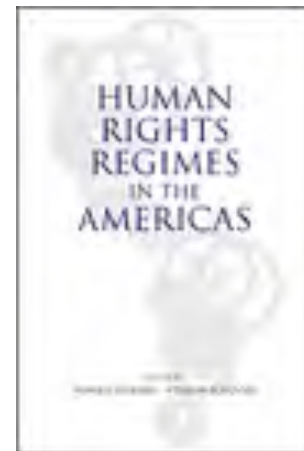
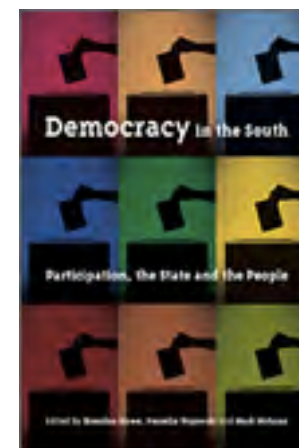
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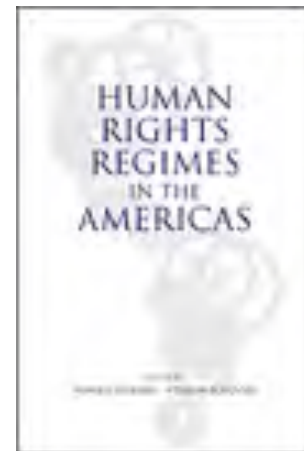
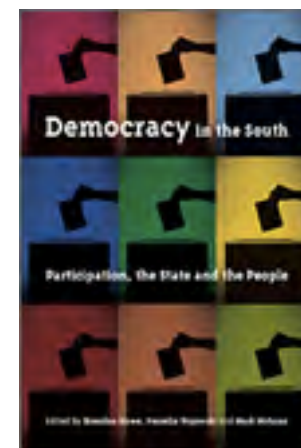
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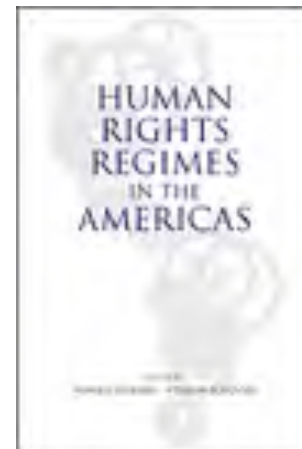
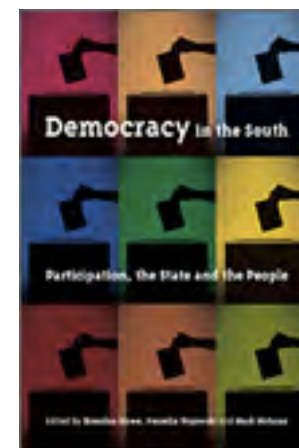
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# Research: International Cooperation and Development



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- The **Solving the E-Waste Problem (StEP) Initiative** is conducting projects around the world on policy, redesign, reuse, recycling and capacity building issues associated with the production, use and disposal of electrical and electronic goods. The StEP Initiative:
  - is a knowledge hub on e-waste for industrialized and industrializing countries;
  - increases re-use of electrical and electronic equipment;
  - increases materials recovery from e-waste;
  - supports the safe processing of e-waste;
  - encourages life-cycle thinking; and
  - develops clear policy recommendations.



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- Global Change and Sustainability
- International Peace and Security
- International Cooperation and Development

*Open to  
International  
Students*

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  - Global Change and Sustainability
  - International Peace and Security
  - International Cooperation and Development
- Elective courses offered by faculty
  - Courses from partner universities.

*Open to  
International  
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# Research Seminars

Seminars emphasize collaborative knowledge building, and incorporate a wide range of learning approaches. Critical analysis, research design, quantitative and qualitative methodologies, and thesis writing are among the skills developed through these interactive and student-centred seminars.

I. Introduction to Research practise

II. Research Development and tools

III. Thesis Development

IV. The Practice of Interdisciplinary Research

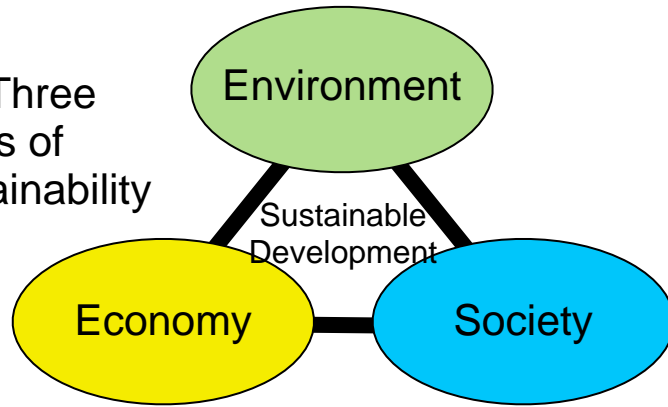




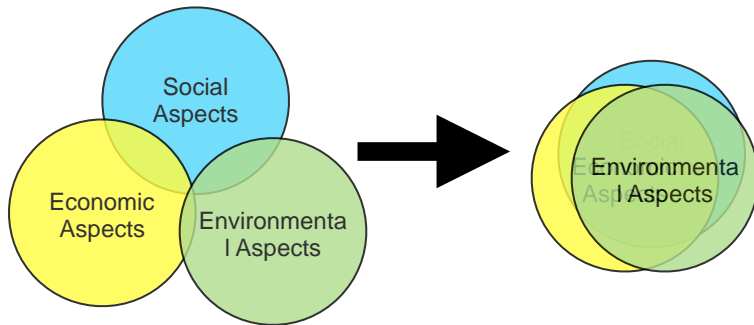
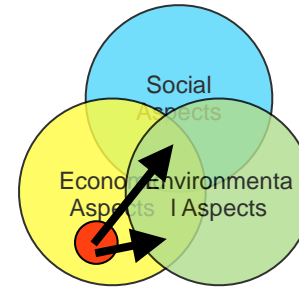
# Sustainability Research

