

Advancing Transdisciplinary Education

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Knowledge to practice: Challenges

- Tremendous **advances** in science and technology; but progress in **solving pressing global problems is slow**. (food security, massive poverty, malnutrition, disease and epidemics, civil wars and conflicts, increasing disaster losses)
- **Problems in translating knowledge to practise** to solve our problems and improve quality of life?
- **What we learnt:** In part due to inadequacy of local capacities that resulted in a general lack of societal involvement in the conceptualization, development, implementation and maintenance of development programs (MDGs experience)
- **What are we doing wrong, and how should we improve?** effective formulation and implementation of solutions that address global challenges need an approach that is locally grounded and involves the widest participation of stakeholders

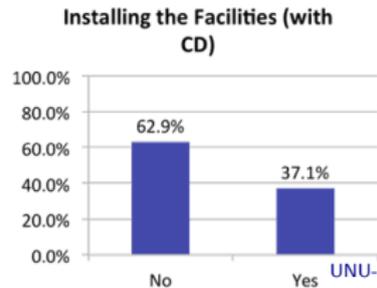
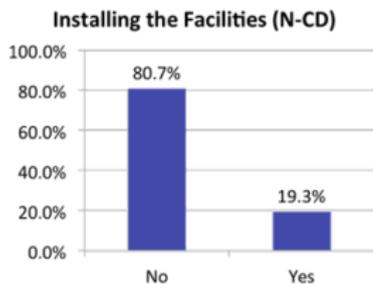
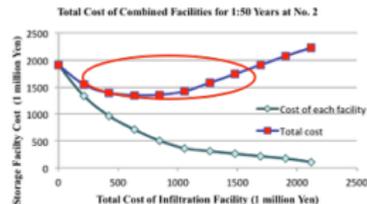
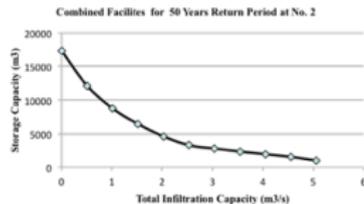
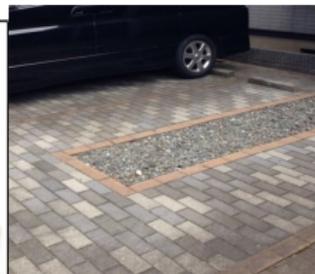
Case Study: Urbanisation and Floods

- Urbanisation reduce natural storage and infiltration increasing flood frequency and peaks
- Drastic flood control measures; still inadequacy of centralised systems. Onsite management → Infiltration facilities and temporary detention. Japan: Creation of ARSIT (1991)
- Although these solutions were developed in late 80's early 90's the decentralised on-site systems is not practiced widely.



Yato watershed, Setagaya ward - Tokyo

- Largest population, 2nd largest in area, pop. dens. 14,400pers/km²)
- **Problem:** urban flood, inundation. **Solution:** infiltration and storage facilities. Low penetration even with 80% of subsidy.
- A combination of centralised and decentralised measures can be used to achieve flood control targets.
- Best benefit/cost ratio: 70%centralised and 30% distributed. Survey: 19% favour. With env. information: 37%



Global Change Challenges

- Climate change: 20% increases for hourly and 11-19% increases for 12 hr. maximum rainfall for 1:10 year return period for Colombo, Sri Lanka and Kathmandu Nepal (with MRI data)
- But there is large uncertainty in projections. Need to find scalable solutions and build Resilient Communities
 - **Build redundancy** → through multiple benefits
Bring together a wide range of expertise (→ multi-disciplinary) to solve problems together (→ inter-disciplinary)
 - **Combine centralised (top down)** measures with scalable **distributed systems (bottom up)**, flood control, renewable energy, etc.
- **Customising global knowledge**
Global change impacts are primarily local. Depends on local bio-physical and social characteristics → **Solutions must evolve locally incorporating traditional knowledge.**
- **Efficient Implementation and Sustainability of programs/projects**
Involve all stakeholders (→ transdisciplinary)

Multi, Inter and Transdisciplinary Approaches

From Annemarie Groot et al, WUR Wageningen KB1 Congress, 2009



Multi-disciplinary:
Experts from different disciplines work side-by-side on elements of the same problem.

Education ▶ Education

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Collaboration between experts from different disciplines, with interaction ranging from exchange to integration.



Training

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Trans-disciplinary:
Collaboration among experts from different disciplines *and* non-experts. Integration of needs, practical experience, and expert knowledge.

