IGES Policy Report, No. 2012-05

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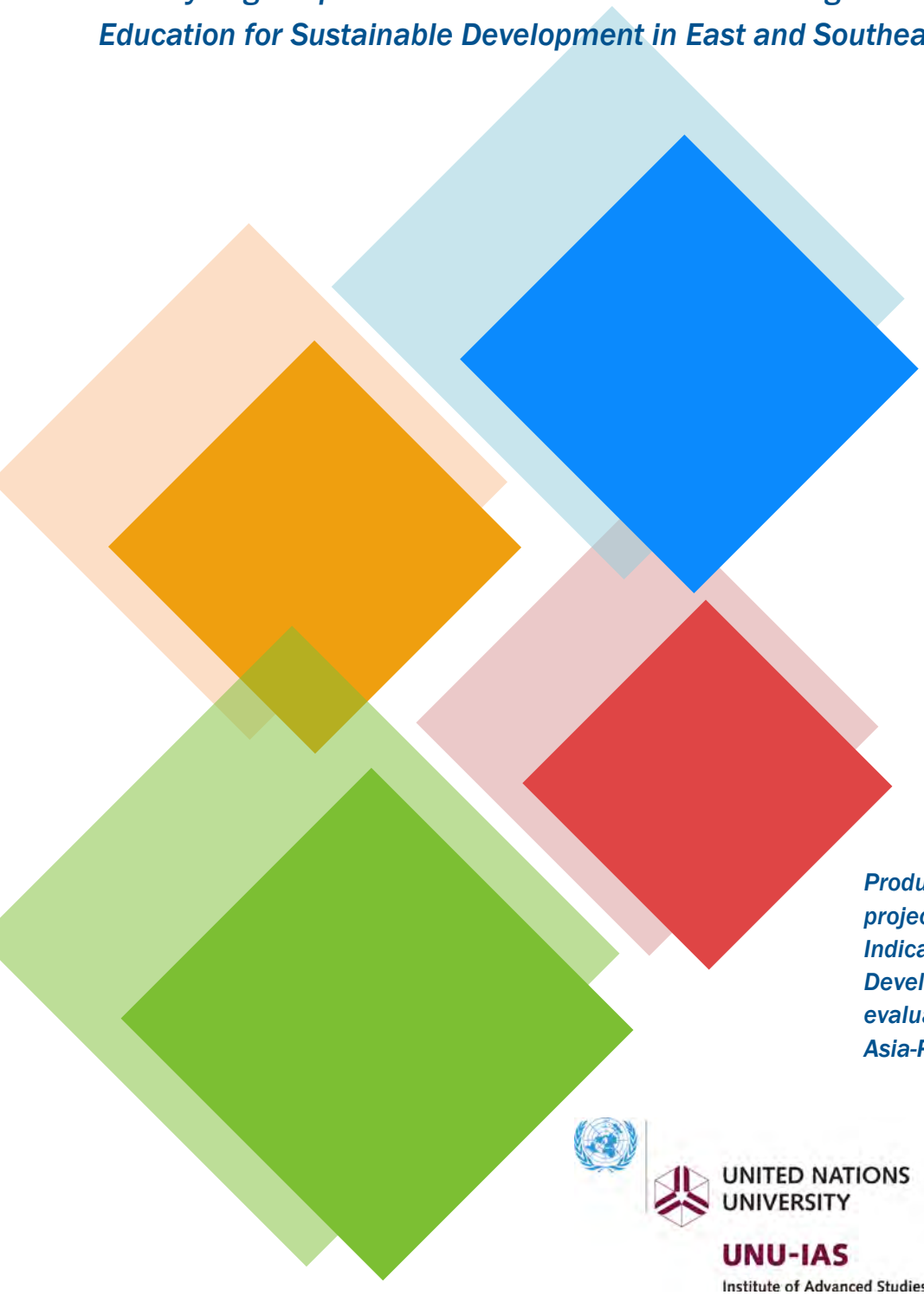
Investigating the Key Factors in Effective Educational Practice and Outcomes for Sustainable Development