- Inter-disciplinary approach engaging components of sustainability

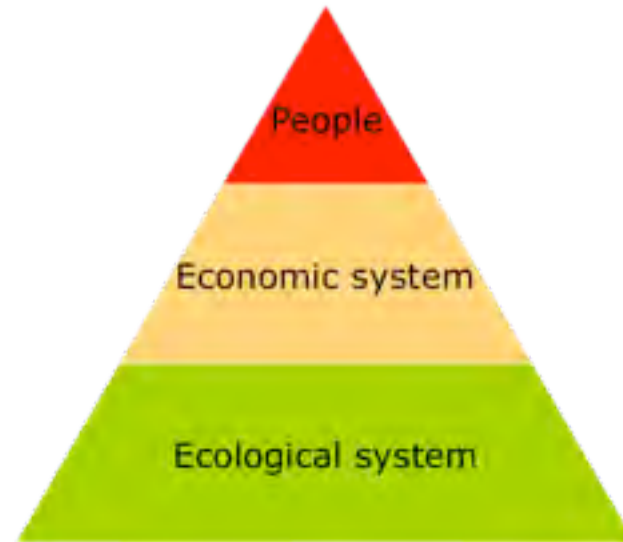
The Three Pillars of Sustainability



Text



Transition to a sustainable society



Ecological Basis

B

# University Network for Climate and Ecosystems Adaptation Research

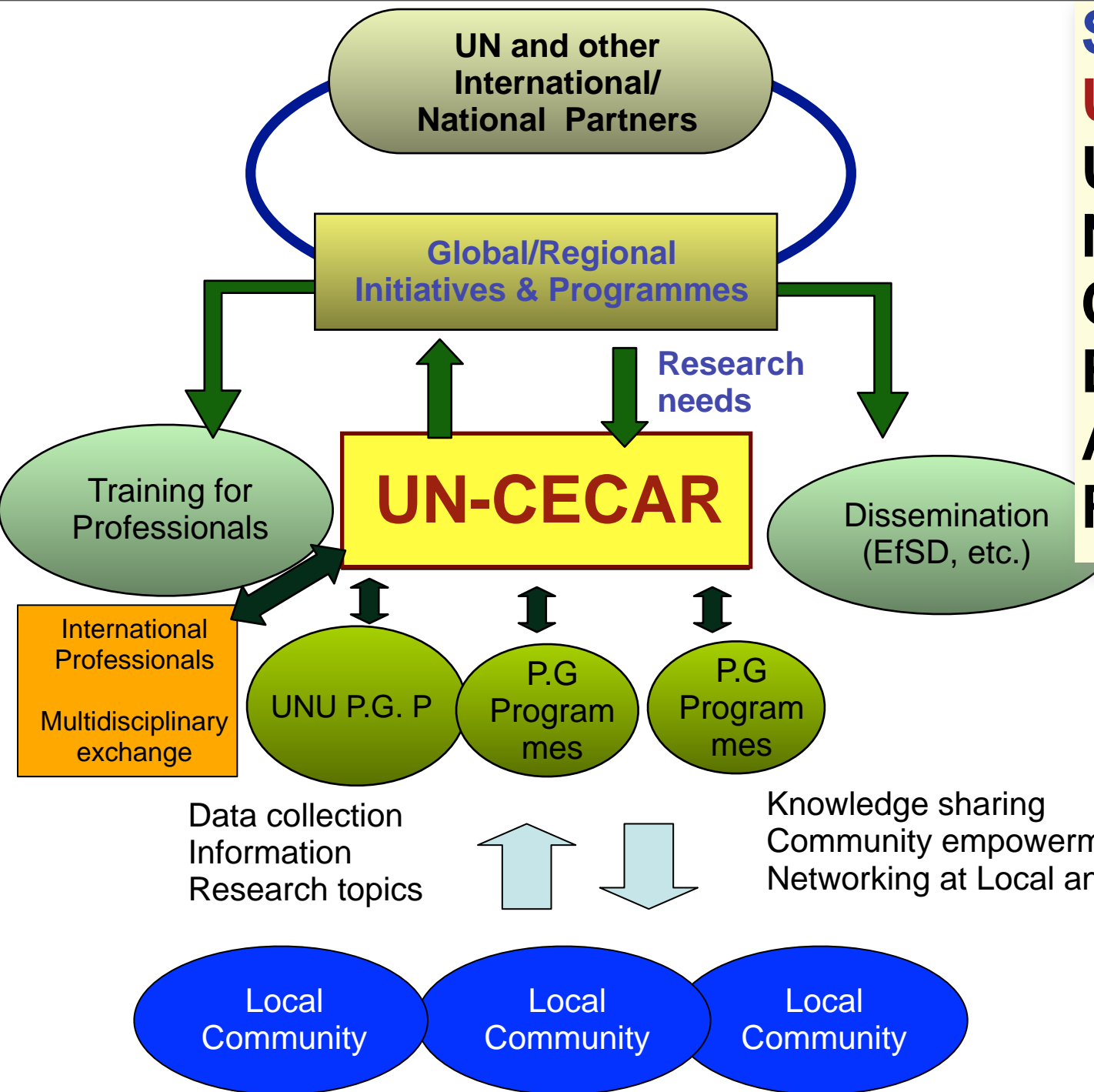
- Multidisciplinary approach
- Holistic View, Towards Sustainability
- 25 Universities in AP

Tsinghua University, CHINA  
University of Tokyo, JAPAN  
UNU-Institute for Sustainability and Peace (secretariat), JAPAN  
Yeungnam University, KOREA  
Asian Institute of Technology, THAILAND  
Chula Longkorn University, THAILAND  
Gadjah Mada University, INDONESIA  
National University of Malaysia, MALAYSIA  
University of Philippines, PHILIPPINES  
Viet Nam National University, VIET NAM  
Australian National University, AUSTRALIA

Indian Institute of Technology, INDIA  
BUET, BANGLADESH  
Institute of Engineering, NEPAL  
University of Peradeniya, SRI LANKA  
Chinese Academy of Forestry, CHINA  
IR3S, JAPAN  
Keio University, JAPAN  
Kyoto University, JAPAN  
Ritsumeikan Asia Pacific University, JAPAN  
Nanyang Tech. University, Singapore  
Inst. of Technology, Lahore, Pakistan



