Education for Sustainable Development in Higher Education in Asia

——Practical Change Projects Studies (From SIDA ITP ESD HE programme)

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——实践项目研究(来自SIDA ITP ESD HE 项目)

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Preface

As global populationis increasing and cities are expanding, especially in developing countries, the world's communities are dealing with the multiple challenges of climate change, resource efficiency, biodiversity protection and management of our growing legacy of waste and environment protection. When considering the future we want, it is recognized by many countries that their prosperity rely on the people's ability to embrace environment and sustainability issues through the core components of Education for Sustainable Development (ESD).

Education for Sustainable Development allows every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future. But it isnot simply another subject to be taught and included in the curriculum. However, it must be interdisciplinary, comprehensive, ethnical and practical. Considering this, higher education institutions play a unique and critical role in mainstreaming environment and sustainability in facilitating transition from our current unsustainable ways, which cannot match the growing need for educating people in critical thinking, imagining future scenarios and making decision at all levels in a collaborative and holistic way.

Since 2005, the International Training Programme (ITP) on Education for Sustainable Development in Higher Education was initiated by Sweden International Development Association (SIDA), in partnership with Tongji University in China and the United Nations Environment Programme (UNEP), aimed at participants from developing countries in Asia. Over 1,000 professors and administrators have attended the ITP sessions in Shanghai and Stockholm, sharing experience, learning from each other's case studies and change projects, and introducing innovations in their own curriculum, campus building, community enhancement and policy making. In this report, we are pleased to present selected case studies from ITP participants, whereby these change projects can be further disseminated and replicated.

I wish to thank SIDA for generously supporting the ITP project, and to NIRAS for the close coordination and overall management of the project. I am also pleased to acknowledge the partnership of UNEP, especially through the Global Universities Partnership on Environment and Sustainability (GUPES), and links with Africa through the Mainstreaming Environment and Sustainability in African Universities (MESA).

This year marks the end of the United Nations Decade of Education for Sustainable Development (2005—2014) and the launch of a Global Action Programme on Education for Sustainable Development. Yet we still have a long way to go in transforming higher education and education at large in responding to global environmental and sustainability challenges. I hope that this report not only provides an avenue to share experiences and best practices, but also to inspire new ideas and thinking on education for sustainable development, for our common future.

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United Nations Environment Programme (UNEP), Nairobi, Kenya Office

Contents

Introduction

Towards a Sustainability Oriented World-class University —A Case Study of the Sustainable Development Theory and Practice of Tongji University

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UNEP-Tongji Institute of Environment for Sustainable Development, Tongji University

Abstract

Against the background that the United Nations Decade of Education for Sustainable Development (2005—2014) is approaching to its conclusion and SIDA International Training Programme on Education for Sustainable Development is celebrating its ten years' achievements (2003—2013), this paper probes into the development of sustainability theory of Tongji University from a Green Campus campaign to a sustainability oriented university, analyzes the core values and practices of Tongji with regard to sustainable development education, research and international communications. Tongji's concrete actions in this respect are illustrated with the work of UNEP-Tongji Institute of Environment for Sustainable Development, Research Center for Green Building and New Energy and the Research Center for Sustainable Development and Management. By introducing Tongji's practice in SD, this paper aims to provoke critical thinking on SD in higher education as well as potentials for SD collaboration.

Key words: Sustainability-oriented University; Tongji University; higher education; research; social service

Context

1. Introduction

Located in Shanghai, one of China's most important windows for academic, economic and social dynamic and the joint point of the Belt and Road national strategy, Tongji University is blessed with a tradition of innovation and prospective vision since its establishment in 1907. Currently, Tongji offers comprehensive courses in its 82 Bachelors, 218 Masters and 94 PhD Programmes and 16 post-doctoral mobile stations, covering 10 categories of academic disciplines, namely engineering, science, medicine, management, economics, philosophy, literature, law, education and arts. Through its 22 state key laboratories and engineering research centers, Tongji's academic research is with world influence in the fields mentioned above. International communications and campus culture are also the priorities of Tongji. Tongji established institutes with United Nations agencies and foreign embassies, with which the international interaction brings dynamic and information to the campus.