A study of good practice cases collected from the Regional Centres of Expertise on Education for Sustainable Development in East and Southeast Asia



Produced as part of a joint research project by UNU-IAS and IGES to develop Indicators of Education for Sustainable Development to conduct monitoring and evaluation of its implementation in the Asia-Pacific Region

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Assessment of Learning Performance in Education for Sustainable Development: Investigating the key factors in effective educational practice and outcomes for sustainable development – a study of good practice cases collected from the Regional Centres of Expertise of Education for Sustainable Development in East and Southeast Asia

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FOREWORD

It is widely acknowledged that education for sustainable development (ESD) provides a new vision of education that empowers people of all ages to assume responsibility for creating and enjoying a sustainable future. ESD helps individuals, organisations and communities adopt behaviours and practices that contribute to sustainable living. The United Nations Decade of Education for Sustainable Development (DESD), which comes to a close in 2014, is providing a useful global platform for showcasing the special role of education in achieving a sustainable society. The DESD is fostering an increased quality of teaching and learning to engage people in sustainable development issues. For this reason it is important for us to conceive the DESD as a global social movement, whose work endures beyond the decade itself. Its principles and objectives must therefore be fostered and nurtured for the well-being of humankind.

A key objective of the DESD is to facilitate networking, linkages, exchange and interaction among various ESD stakeholders. The United Nations University Institute of Advanced Studies (UNU-IAS) has been achieving this objective through its Regional Centres of Expertise (RCEs) on ESD initiative. An RCE is a network of individuals, organisations and experts who are each committed to using education and learning as tools for fostering a sustainable society. As networks of formal, non-formal and informal education institutions, RCEs are well placed to translate the global vision of the DESD into local realities. Based on distinct capacities, expertise and resources within the network, RCEs contribute to multi-stakeholder learning and policy development. Collectively RCEs constitute a global learning space for sharing good ESD practices and dialogue, while acting as a catalyst for new partnerships on sustainable development. Collaborative RCE undertakings across geographic and disciplinary boundaries include research and development, re-orientation of education towards sustainable development, increasing access to quality education and providing training programmes for all sectors of society. These undertakings are useful in generating knowledge, values, ideas and principles that support ESD and promote implementation of the DESD.

Over the last seven years the RCE network has grown in size and positioned itself to address new and emerging challenges in sustainable development. RCEs in different parts of the world are taking an active role in implementing thematic and strategic actions on ESD. RCEs are now evolving into self-sustaining thematic and regional ESD networks. One such regional network is the Asia-Pacific RCE network, which comprises 41 members. This network provides a useful forum for sharing good practices in ESD and joint implementation of projects on thematic areas such as biodiversity and traditional knowledge, community and livelihood, youth, formal education, climate change and disaster reduction. There is no doubt that Asia-Pacific RCEs are taking a lead role in the implementation of the DESD in the region. It is instructive to note that 11 RCEs from the network provided qualitative data for the UNU-IAS and the Institute for Global Environmental Strategies (IGES) joint research project on monitoring and evaluation of ESD, whose findings form the basis for this publication. The 10 RCEs provided qualitative research through case studies on their flagship projects for comparative analysis on different approaches, visions, models and tools used to sustainable development in its three dimensions of economic, environmental and social.

Case reports on good practice in ESD provide useful insights into the benefits of multi-stakeholder partnerships and learning approaches used within the RCE network. The reports also highlight factors that both enable and constrain the implementation of ESD through the RCE initiative in the context of Asia-Pacific. Through monitoring and evaluation as learning processes of social change, it is possible to draw upon emerging lessons to improve implementation of new collaborative ESD projects. It is also possible to

investigate key factors which contribute to effective educational practice and sustainable development outcomes in a specific context. In order to ensure ongoing relevance and effectiveness of ESD, it is important to monitor and evaluate the implementation of the DESD at local, national, regional and international levels. This is useful in assessing change and also providing policy recommendations for future planning and implementation of ESD initiatives. This publication underscores the role of RCEs in providing learning performance assessment in ESD as a key indicator in monitoring and evaluation of the DESD.