# Structure of UN-CECAR University Network for Climate and Ecosystems Adaptation Research



# UN-CECAR Postgraduate Courses: Building Resilience to Climate Change (1 & II)



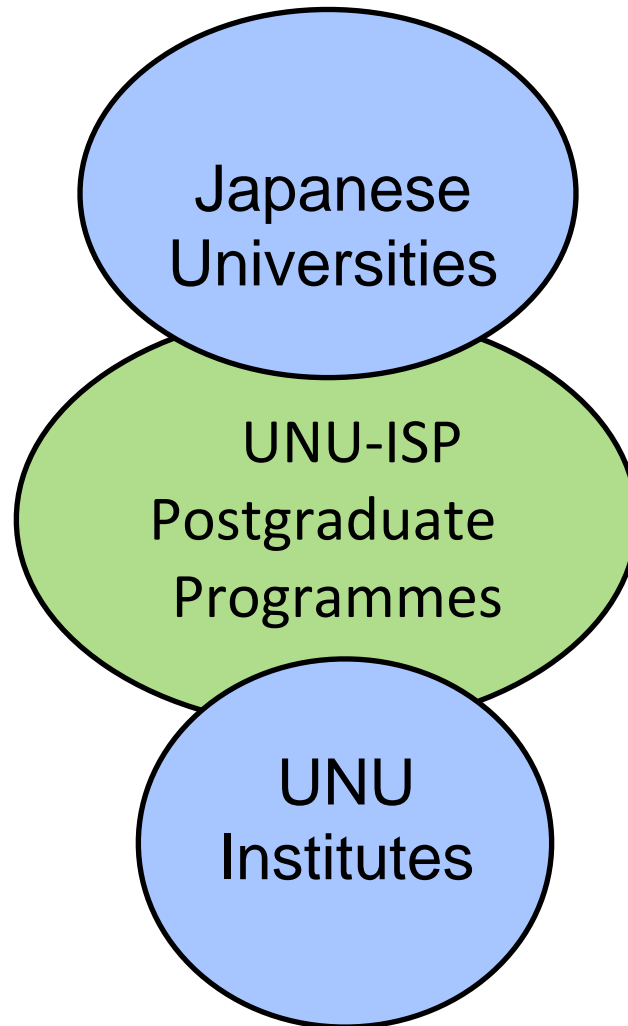
- Science, Impacts and Vulnerability - I (nat. science)
- Approaches to adaptation - II (social science)



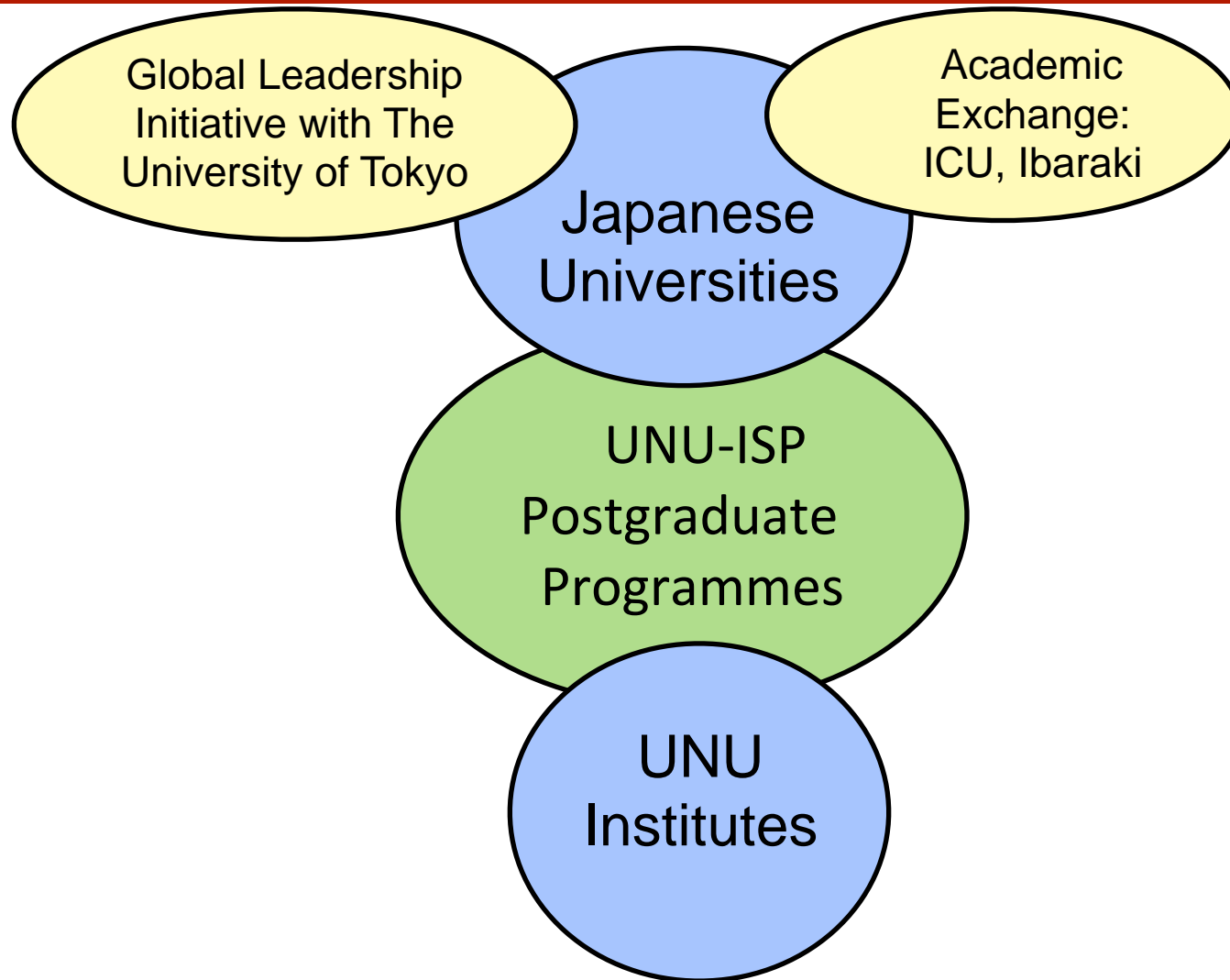
- Held in 2010, 2011 and 2012
- Average class size 33

- Taught by partner university faculty and international experts.
- Students nominated by member uni, credits are transferred.
- Open to all, no tuition fee for member inst. often local support provided
- RENEWABLE ENERGY: 2013

