Postgraduate Forum on Sustainability in Africa (Cape Town, January 26 2017)



## **Transdisciplinary Research**

Masafumi Nagao Institute for the Advanced Study of Sustainability United Nations University

# **Transdisciplinary research?**

<Keywords that characterize TR>

## A working definition of TR

Mutual learning by researchers and other stakeholders based on science and practice through collaboration on an equal footing

## Multi-disciplinary research Inter-disciplinary research Transdisciplinary research



Source: Kajikawa (2008)

Science for sustainability vs. Science of sustainability Spanghenberg (2011)

#### Lund University's LUCID Program (Jerneck et.al, 2011)

time achievement	Phase 1 (year 1-2)	Phase 2 (year 3-5)	Phase 3 (year 6-10)
Theoretical development	Multidisciplinarity. Researchers from different disciplines co-operate across their own theories and perspectives	Interdisciplinarity. Ontological approaches are questioned resulting in a co-evolution of theories for sustainability science	Transdisciplinarity. Theories evolve and mature to gradually incorporate more domains and transcend the boundary between science and practice
Methodological development	Different disciplines apply their own tools and methods on joint research problems	Tools and methods for sustainablity science evolve along with theories. Participatory approaches are increasingly important	Research increasingly follows participatory and goal oriented approaches while being reflexive. Integration of external stakeholders in the research
Organisational development	LUCID is an arena where different disciplines meet but are not integrated. Some researchers are located at LUCID, some at their home departments	Closer interaction between researchers requires common premises. The PhD programme in sustainability science, started in phase 1, is further developed	Disciplines external to LUCID are increasingly involved. The Centre of Excellence is instrumental in structural renewal of many knowledge fields related to sustainability
Educational development	Close interdepartmental cooperation in related but independent Masters programmes	Masters programmes covering different aspects of sustainability (social, economic, environmental) become more and more integrated	Apart from Masters programmes in sustainability science, other fields adopt sustainability as a major component resulting in many co-operating programmes



## Transdisciplinary research in action

### Phosphorous Governance Issue

- -How to 'globally' manage the production and consumption of phosphorous resources (ref: planetary boundary)
  - Physical/technical dimension
  - Institutional dimension
- -Transdisciplinary framework
  - 1/ Knowledge integration

2/ Multi-actor governance

- 'Pro-active' role of higher education institutions

### Other issues suited for TR?

## How to formulate a TR question?

## **Basic issue**

## -How to bring about sustainable industrialization in Africa?



"A prosperous Africa based on inclusive growth and sustainable development" "Transform, grow and industrialize"

## > African Development Bank – Strategy for 2013-2022

- "Inclusive growth" and "Green growth"



#### Background 1 Africa and Asia: Size comparison

	Gross National Income		Population (Million)		Labor force growth	
	(\$ billions) 2014	Per capita (\$) 2014	2014	2025 (Projected)	(%) 2005 - 2014	
Sub-Saharan Africa	1,595	1,638	973	1,291	3.0	
Middle East & North Africa	1,656	4,732	357	424	2.0	
India	2,028	1,570	1,245	1,462	0.7	
China	10,097	7,400	1,364	1,411	0.6	
REF: High income countries	53,538	38,294	1,399	1,457	0.8	
Source: World Bank, World Development Indicators (on-line)						

#### Background 2 Africa and Asia: Development comparison

	GDP	Industry	Industry share in GDP (%) 2014	Energy use		Carbon dioxide emmsissions	
	(annual % (ann growth) gro 2000-2014 2000	(annual % growth) 2000-2014		Total (MMTOE <sup>1</sup> ) 2012	Per capita (KOE <sup>2</sup> ) 2012	Total (MMT <sup>3</sup> ) 2011	Per capita (MT <sup>4</sup> ) 2011
Sub-Saharan Africa	4.9	3.0	27	540	694	739	0.8
Middle East & North Africa	3.9	3.2	37	476	1391	1,309	3.9
India	7.6	7.4	30	788	624	2,074	1.7
China	10.3	9.7	43	2,894	2143	9,020	6.7
REF: High income countries	1.7	1.1	25	6,456	4678	15,234	11.1
Notes:    1 MMTOE: Million metric tons of oil equivaolent      2 KOE: Kilograms of oil equivalent      3 MMT: Million metric tons							
	4 MT: Metric t	ions					
Source: World Bank, World Development Indicators (on-line)							

Key question: Who should drive Africa's sustainable industrialization?