Tongji has been kept pace of times and conformed itself to new globaland national conditions, especially after the Reform and Opening up Policy of China. During the Rio+20 summit (the United Nations Conference on Sustainable Development) in 2012, a group of UN agencies and partners initiated the "Higher Education Sustainability Initiative" to call for research and education driven SD and cultivate current and future decision makers with SD visions. The leaders of Tongji seized opportunities for development and forged a path for a sustainable development (SD) university. From SD in civil engineering to environmental management and pollution control, SD education through the Program for Young Excellent Talents, energy-efficient campus to a SD-oriented university, Tongji explores the path to integrate SD theory into practices in disciplinary development, talent cultivation, scientific research, international communications, campus

construction and social service, etc. In July, 2013, with the promotion of President Gang Pei and Prof. Zuyi Zhou, Chairman of Education Committee, Tongji identified "Towards a Sustainability Oriented World-class University" as its mission and goal.

Nature reported the practice of the green campus campaign of Tongji under the theme of "How green is your campus". Tongji shares its experience in SD education, research and campus development in important events, including the Rio+20 Summit, the first United Nations Environment Assembly, the 21st Century Sustainable Development International Forum in Tokyo etc. In recognition of its efforts in SD university development, Tongji was awarded the Sustainable Campus Excellence Award by the International Sustainable Campus Network in 2012.

2. Current Practice of Sustainable Development in Tongji University

The campus of Tongji is home to 50,000 students from China and the abroad in 35 schools, and a faculty team of national and international experts and researchers for education, research and tuition. Tongji also pays high attention to international communications and outreach through talents cultivation and exchange programmes, collaboration with organizations and enterprises. With the identification of its goal to develop a SD oriented world-class university, the SD in Tongji entered a new era by integrating SD theory into every aspect of its growing(Figure 0-0-1).

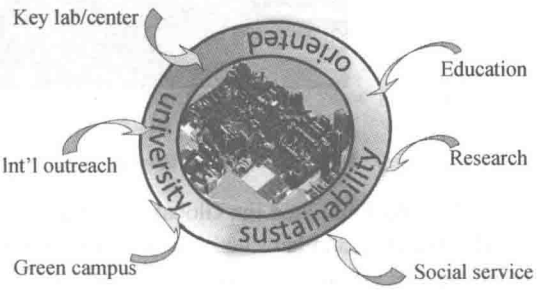


Figure 0-0-1 Tongji Siping campus and its SD practices matrix

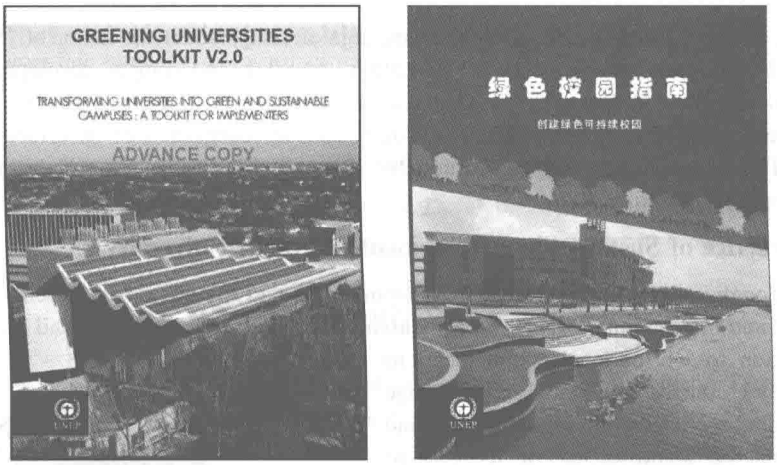
The Vice President of Tongji, Prof Wu Jiang and his team identified the Core System of Sustainability Oriented University Development of Tongji based on its years of practice. This system covers SD values, decision making, national and international communications and collaboration, life on the campus, education, research and social service. The seven aspects of the system are identified to the mission, function and vision of Tongji and each aspect works closely and complements each other. It serves to enhance people-oriented values and harmonious co-existence of man and nature, the designing of policies and think tanks, activate outreach and information sharing, as well as facilitate education and research in order to provide better service to the society through concrete actions and education of future leaders for the world.

3. Paradigms of Tongji in Sustainable Development

This paper willanalyze some paradigms of Tongji in its efforts towards a SD oriented university to foster critical thinking, for instance, on emerging ethics and values of SD in higher education and the next generation of leadership and vision for SD.