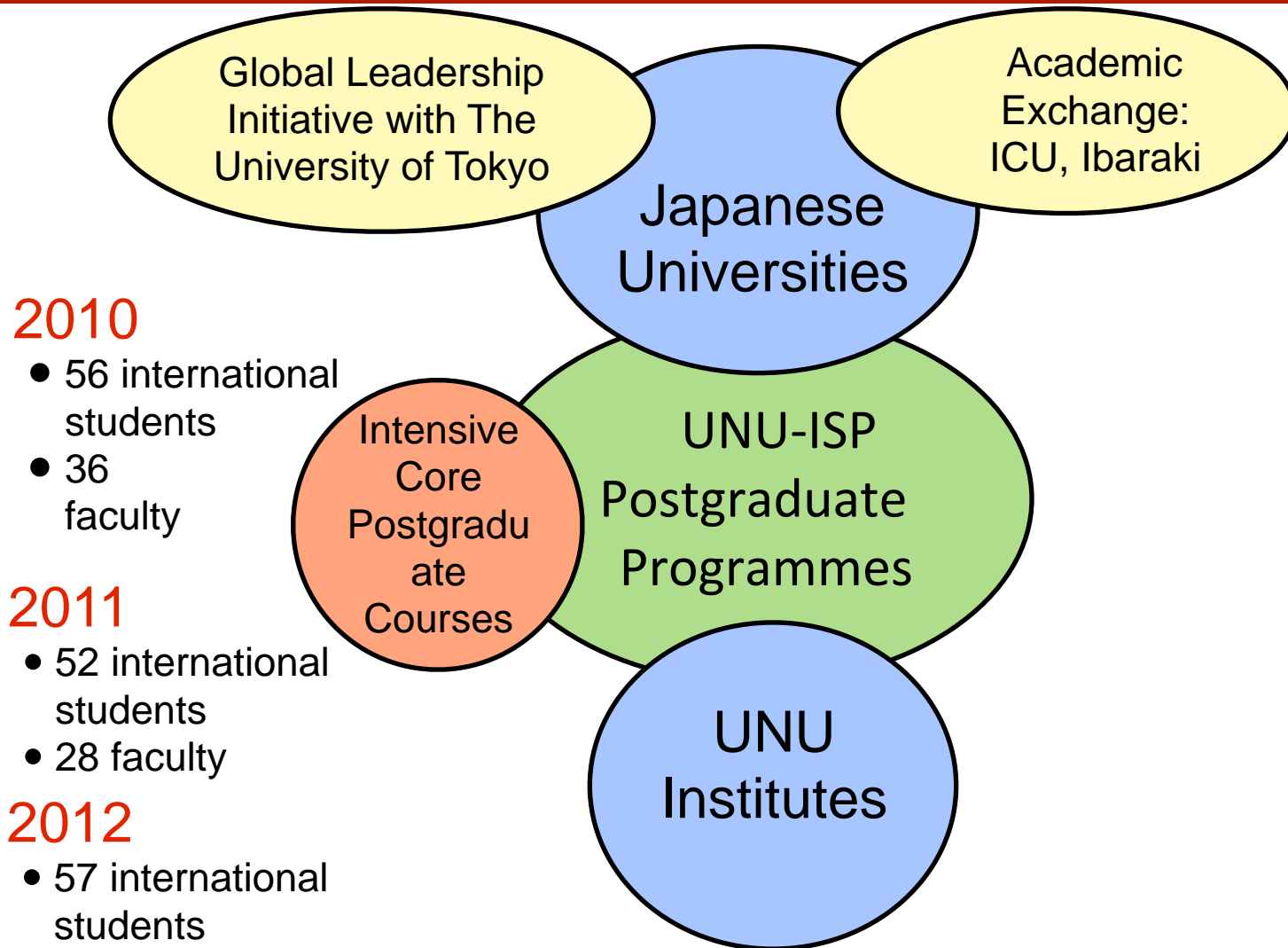
# Partnerships



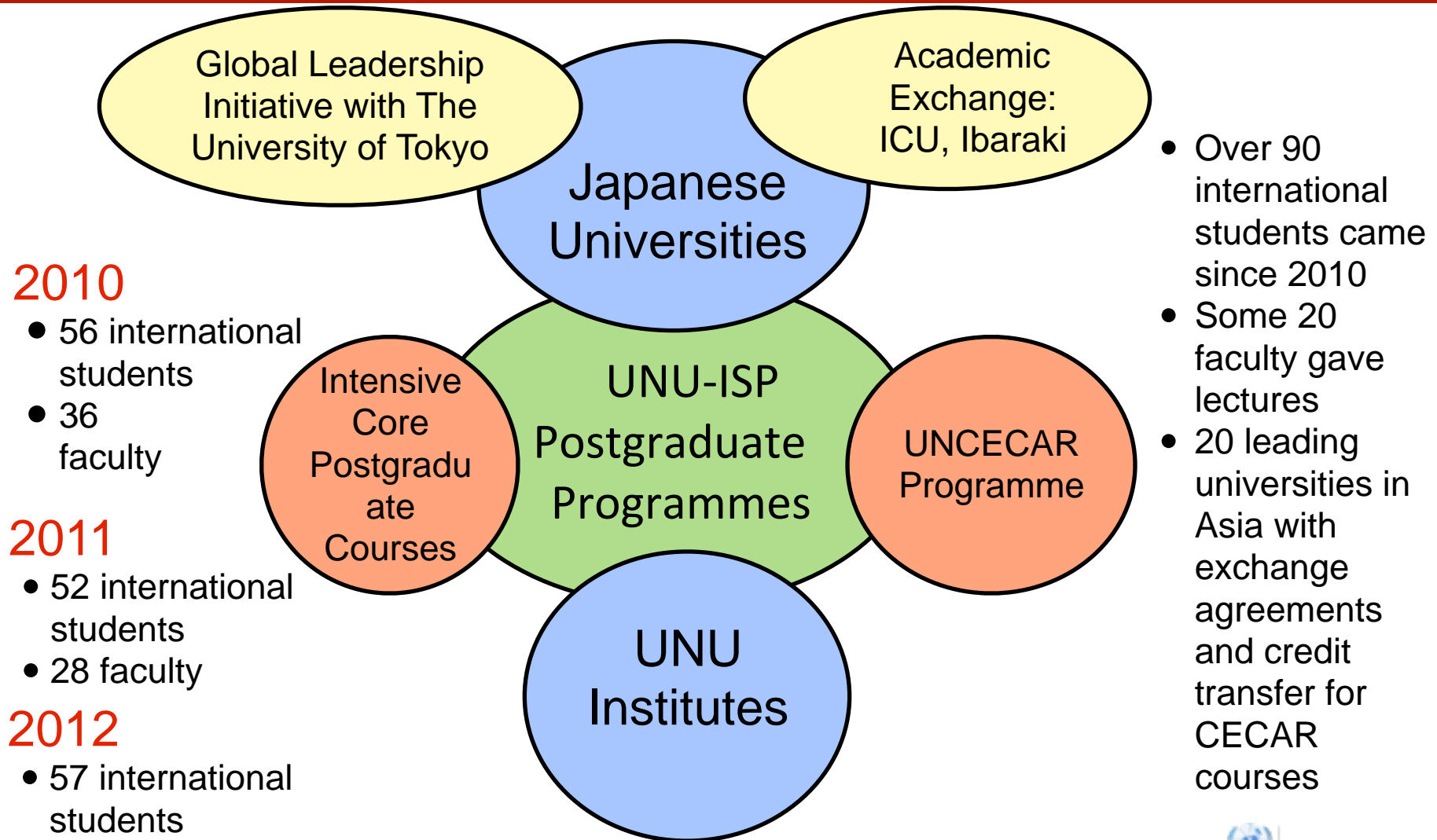