I hope the readers of this publication will appreciate the concerted efforts that UNU-IAS and IGES, in collaboration with UNESCO Asia and Pacific Regional Bureau for Education, have put into implementing the joint research project that aims to establish regionally-relevant indicators of ESD. While noting that challenges remain in developing relevant indicators to measure ESD progress in the region, UNU-IAS welcomes the outputs achieved so far. I congratulate all those who participated in the joint research for the outputs. This publication illustrates the perspective that ESD is a multi-dimensional and evolving concept whose effectiveness cannot be easily evaluated by only one universal indicator. It is therefore important for UNU-IAS and IGES to continue their collaborative research agenda with a view to coming up with innovative evaluation methodologies and indicator sets for piloting and subsequent use in the Asia-Pacific region. The involvement of RCEs in this collaborative research provided an opportunity for reflection and learning, as well as skills development in the area of ESD monitoring and evaluation. I would like to thank the 11 RCEs that participated in the joint research project and further encourage their continued participation in monitoring and evaluation processes of ESD.

Yokohama, Japan
24 October 2012

Kazuhiko Takemoto
Director, ESD Programme
United Nations University Institute of Advanced Studies

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LIST OF ACRONYMS AND ABBREVIATIONS

AERD	Association of Environmental and Rural Development, Thailand
APRCEs	Asia Pacific Regional Centres of Expertise
ASMEP	Association for Science and Mathematics Education, Penang
BCD	Biodiversity Cyber Dialogue
BCDP	Biodiversity Cyber Dialogue Project
BTW	Bridge to the World
CBD	Convention on Biological Diversity
CBD-COP10	Tenth Conference of the Parties of the Convention on Biological Diversity
CBOs	Community-based Organisations
CERPN	Chubu ESD-RCE Promoting Network
CoP	Communities of Practice
COP 11	Eleventh Conference of the Parties (of the Convention on Biological Diversity)
CT	Critical Theory
DESD	Decade of Education for Sustainable Development (2005-2015)
DOE	(Australian Government) Department of Environment
DRE	Disaster Risk Education
DRR	Disaster Risk Reduction
EE	Environmental Education
ELPC	Educational/Learning Process and Content
ELT	Experiential Learning Theory
ERECON CaM	Environment Conservation and Rehabilitation, Cambodia Branch
ERECON	Institute of Environmental Rehabilitation and Conservation
ESD LP	Education for Sustainable Development Learning Performance
ESD	Education for Sustainable Development
FTSE	First Tier Sustainability Equilibria
GPO	Green Partner Okayama
HCM	Ho Chi Min City
HMUK	Her Majesty's Government of the United Kingdom
HRH	Her Royal Highness
ICT	Information and Communication Technology
IGES	Institute for Global Environmental Strategies
IPST	Institute for the Promotion of Teaching Science and Technology
ISAP	International Forum for Sustainable Asia and the Pacific
IT	Information Technology
IU	International University
JCN-CBD	Japan Civil Network of Convention on Biological Diversity
JICA	Japan International Cooperation Agency
KP4	Agricultural Training Research and Development Station, Gadjah Mada University
LP	Learning Performance
LR	Cooperative Learning Relationships
LTK	Learning Theories Knowledgebase
M&E	Monitoring and Evaluation
M&E of ESD	Monitoring and Evaluation of Education for Sustainable Development