The UNEP-Tongji Institute of Environment for Sustainable Development (IESD) is co-established by United Nations Environment Programme (UNEP) and Tongji University in 2002. Over the past 12 years of UNEP-Tongji partnership, IESD has played a key role in facilitating South-South cooperation, environmental research and education through international SD education, SD technology innovation and transfer, the sharing of strategic research. IESD has been collaborating with UNEP, the Chinese Ministry of Science and Technology, Ministry of Environmental Protection, the National Development and Reform Commission, SUN-Habitat, among other international organizations and governmental sectors, to make contributions to global SD strategy by talents cultivation and capacity building programmes. IESD also serves as a base and window for international communications for Tongji, especially in the fields mentions above (For more information: http://unep-iesd.tongji.edu.cn). In 2013, Tongji and UNEP released Greening Universities Toolkit (Chinese and English version) to introduce the best practices in prestigious universities around the globe in order to provide guidance for SD in higher education (Figure 0-0-2). IESD integrates SD theory

into practice and education and build the campus as a green and ecological laboratory to encourage students to be part of the green lab and grow into a qualified citizen for green society development.



(a) (b)

Figure 0-0-2 The English and Chinese version of the UNEP *Green Universities Toolkit*

In 2010, UNEP initiated the Global Universities Partnership on Environment and Sustainability (GUPES) in its Headquarters and launched it two years later in Tongji. Prof Jiang Wu, the Vice President of Tongji, serves as the President of GUPES. Its secretariat sits in IESD. Currently, GUPES has over 520 members from over 75 countries around the globe. GUPES is not only a network for member universities to share SD theory and practices, but also a base for talents cultivation, information sharing and practice experiments (Figure 0-0-3). In addition to GUPES networking, IESD also promotes SD communications through its flagship projects, including the International Students Conference on Environment and Sustainability, the Asia-Pacific Leadership Programme on the Environment and Sustainable Development, etc.

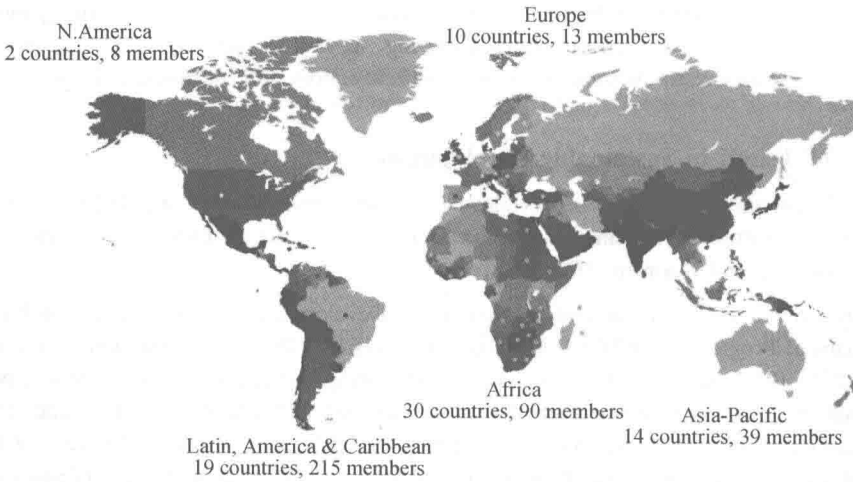


Figure 0-0-3 The distribution of GUPES members in the globe

With education and capacity building, IESD hosted over 40 national and international conferences and trained over 2000 people from governments, academic institutes, media and enterprises. Since 2006, IESD launched international Master and PhD programmes on environmental management and SD and environmental engineering as well as interdisciplinary PhD programmes for SD.

The inter-disciplinary education and research is developed on two dimensions by introducing fellow professors to take charge of discipline and curriculum system development related to the sustainable development and undertake relevant teaching task, and meanwhile, inviting international professors to undertake teaching tasks and international exchanges and promoting teaching reform and innovation. For courses designing, Tongji designs and develops public courses for undergraduates and minor degree for post-graduates.

A. Public Course of "Sustainable Development and Future"

Since the fall semester in 2013, IESD organizes interdisciplinary public elective course "sustainable development and future". In 2014, about 200 students enrolled in it. The course, in the form of lectures series, invites authoritative experts and scholars of different disciplines, analyzing problems from different perspectives, identifying the relationship between the future development of individuals and sustainable development. At the same time, IESD also gives public lectures to the whole students and faculty of the university.

B. Minor Degree of Sustainable Development for Postgraduates

Since 2012, IESD has been organizing the minor degree for SD to postgraduates in response to the demand of the university to cultivate talents with interdisciplinary vision and awareness in SD. Now more than 200 students from 26 colleges attend the minor courses. The core courses are as follows.

- environmental management & SD
- higher education & SD
- green building & SD
- environmental law & SD
- international relations & SD
- green economy & green finance
- creative design & SD
- Germany study & SD
- green transportation & SD

C. Interdisciplinary Ph. D. in "Environment and Sustainable Development"

It is indicated from practice that many significant scientific achievements are made by a multidisciplinary approach. In order to cultivate innovative leadership, IESD has decided to recruit 5 multidisciplinary doctoral candidates each year since 2013. So far, 10 doctoral candidates from different majors including mathematics, economics and literature have been enrolled and the academic outcomes turn out well. The programme continues a "double-tutor" system, in order to enrich doctoral scientific research system, and to expand the approaches to carry out the high-quality scientific research in Tongji University.