- Can Government do it?
  - What is the lesson the East Asia countries
    - teach with their experiences?
    - 'Development State'
    - Pragmatic industrial policy
- Will foreign capital help?
  - What is the experience of Africa's mining industry?
- Who will engage with industrial development process on the ground? Who will take risks for innovation and investment?

#### Digression: UNU-initiated ESDA (Education for Sustainable Development in Africa)Project

# Multilateral graduate training and research program for sustainable

Programme	University	
Sustainable Urban	University of Nairobi	ES Pr
Development (SUD)	Kenyatta University	Sustaining cases 100 Sustainable Development in Africa
	University of Ibadan	University of National Keny atta University Upbygesity of Ibadan
Sustainable Integrated	University of Ghana	University of Ghana Kupatre Noruma University of Bence and fectmology
Africa (SIRDA)	Kwame Nkrumah University of Science and	University for Development Bludes University of Zamba University of Zamba
	University for Development Studies	Education for Sustainable Development in Africa
Mining and Mineral	University of Zambia	vertice to Automatily and Auto
Resources (MMR)	University of Cape Town	

#### Key lesson: Implication of mining capacity development

**Africa Rising Narrative and Cheetah Generation** 

- Is African economy really rising?
  Is cheetah generation equipped for long-term engagement and industrial leadership role?
  - Data, information and knowledge are critically missing not only *about* cheetah generation, but more importantly *for* cheetah generation.
- Enter transdisciplinary research

t

Collaboration between young researchers and young entrepreneurs to integrate knowledge, promote its innovative use and train, through transdisciplinary education, future entrepreneurs.

#### New initiative to develop youth entrepreneurship based on young entrepreneur-researcher collaboration

#### Africa Youth Entrepreneurship Workshop

Theme: African Youth entrepreneurship Development for Sustainable Industrialization

Dates: 25 - 27 August 2016

Venue: KCB Leadership Center, Nairobi, Kenya

Organized by: UNU-IAS, African Development Bank, University of Nairobi, the University of Tokyo GPSS-GLI Brain-storming workshop with 30 young entrepreneurs and 25 young researchers from 15 African countries



#### **TICAD Youth Entrepreneurship Forum**

Theme: Catalyzing the Next Generation for Africa's Sustainable industrialization

Date: 28 August 2016

Venue: Kenyatta International Convention Centre, Nairobi, Kenya

Organized by: Government of Kenya

African Development Bank,

United Nations University



Political endorsement at a major international conference hosted by Kenyan Government and supported by AfDB.

## **Workshop Recommendations**

- 1. Develop a <u>collaborative network of young</u> <u>African entrepreneurs and researchers</u> to share streams of entrepreneurial innovations and experiences
- 2. Expand and <u>increase the number of business</u> <u>incubation centers</u> across Africa for joint entrepreneurial innovations.
- 3. Develop entrepreneurial training courses and programs to be jointly hosted by African higher education institutions "Africa MBA"

#### Some references

- Anne Jerneck et.al. (2011) "Structuring sustainability science" Sustainable Science 6 DOI 10.1007/s11625-010-0117-x.
- Joachim Spangenberg (2011) "Sustainability science: a review, an analysis and some empirical lessons" *Environmental Conservation* 38 (3). Pp.275-287.
- Kaikawa, Y. (2008) "Research core and framework of sustainability science" *Susainable Science* 3 DOI 10.1007/s11625-008-0053-1.
- Danniel Lang et. Al. (2012) "Transdisciplinary research in Sustainability Sciencesustainability science: practice, principles, and challenges, DOI 10.1007/s11625-011-0149-x
- Masaru Yarime et. al. (2012) "Establishing sustainability science inhigher education institutions: towards an integration of academic development, institutionalization, and stakeholder collaborations" *Sustainable Science* 7 (Supplement 1) DOI 10.1007/s11625-012-0157-5. 10.1007/ s11625-012-0157-5.
- Shiroyama, H., Yarime, M., Matsuo, M. et al. Governance for sustainability: knowledge integration and multi-actor dimensions in risk management Sustain Sci (2012) 7(Suppl 1): 45. doi:10.1007/s11625-011-0155-z