MAD	Mixed Approach Design
MNS	Malaysian Nature Society, Penang Branch
NEPO	National Energy Policy Office, Ministry of Energy, Thailand
NGOs	Non-Governmental Organisations
NPOs	Non-Profit Organisations
ONEP	Office of Natural Resources and Environmental Policy and Planning
PAR	Participatory Action Research
PBL	Problem-based Learning
PEWOG	Penang Environmental Working Group
PP	Progressive Pedagogies
R&D	Research and Development
RCE GPP	RCE Greater Phnom Pehn
RCE	Regional Centre of Expertise on Education for Sustainable Development
RUA	Royal University of Agriculture
SAM	Sahabat Alam Malaysia
SC	Sustainability Competences
SD	Sustainable Development
SEAMEO	Southeast Asian Ministers of Education Organization
RECSAM	Regional Centre for Education in Science and Mathematics
SEP	Sufficiency Economy Philosophy
SERI	Socio-Economic and Environmental Research Institute
SIEP	Sirindhorn International Environmental Park
SLT	Social learning theory
SMEs	Small-to-Medium Enterprises
SNS	Social Networking Service
SWOT	Strengths, Weaknesses, Opportunities and Threats
TL	Transformative learning
TPI	Taiping Peace Initiative
TTSE	Two Tier Sustainability Equilibria
TUA	Tokyo University of Agriculture, Japan
UGM	Universitas Gadjah Mada
UN DESD	United Nations Decade of Education for Sustainable Development (2005-2014)
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNU-IAS	United Nations University Institute of Advanced Studies
USM	Universiti Sains Malaysia
VNU - HCM	Vietnam National University, Ho Chi Min City
VNU-IU	Vietnam National University's International University
WMA	Wastewater Management Authority
WV	Framework of Understanding and World-View
WWF-Malaysia	World Wide Fund Nature Malaysia
WWP	Water Watch Penang

Background of Research on
MONITORING & EVALUATION OF EDUCATION FOR SUSTAINABLE DEVELOPMENT

Beginning in July 2011, the United Nations University Institute of Advanced Studies (UNU-IAS) and the Institute for Global Environmental Strategies (IGES) initiated a collaborative research project in close cooperation with UNESCO Asia and Pacific Regional Bureau for Education. This project focuses on the **Monitoring and Evaluation of Education for Sustainable Development** (M&E of ESD) and aims ***to establish regionally-relevant Indicators of ESD*** for assessment of the implementation that has occurred during the United Nations Decade of Education for Sustainable Development (2005-2014) in individual countries across the Asia-Pacific region.

The **overall goal of the research project** is to contribute to the monitoring and evaluation of the implementation of Education for Sustainable Development (ESD) through development of progressive indicators for piloting in the Asia-Pacific region. The **main objectives of the project** include:

1. To develop an ESD monitoring and evaluation framework;
2. To develop an ESD learning performance-good practice case framework;
3. To gather data for National ESD Status Reports;
4. To collect case reports on ESD good practice and learning performance;
5. To undertake data analysis to identify leverage points, success factors and barriers to ESD implementation; and
6. To draft pilot ESD indicators for future application and assessment.

This project was developed with regards to the fact that the UN Decade of Education for Sustainable Development (DESD) will come to a conclusion in 2014. Although there is a large amount of anecdotal evidence about the successes achieved under the DESD framework, there is currently no systematic way to evaluate the implementation of ESD across multiple countries. Furthermore, one of the seven target implementation goals for achievement during the Decade clearly states the need for systems to monitor and evaluate ESD performance. With this in mind, this research project was established to first try to identify the important context, factors and leverage points that commonly lead to successful ESD implementation, along with identifying the strengths and barriers in achieving effective ESD learning performance. Second, the research team aims to launch a set of ESD Indicators for Asia-Pacific along with a guidebook for implementing an effective monitoring and evaluation process. These indicators will ideally be both regionally relevant while also being suitable for application by individual countries in the monitoring and evaluation of their own ESD systems. Thus, the indicators will need to be both replicable (allowing for annual systematic usage) and also provide comparability between different countries' ESD implementation.

The strategy for this research was developed to take account of both the quantitative and qualitative nature of educational monitoring and evaluation. However, this also highlights the conceptual challenge for M&E of ESD, which is that to provide meaningful and timely information to support effective interventions in ESD implementation it is necessary to demonstrate how specific educational inputs will support better ESD learning performance (i.e. increasing the quantity of a input should ideally lead to increased quality of ESD). The priority sectors and focal areas for ESD monitoring and evaluation addressed in this research were identified during an Expert Consultation meeting on ESD monitoring and evaluation held in July 2011 as part of the International Forum for Sustainable Asia and the Pacific (ISAP). It was agreed by the experts at this meeting that the target users of the outcomes from the envisioned monitoring and evaluation work should be national governments and relevant policy makers (especially those from the ministries of education and environment). Six different sectors were identified for investigation during the research; these include: National Curriculum, Formal Education, Teacher Training, Non-Formal Education, Civil Society, and the Private Sector.