# Partnerships



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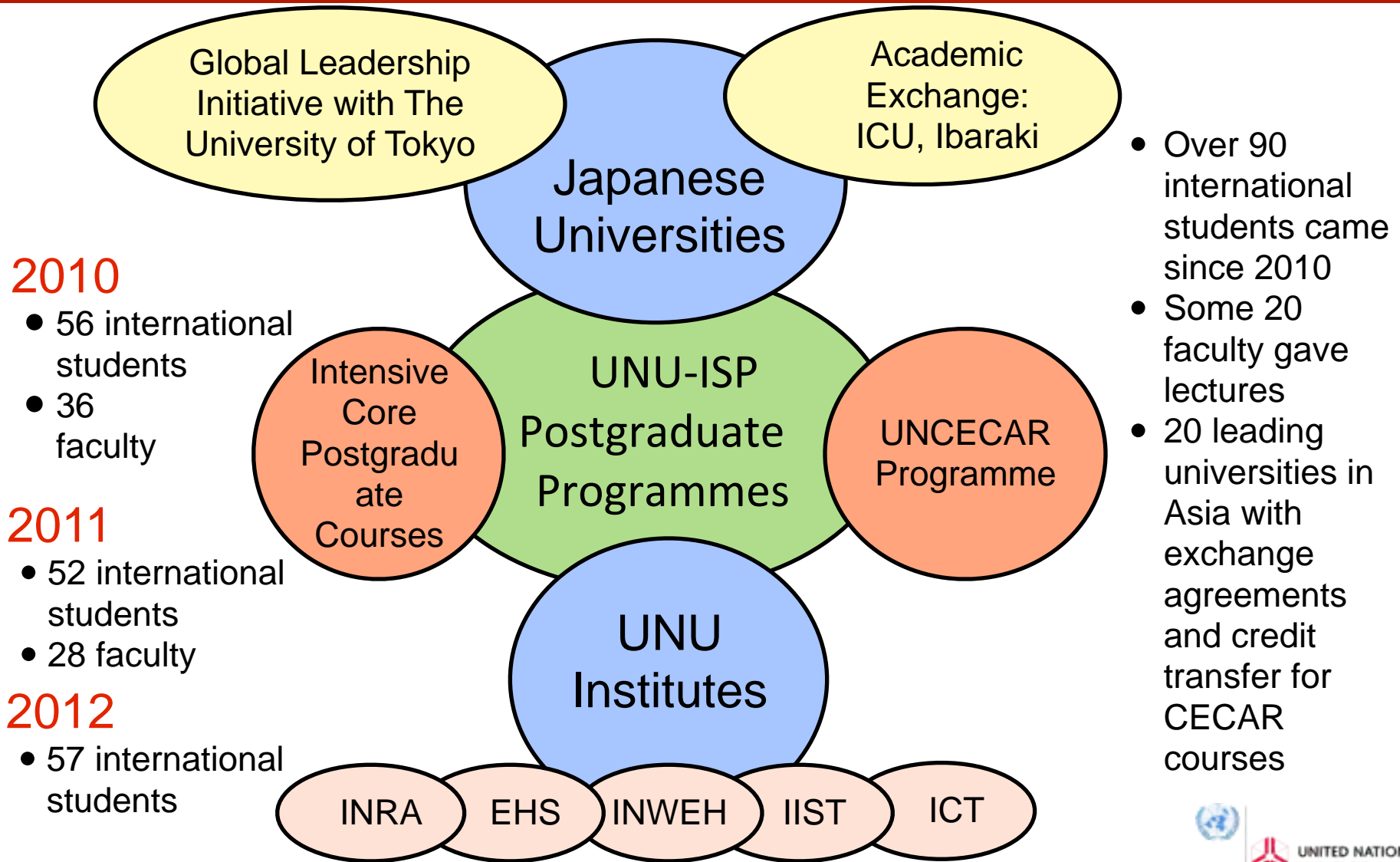