Training ▶ Training

Applied Field Projects

UNU-IAS

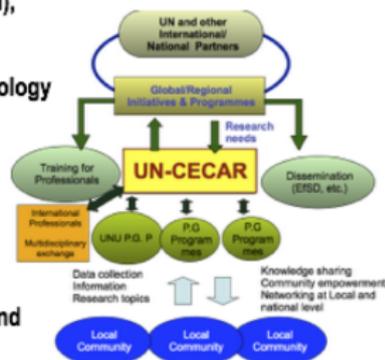


University Network for Climate and Ecosystems Adaptation Research: UN-CECAR

Established in 2009 to develop local capacities through Interdisciplinary approaches. The group jointly develop educational and research programmes.

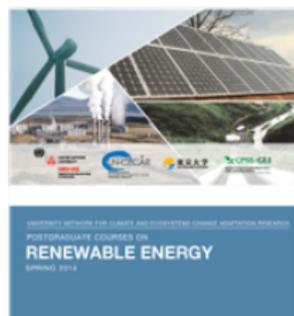
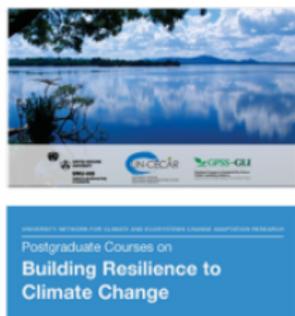


- Australian National University
- Bangladesh University of Engineering and Technology
- Tsinghua University, China
- Chinese Academy of Forestry
- Indian Institute of Technology Delhi
- Indian Institute of Technology Kharagpur
- Gadjah Mada University (UGM), Indonesia
- Kyoto University, Japan
- The University of Tokyo, Japan
- Ibaraki University, Japan
- Ritsumeikan Asia Pacific University, Japan
- National University of Malaysia (UKM), Malaysia
- Tribhuvan University, Nepal
- University of Engineering and Technology Lahore (UET), Pakistan
- University of the Philippines,
- Yeungnam University, Korea
- Seoul National University, Korea
- Nanyang Technological University, Singapore
- University of Peradeniya, Sri Lanka
- Asian Institute of Technology, Thailand
- Chulalongkorn University, Thailand
- Viet Nam National University, Viet Nam



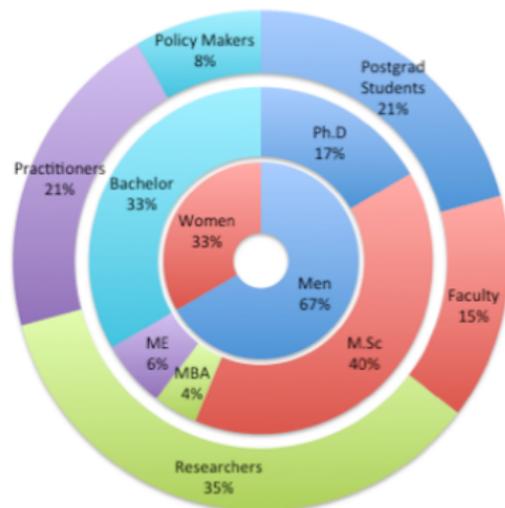
UNCECAR programmes

- Courses: Building resilience to climate change (science and impacts) ; Building resilience to climate change (vulnerability and adaptation) ; Renewable energy (technology and policies); Leadership for Sustainability; Fisheries and Climate Change
- Training: Climate change projections downscaling and applications (food and water), flood forecasting
- Courses developed collectively, taught by partner university faculty, international experts, and development specialists.



Research to Implementation: Capacity Development Needs

- Challenges
 - Enabling Research to Implementation in developing countries is a major challenge due to lack of investment for research in business and industry to translate research results to practice.
- Approach: Selection of target audience to build teams and exchange
 - **Higher Education:** To customise global knowledge
 - **Professionals:** Need to have efficient training programmes
 - **Policy Makers:** To provide key messages
- Participants are selected from those nominated by partner institutions, government agencies, international organizations as well as individual direct applicants.



Delivery

Projection of Climate Change Modeling Climate System

Changes in the Atmosphere: Composition, Circulation

Changes in the Hydrological Cycle

Changes in the Ocean: Circulation, Sea Level, Biogeochemistry

Changes in the Land Surface: Orography, Land Use, Vegetation, Ecosystems

IPCC WGII AR4, 2007

Climate Change Impacts: Water Resources

Weibao Minnie

Outline	Thumbnail	Notes	Search
Climate Change Impacts...		00:21	
Introduction		00:34	
Landform Structure		00:05	
Projection of Climate ...		00:38	
Global Climate Model A...		01:18	
Supercomputer: Earth S...		00:38	
Scenario-based Approac...		01:03	
Climate change projec...		00:53	
Temperature Rise (SST)...		00:39	
3. meteorological cycle...		00:04	
Schematic Diagram of R...		00:13	
Factors Affecting Meth...		01:12	