Following the Expert Consultation held at ISAP 2011, an evaluation framework for identifying the target areas of ESD assessment was developed. This framework was then used to prepare a country ESD survey, and a further reporting format was developed to collect good practice cases on ESD in a systematic manner. Having received the agreement and support of our partner institutes, we then proceeded to initiate the country research and data collection phase of this project. The research utilised two distinct but complementary approaches. First, national ESD focal points were targeted for participation in a quantitative country survey regarding the national context of ESD implementation. Second, the Regional Centres of Expertise (RCEs) were targeted for qualitative research to provide good practice case studies for a comparative analysis.

This research phase of the project from June 2011 to August 2012 was conducted as a multi-country scoping process to identify the important areas for which indicators should be developed. The main research and data collection process occurred between December 2011 and July 2012 in two rounds, starting first with selected countries in East Asia and then following a refining process moving on to selected countries in Southeast Asia. During the scoping phase, research was conducted across a total of nine countries. Throughout the year long research process, two sub-regional reporting and capacity building workshops on M&E and ESD were held. Additionally, two meetings were also held with the Expert Consultation group to review the process and findings of the research project

The main purpose of this research process is to enable the movement from a wide evaluation framework towards the identification of a core set of important targets and leverage points for ESD. Thus, the scoping research phase was followed by the refinement of the selected ESD leverage points in order to elaborate a

set of regional ESD indicators. These proposed indicators went through a further review from the expert working group before their final drafting.

Four major outputs are expected as the products of this year's research. First, a compilation and comparative evaluation of ESD Country Status Reports will present the current status of ESD implementation in the seven reporting countries. Second, based on the ten good practice cases submitted by the RCEs, these cases are analysed to identify the important criteria for ESD qualitative achievements and develops a learning performance assessment framework for ESD. This report is the second output from this research. Third, a theoretical discussion of the process for monitoring and evaluation of ESD is presented and compared with the identification of specific leverage points for ESD implementation from the previous two reports to present an overall framework of the main factors and contents of effective ESD implementation. Finally, the specific ESD Indicators for piloting are identified and explained in a guidebook for ESD monitoring and evaluation in the Asia-Pacific region.

With continued usage and development of these indicators, it would be possible to provide substantial reporting on the status of ESD across the Asia-Pacific region and to provide a comprehensive report of the achievements made during the UN Decade of Education for Sustainable Development. These indicators should also serve as a valuable tool for individual countries to analyse their own ESD systems and to conduct a strategic needs assessment for planning future interventions for strengthening ESD implementation. Furthermore, a comprehensive study of ESD implementation in the region would also provide policy recommendations about how to continue to improve ESD into future.

The success of this research owes a significant debt to the generous participation of numerous contributors throughout the entirety of this research project (the specific contributors to this report have been noted on the title page). Over twenty-five people contributed directly to the data collection, country status reports and good practice cases. An additional group of fifteen experts provided review and consultation support for the overall research process. The continued support of UNESCO Asia and Pacific Regional Bureau for Education was invaluable throughout this work. The authors of this work and the members of the research team would like to express our deep gratitude to all of these individuals and organisations who have so eagerly cooperated with this research, and who continue to demonstrate a sincere willingness to improve the global implementation of Education for Sustainable Development.

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INTRODUCTION

To transition to a more sustainable world requires a new mind-set (Huckle, 2012) changed by a new form of education/learning that ushers humanity into a new paradigm pioneered by critical, holistic, systemic and systematic thinking citizens who seek to live in a more reflexive and resilient society. Education for sustainable development (ESD) is the core of this new learning.