Cooperating with UNEP, IESD undertakes important research projects, including the Chinese version of UNEP's flagship report Green Economy Report, China-UNEP-Africa cooperation programme on the environment, Chongming Eco-Island Project, among others. State key labs on climate change and chemicals risk management also serve as the basis for researches in environment and SD.

A. China Meteorological Administration (CMA) key laboratory of "Shanghai Urban Responses to Climate Change"

The laboratory was launched with the Memorandum of Understanding signed by Prof. Gang Pei, the President of Tongji and Mr. Guoguang Zheng, the Administrator of the China Meteorological Administration in 2011. The key lab relys on multi-disciplinary strengths of Tongji University and Shanghai Meteorological Bureau in atmosphere, environment, civil engineering, architecture, oceanography,

topography, and communications engineering, and integrate the research and business strengths in the area of climate change of CMA and SMB, aiming to improve adaptability to climate change and explore strategies and techniques to address climate change of megalopolis areas. The focus of the key lab is on improving the capability of major urban infrastructure to adapt to climate change under extreme weather conditions, and the interactions between urban climate change and regional energy, resources and environment changes(Figure 0-0-4).

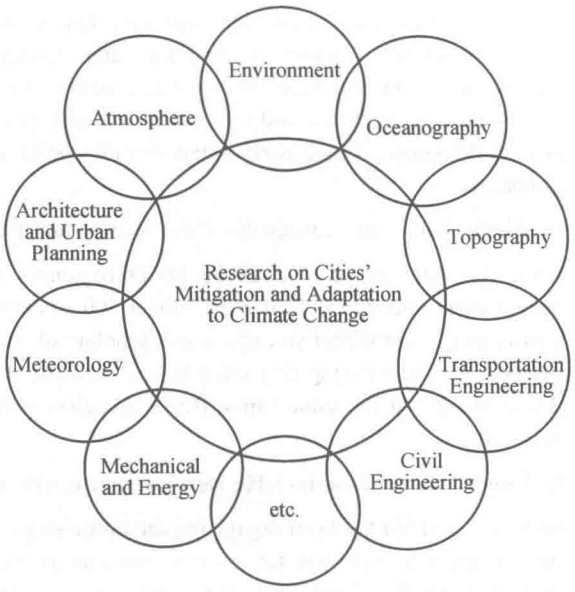


Figure 0-0-4 The interdisciplinary research teams of the key lab

B. Shanghai Key Laboratory of Chemicals Analysis, Risk Assessment and Management

This lab is supported by the Science and Technology Commission of Shanghai Municipality and Tongji University. With the resources mobilized from IESD, Chemistry department and the College of Environmental Science and Technology in Tongji University, it serves as a platform for interdisciplinary study. The establishment of "Shanghai Key Lab of Chemical Assessment and Sustainability" positively responses to the "twelfth five-year plan" on environment and it is also in accordant with the guidance of global chemicals harmless management of UNEP. This lab aims to strengthen the environmental management of chemicals by providing advices and solutions to the relevant government departments, enterprises and other organizations, so as to play the role of monitoring and supervision, precaution and emergency.

The technology support of SD in Tongji, especially with regard to green buildings and new energy is accomplished through the Research Center for Green Building and New Energy. Established in 2003, the Research Center is a platform for research on civil engineering, architecture, urban planning, energy, and environmental engineering. Its mission is to explore SD in architecture and urban industry so as to support China to achieve the goal of energy efficient buildings. For more information: www.cgun.org.

The green campus campaign of Tongji starts with resources and energy efficiency. A monitoring system was established to calculate the energy consumption and distribution on the campus to provide solutions of energy efficiency for existing buildings. On the other hand, Tongji is developing towards a greener campus, which requires a master plan for green development, including construction, operation, management and maintenance, SD education, etc.

The Center is also the secretariat to China Green University Network, which is launched in 2011. The Network is a non-governmental organization with 200 university members. It provides policy making proposals and stimulate communications among universities. In addition, the technology of Tongji's timing energy and carbon emission system can also be transferred to the members of the China Green University Network.