33 Minutes 04 Seconds Remaining

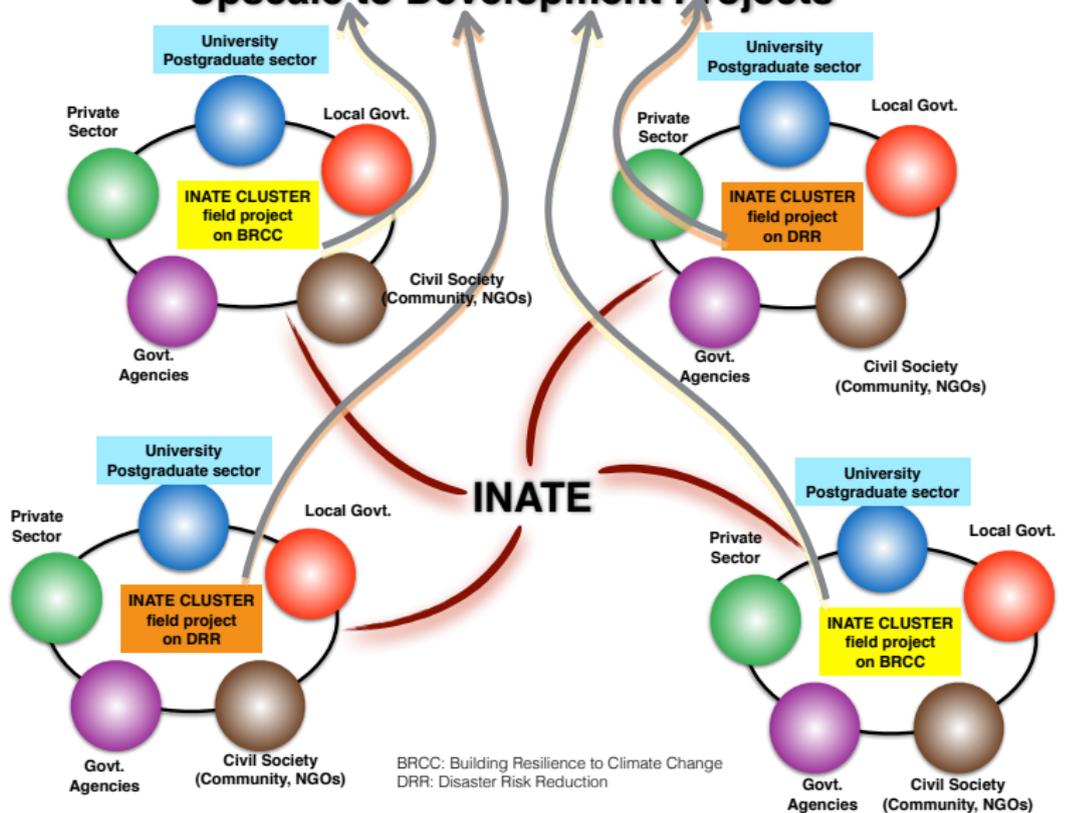


- Blended mode to expand out reach: combination of online and class room
- Lectures are transcribed and narration embedded in slides
- Students learn content before coming to class and answer tutorials
- Classes across partner institutes connected through video conferencing, lectures are primarily on discussions and group activities

Transdisciplinary Projects

- New methodologies for sustainable solutions
 - Sustainability Science (2001); a transformational scientific field with transdisciplinary, community-based, interactive and participatory approaches to education and research.
- Challenges
 - Designing educational and research programmes supporting transdisciplinary approach to knowledge generation.
 - Developing methodologies for the design and implementation of transdisciplinary development projects, which also require research.
- Proposal
 - **International Network for Advancing Transdisciplinary Education (INATE)**
 - **Platform** for transdisciplinary approach to knowledge generation and project implementation
 - **An incubator** for the translation and implementation of knowledge to transdisciplinary practices in addressing global change challenges.

Upscale to Development Projects



Working Together

- Transforming conventional project planning to transdisciplinary project design and implementation requires new research on collective solution identification, program design and implementation. This calls for a new type of education and training that promotes transdisciplinary actions.
- Partnerships between development agencies and educational institutions essential to advance such programmes.
- The expertise of regional educational networks of UNU will compliment ADB's extensive experience in development programmes and networks of planning agencies and professional networks.
- The Leadership programmes of ADB and UNU can provide a basis to integrate, compliment and expand content to suit different target audiences based on experience and new research outcomes.

Thank You!