After eight years of committing a significant amount of resources and time across the world to establish the importance of the UN Decade of Education for Sustainable Development (DESD) and embed sustainable development (SD) through education and learning in all spheres of life, the overall results achieved so far are mixed with modest accomplishments in the form of provision of capacity strategies, mechanisms, methods, practices and initiatives across various scales (Tilbury, 2010; Tilbury, 2011; Wals, 2012). There are also shortcomings including varying implementation of ESD across countries and regions, lack of an effective system to monitor and evaluate the implementation, and persistent questions regarding the level of impact DESD will be able to achieve on society during and beyond 2014.

Currently there are calls for measuring the progress of ESD implementation with the major challenge being how to evaluate the extent to which ESD has been implemented and how to measure the outcomes and identify methods to further mainstream the important learning processes in a systemic manner. On top of that is the need to identify capacity building measures aimed at the individual, group or community. ESD monitoring and evaluation (M&E) has been a high topic on the DESD agenda since the beginning of the Decade in 2005. However, there is still some ambiguity regarding the meaning and operationalisation of the ESD concept, hence making development of a conceptual framework for developing tools or indicators for measurement somewhat difficult. To overcome this conceptual challenge and provide meaningful and timely information to support effective interventions in ESD implementation, it is necessary to demonstrate how specific educational inputs will support better ESD learning performance (i.e. increasing the quantity of an input should ideally lead to increased quality of outcomes).

Against that backdrop, this work was designed as part of an on-going project to develop regional indicators for monitoring and evaluation of the implementation of the DESD in Asia-Pacific region, and also contribute to the formulation of new efforts and initiatives on ESD towards 2014 and beyond. In addition to implementing effective and relevant monitoring and evaluation mechanism(s) to fulfill one of the seven strategies of the International Implementation Scheme for the promotion of ESD, identifying and strengthening the platforms with the potential to effectively facilitate the implementation of ESD at the local /regional level is also crucial. Such learning systems should be able to mobilise resources and generate

adequate responses needed for development (Fadeeva, 2007) that differs by location and is content-specific by being culturally and locally relevant. The Regional Centre of Expertise (RCE) in addition to providing a regional learning system and platform for transformative education explores the subject of evaluating its ESD activities both as a global process and as local/regional learning initiatives (Fadeeva et al., 2005; Fadeeva, 2007).

This report presents good practice cases on ESD obtained from 11 RCEs in nine countries located in East and Southeast Asia. Although different in several aspects, the cases were qualitatively evaluated and where possible compared on the basis of both educational/learning processes and content types into which the parameters were grouped with the expectation that important information for the implementation of future ESD initiatives would be obtained, e.g., identifying the strengths and barriers in achieving ESD learning performance. Furthermore, the report comparatively analyses these good practices to distinguish the important components/aspects of ESD that lead to effective learning performance. In addition, an action-reflection process was utilised to develop a framework of the important components for ESD learning performance. This framework, if successful can be used for reference regarding the implementation of future ESD initiatives towards effective performance outcomes to strategically facilitate translation of the ESD agenda at the local level into a new global educational/learning framework especially as we near the end of the Decade of ESD and begin to consider what lies beyond. This report also aims to inform policy and to encourage greater support for the mobilisation of available capital in the local area/region especially from local governments and businesses.

The overall objectives of this study are to identify the important components of ESD that support effective learning performance and to develop an ESD Learning Performance framework based on these components. The aspects of ESD learning performance were investigated through an iterative, reflective process that cycled between investigation of the practice cases, reflection on existing educational theories, and testing initial propositions in comparison with actual practice in the cases.

Some of the questions that guided the research process and assessment include the following:

1) What benefits could be gained from this type of evaluation framework in the existing cases? What lessons could be learned for ensuring better learning performance in the future? How can it help structure good projects by incorporating coverage of all 4 elements and how can it help us have a better understanding of ESD practices in the context of effectiveness?
2) In connection with the quantitative part of the project, how can the two aspects the research be bridged? In other words, how can we develop indicators for M&E of ESD with the needed contextual knowledge of how educational inputs and throughputs impact the context and processes of learning and, how to achieve improvements in learning performance and ESD outputs?