4. Outlook of the Sustainable Development in Tongji University

As the United Nations Decade of Education for Sustainable Development (2005—2014) is approaching to its conclusion, Tongji is well aware that education is central to its goal of building a Sustainability Oriented World-class University. In particular, Tongji will endeavor to forge researches on developing criteria for green campuses, including infrastructural, managerial and operational considerations, inspire and encourage students to develop SD thought and integrate it into their studies and future service to societies, improve the

resource efficiency of existing buildings and develop SD campus master plans, facilitate communications with national and international decision makers, so as to build stakeholder capacity to deliver systematic integration of sustainability principles into all aspects of university business and the cultivation of future leaders.

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1

Curriculum

1.1 Higher Education Quality and Capacity Improvement Project (HEQCIP) Climate Change Adaptation Towards Curriculum Development(CCACD) (Curriculum Development Project)

Sien Sreynet, Kong Sedth & Jeremy Rappleye
Bright Hope Institute(BHI Research Team), Cambodia

Figure 1-1-1

Abstract

This report is an academic journal article report on the research on "Climate Change Adaptation towards Curriculum Development". The climate change as discourse has now become a key factor when discussing impacts to livelihoods and resources in developing countries. Not a people will be affected equally in a region by climate change. Climate change will have differential impacts on different social groups under specific geographical conditions with varying levels of dependency on natural resource stocks. The degree of vulnerability of these groups, their resulting levels of poverty and their adaptive capacities will combine to determine the severity of impacts of system changes as a result of increased climate variability in conjunction with other social, cultural, economic or environmental change agents.

Poverty and high population densities in most South-East Asian countries would mean that even small changes in land or crop productivity would have serious social and economic consequences. Additional heat

stress, shifting monsoons, rising temperatures, changing rainfall patterns, and drier soils may reduce agricultural yields in regional countries. The most severe threat to livelihoods would perhaps come from bank of river flooding due to water level rise. Densely populated coastal areas and low-lying plains of South-East Asia would be particularly vulnerable to flooding. These include some of the most productive lands in the region, such as Mekong river deltas, and the Central Plain around the Tonle Sap Great Lake in Cambodia.

Climate change as a long term influence on livelihoods is poorly understood by the target groups. They have noticed changes, with an increase in temperature, increased erratic rainfall patterns with longer duration floods, climate change is not seen as an important factor in their lives, but they do recognize the potential for increased hardships if flood-drought intensity.

This study looks at the social-ecological resource systems of ten *Community Farming and Livelihoods* in Kampong Chhnang Province, Cambodia and began to assess the impacts of climate change on livelihoods activities and to outline key concerns and possible research and development actions to be taken in the future. This is a case study approach using different tools and to synthesize the results into broader concepts such as linked socio-ecological systems, wicked problems and Ecosystem-based livelihoods Management.

The key concerns are floods and droughts, with droughts being more important. Hot dry weather may lead to more animal deaths. The amount of farming has declined because yield per unit effort is poor and there is also local concern with over restrictive gender divisions on tasks/roles seem to be breaking down with both men and women doing all tasks including wage labor when beneficial to the household. All members of the family work towards household sustainability. Neither expresses distinct climate related perceptions on major concern is relationship between warmer and/or wetter weather and increased livestock/poultry deaths. It will be important for any future work on poverty reduction in these types of natural resource dependent communities, undergoing quite profound change, to begin with a better understanding of local perceptions and relationships concerning environmental and natural resource change. This requires better understanding of human agency and subsequent behaviors leading to more relevant and inclusive vulnerability assessments and hopefully to more fair and equitable climate change policies and actions for the rural resource users of Cambodia.

1. Context

• Introduction

The Department of Higher Education is currently focused on Higher Education Quality and Capacity Improvement. Curriculum Development is the one of activities to improve quality and capacity in the Bright Hope institute (BHI). The Bright Hope Institute is currently focus to review and upgraded curriculum training program to cope with job market, community need, and link higher education with community development. Climate Change and Adaptation is one of the most priorities topics to conduct research for training curricula development.

Throughout the developing world the real and potential impacts from climate change have now become critical elements influencing the wider rural development discourse. The argument to whether these climatic "change events" is part of very long term natural, global process or is recently man-made, or some complex combination is now moot. These changes are happening now in developing countries that they will need to alter their livelihoods and living patterns or be prepared to undertake environmental migrations. The potential impacts of climate change are: increase in air and water temperatures, changing precipitation patterns, increase in the frequency and magnitude of extreme weather events with long term negative effects on many sectors.

Thehistory of climate change in Cambodia shows that the climate has changed since 1960 in terms of rainfall patterns (more erratic) and temperature (general increases), and climate change is not happening in isolation, but is coinciding with many additional internal and external social and ecological stresses on