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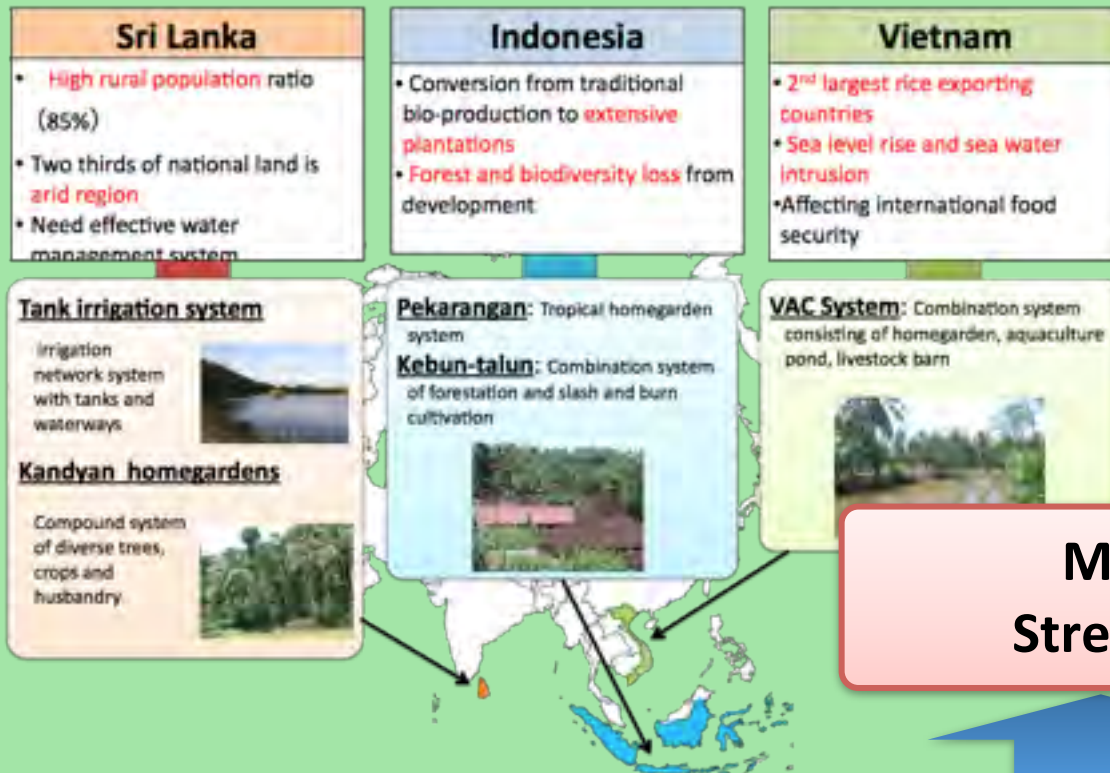


# Partnerships



# Strategies to enhance resilience to climate and ecosystem changes

## Traditional Bio-production systems



**Mosaic System to Strengthen Resilience**

**B**

**Traditional Systems**  
High Resilience, Low Efficiency

**Synthesis**

**Modern Systems**  
High Efficiency, Low Resilience

# Strategies to enhance resilience to climate and ecosystem changes

## Traditional Bio-production systems

Sri Lanka	Indonesia	Vietnam
<ul style="list-style-type: none"> <li>• High rural population ratio (85%)</li> <li>• Two thirds of national land is arid region</li> <li>• Need effective water management system</li> </ul>	<ul style="list-style-type: none"> <li>• Conversion from traditional bio-production to extensive plantations</li> <li>• Forest and biodiversity loss from development</li> </ul>	<ul style="list-style-type: none"> <li>• 2<sup>nd</sup> largest rice exporting countries</li> <li>• Sea level rise and sea water intrusion</li> <li>• Affecting international food security</li> </ul>

**Tank irrigation system**

Irrigation network system with tanks and waterways



**Kandyan homegardens**

Compound system of diverse trees, crops and husbandry.




**Pekarangan:** Tropical homegarden system

**Kebun-talun:** Combination system of forestation and slash and burn cultivation



**VAC System:** Combination system consisting of homegarden, aquaculture pond, livestock barn



Managing long term and short term risks due to climate and ecosystems change in Africa

**ICD and GCS**

**Mosaic System to Strengthen Resilience**

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# Research to Implementation: Capacity Development needs

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# Research to Implementation: Capacity Development needs

- Enabling flow from **research** to **implementation** in developing countries
- Involvement of a range of disciplines
- Target groups:
  - **Higher education: Customizing global knowledge**
  - Professionals: Rapidly train a large number
  - Policy makers: Key messages

# Integrating Education, Research and Capacity Development

- Higher Education Sector to customize global knowledge and lead development
- Capacity development programs for training a large number of international competent professionals and policymakers.