Review of Theoretical Background

This section presents a review of various discourses about 'new ways of learning', namely the practice of ESD in contrast to an overview of the characteristics of conventional educational practices. It begins with a brief presentation on the current state of the environment, the importance of learning regarding that and then looks at the characteristics and processes of learning and its relation to knowledge and action. It does so at the backdrop of a summary of education/learning theories, some aspects of which seen to ground ESD will be expanded later in the report. The section also discusses the RCEs and their roles as important platforms to facilitate the embedding of this new learning (ESD) into society.

Forty years after the Stockholm Conference (1972) and twenty years after the Earth Summit in Rio de Janeiro (1992), which was followed recently by Rio+20 UN Conference on Sustainable Development, the state of the environment in the context of sustainability is still on top of the international agenda. This is because the environment has shown 1) uneven progress in regard to advances in technology, economic growth, agricultural productivity, access to education and clean air and water in many parts of the world, 2) inertia in relation to issues like improving quality of education, elimination/avoidance of war, resolution of ethnic tensions and all forms of conflict, 3) considerable decline in how natural capital/resources are managed, how global and regional ecosystems are protected, and how social justice and economic equity are achieved (Wals and Corcoran, 2012; Nelson and Cassell, 2012; UNDP, 2011; UNSG Report, 2012). Several of the nine planetary boundaries identified have exceeded their safe limits (Rockstrom et al., 2009) and in fact the planet is currently operating beyond its carrying capacity (Nelson and Cassell, 2012).

This situation is primarily due to humanity's inadequate perception (Sterling, 2002) and people's current modes of thinking that keep moving society away from a better, more sustainable world that is desired, and also a worldview that fails to see humans beings who think, feel and experience meaning and are able to connect to nature (Ledwith and Springett, 2010). What prevails therefore, in the midst of abundant information is a sense of crisis for which there are no ready-made solutions. To better address this crisis would require both a shift in the non-participatory nature of our world-view (Ledwith and Springett, 2010; Sterling, 2007; van Djik and van Djik, 2012) and a reversal of individuals' dissociation that has become such a prevalent social norm, for which education and learning can provide meaningful tools to re-address these types of normative conventions. Unfortunately, the majority of the world's current education systems are incapable of affecting this needed change let alone even considering the idea of a paradigm shift. This is because the type of learning embedded in these education systems are premised on worldviews that perpetuate unsustainability (Jucker, 2011), and hence the products of such education systems need to exploit the planet's resources further to maintain the status quo (of their lifestyles).

As Albert Einstein pointed out "we cannot solve problems by using the same kind of thinking we used when we created them" (Jucker, 2011: 41, Sterling, 2002: 15), neither can these challenges be solved solely through advances in technology, legislative instruments and policy frameworks (Wals, 2012), yet the educational approach as proposed by Freire in van Djik and van Djik (2012) can be the medium in which societies and their institutions of learning can become dynamically aligned to enable the recreation of society and its constructs of knowledge codification and interpretation to support the framing of a better, more sustainable global trajectory.

Hence the importance of this learning-based change (Tilbury, 2007) requiring a diverse array of learning processes and content (Wals and Corcoran, 2012; Wals, 2010) and needing a flexibility of contextualisation for various factors and scales can no more be ignored. The adoption of a resolution on education for sustainable development (ESD) at the 34th UNESCO General Conference in 2007 on the recognition that further significant steps ought to be taken by UN Member States and by UNESCO to reorient teaching and learning towards sustainable development worldwide (Wals, 2012) indicates how the contribution of learning and education to sustainability has increasingly become important. At the recent Rio+20 Conference in June 2012, the outcome document adopted at the summit reiterated the importance of ESD: "We resolve to promote Education for Sustainable Development and to integrate sustainable development more actively into education beyond the United Nations Decade of Education for Sustainable Development (2005-2014)" (UN General Assembly, 2012: paragraph 233: 41).