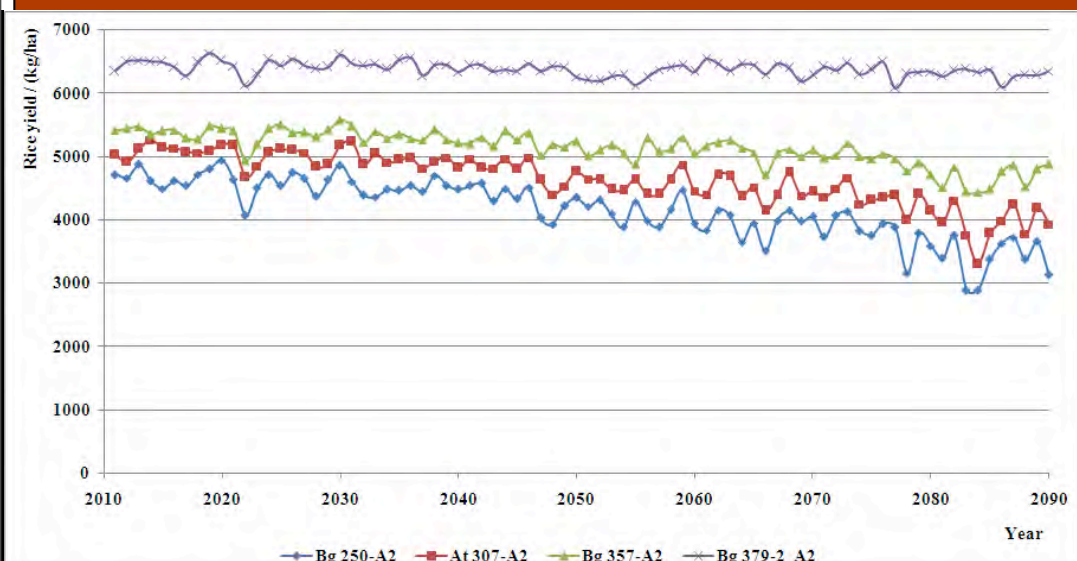




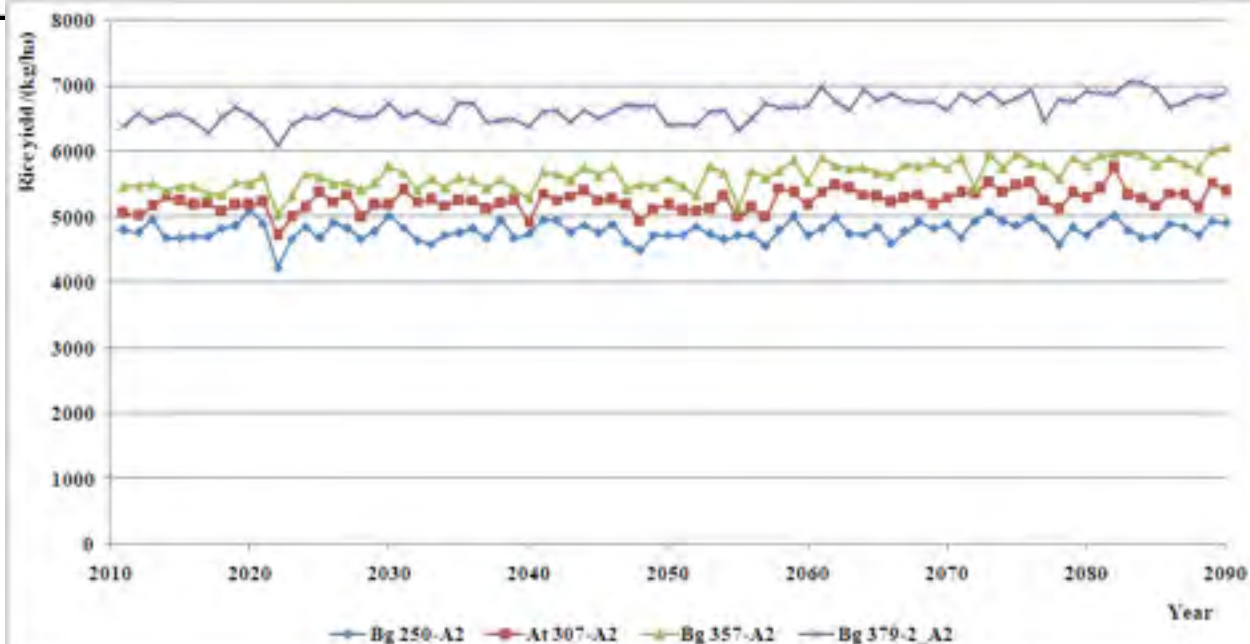


# Rice Yield under future climate (A2)

Future temperature, no CO<sub>2</sub> change for 4 varieties



Future temperature, and Future CO<sub>2</sub> change for 4 varieties



# Integration with Short term Training and Team Building: Researchers, Professionals and Planners



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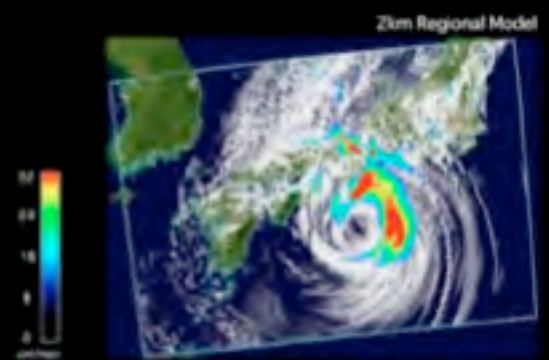
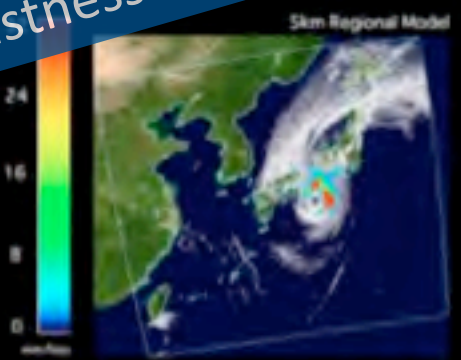
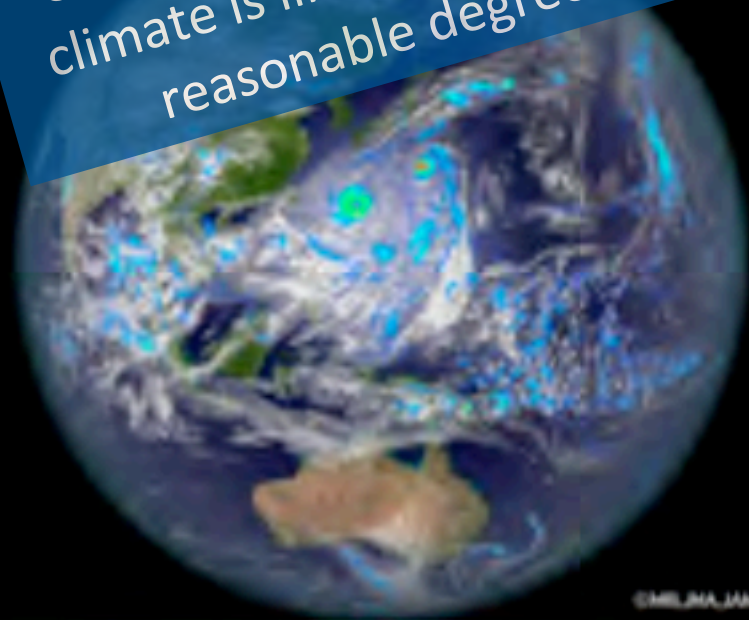
UNU-ISP

Institute for Integrated Environmental and Development Studies

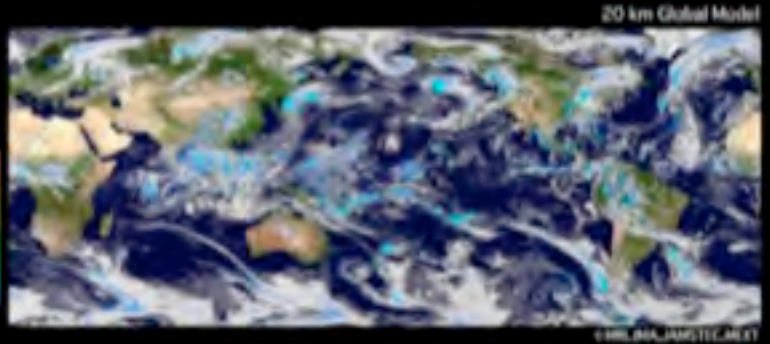


The key issue to resolve in Adapting to Climate Change is assessing what future climate is likely to be at local scale with a reasonable degree of robustness

13 Sep 208X 17 UTC



17 Sep  
208X  
21 UTC



University Network for Climate and Ecosystems Change Adaptation Research

# Training Programme on Climate Change Downscaling Approaches and Applications

9-14 November 2011 **09-22 November, 2012, Bangkok, Thailand**

<http://cecar.unu.edu>

# Training module details

- 5 days climate
  - Climatology: **IIT, Delhi**
  - **Dynamic Downscaling with WRFC**, Dynamic Downscaling (WRF) by **NCAR**, implementation by **University of Nebraska, USA**
  - 20km Global model forecasts by **MRI, Japan**
  - Statistical downscaling by **University of Tokyo**
  - Bias Correction, Risk Assessment and GIS (**UNU-ISP**)
- 5 day impacts
  - GIS ( **AIT, Nippon Koei**)
  - Climate Extended, IDF and Extremes (**UNU , UP, IHP**)
  - Impact on rice production (**UNU, IIT, TH, SL )**
  - Flood Impacts (**UNU, NK, TU, SL**)
  - Communicating Results (**ISET**)
- **last session in thailand, 9 - 21 nov**
  - **10 pg students, 7 faculty, 18 researchers, 12 practitioners and 4 policymakers**

# Expectations

- **UNU Knowledge Hub: Getting the best from Academia, UN, Industry**
- **Making best use of the opportunities made available to our students and scholars in the region.**
- **Holistic approach to problem solving - Sustainability Science**
- **UN House environment provides access to important symposiums, discussions**
- **Global leadership in addressing emerging global change challenges**

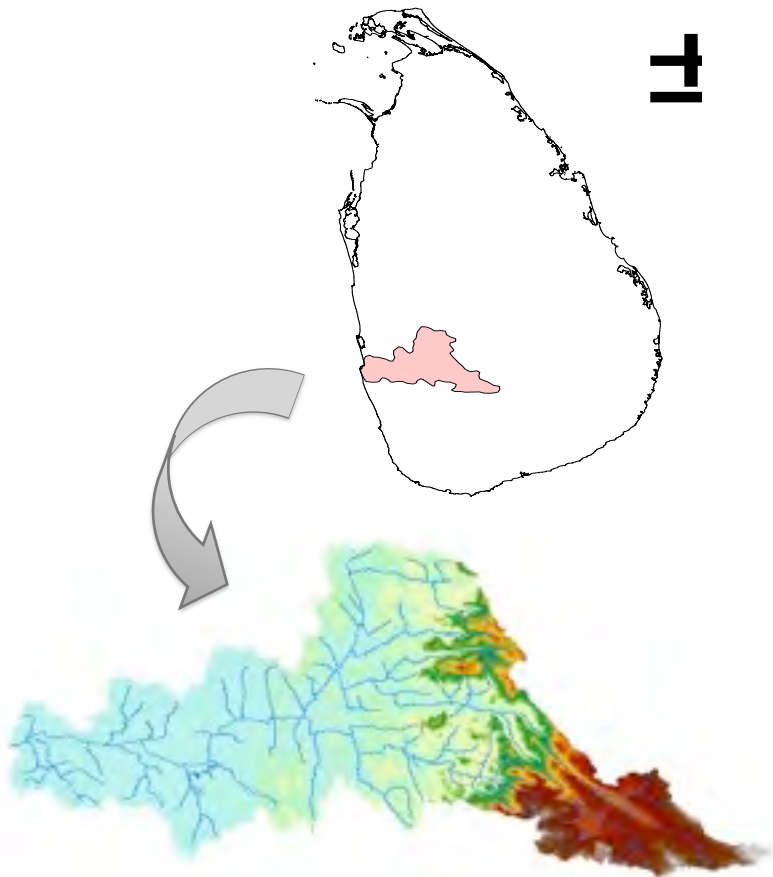


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Thank You for your kind Attention

# Flood Impacts and Adaptation Measures in Kelani River Basin Sri Lanka

## Study Area



- Analysis of rainfall time series of Sri Lanka shows an increasing trend of rain in both upper and lower Kelani basin
- The lower Kelani basin, Colombo faces the highest risk of flood in the future, the adaptation measures are necessary to minimize the damages due to the extreme flood conditions.



**Inundation map relevant to 100 year return period pentad rainfall of upper catchment with 100 year return period daily rainfall of lower catchment according to A2 and B2 scenario**



A2






B2

### Vulnerable areas for floods

Hazardous status	Vulnerable area / (km <sup>2</sup> )			
	50 year return period A2	50 year return period B2	100 year return period A2	100 year return period B2
Low	390.66	384.25	396.29	391.07
Moderate	163.14	77.70	207.73	194.68
High	28.74	15.57	49.44	33.01

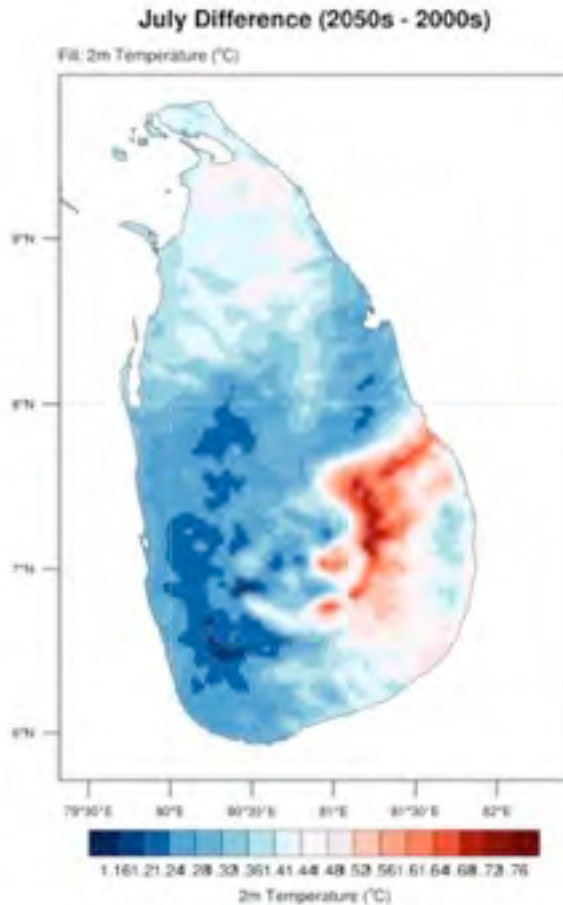
### Legend

-  - 1.5 m < Water level < 2.0 m
-  - 2.0m < Water level < 2.7m
-  - Water level > 2.7m

# 4 km future climate projections

Temperature differences 2050s - 2000s (NCAR, WRF)

July



January