Learning for Sustainability:

Vare and Scott (2007) contend that if sustainable development (SD) is ever going to be achieved it would have to engage an active learning process. Learning is a complex concept as signified by a number of differing learning theories (Armitage et al., 2008), the fields/disciplines underlying it (Garmendia and Stagl, 2010; Loeber et al., 2007) and the various types namely individual, groups, and organisational or social systems (Senge, 2006; Senge et al., 2004; Kilpatrick et al., 1999; Lee, 1993). From that perspective, Lee (1993) distinguishes different types of learning first based on the division between individual and group learning, second by the division of the context of decision making processes, and thrid by the types of results to be learned. Other authors also posit different definitions and types of learning. Learning (and education) focused on building capacities and developing competencies is necessary for sustainability (Dlouha et al., 2011). Henry defines learning as the continuous and active "process by which actors assimilate information and update their cognitions and behavior accordingly" (2009: 131). According to Garmendia and Stagl (2010), the centrality of learning as a process to overcome current environmental crisis and reconstruct the existing problems and shape new values in society is conceived when Dewey's view of natural environment as a

constructed cultural conflict is brought to focus. This provides a means for individuals and groups to acquire capacity for adapting to local conditions/contexts.

As a process that involves collaboration and reflection, learning is an extension of this into an inter-generational dimension (Scott and Gough, 2010). Looking specifically at the meanings of learning and how it manifests itself in the context of ESD, Tilbury refers to learning that goes beyond knowledge and value acquisition along with theories related to SD as: "learning to ask critical questions; learning to clarify one's own values; learning to envision more positive and sustainable futures; learning to think systemically; learning to respond through applied learning; and, learning to explore the dialectic between tradition and innovation" (2011: 104). In a recently released 2012 Full-length Report on UN DESD, 'Learning for ESD' refers to "the learning experienced by all those engaged in ESD, including learners themselves, facilitators, coordinators and funders" (Wals, 2012: 12).

Learning could also have different meanings that depend on whether reference is being made to processes involving individuals, collective agents, or wider social systems (Tabara and Pahl-Wostl, 2007; Kilpatrick et al., 1999; Foster, 2008). According to Mehlmann et al. (2010), changes in our way of life are significantly linked to effective learning for sustainability and the meaning we derive from it, and furthermore for inspiring learners to take action because that action contributes to improving sustainability, not just learning for the sake of it. Additionally, learning is considered effective if it can result in immediately useful and tangible outcomes with regard to knowledge, understanding, skills, perceptions, values, etc., and also to strengthen the capability and motivation necessary for further learning (Scott and Gough, 2010).

Vare and Scott (2007) suggest three types of approaches to learning to bring about social change. Type 1 approach assumes that the problems humanity faces are primarily environmental and thus can be understood through science and resolved through the right social actions and technologies at the assumed backdrop that once facts have been established and people are told what they are, learning will lead to change. Type 2 approach assumes that humanity's problems are actually socio-political that produce environmental symptoms and could be addressed using anything ranging from socio-scientific analyses to an appeal to indigenous knowledge. They contend that for both types, learners learn to value what others tell them are important. "Type 3 approaches assume that what is (and can) be known in the present is not adequate; desired end states cannot be specified…. that any learning must be open-ended" (Vare and Scott, 2007: 3). They pointed out the importance of Type 3 approaches if the uncertainty and complexity inherent in our present way of life will result in reflective social learning about the nature of our future lifestyles.

Levels of learning, types of knowledge and links to action:

It is argued that the majority of educational systems around the world place a priority on the importance of the economic system at the detriment of other fundamental human goals which in effect has resulted in increased unsustainability and an accelerated loss of nature (Orr, 2003; Orr, 2004; Senge, 2010; Wals, 2010). Although learning is crucial to support a more sustainable future, much of today's non-formal and formal education add very little to supporting sustainability and in fact some learning further enhances people's ability to exploit the planet's resources (Sterling, 2007; Jucker, 2011).

Bateson (as referenced in Sterling, 2007) and also Argyris and Schön, (1996) identify three levels of learning. First order learning constitutes the basis of most educational systems and is the functional transfer of knowledge/information, but it occurs without any real consideration or questioning of the values or logical frameworks that predicate these ideas. This type of learning helps maintain a functioning social system by ensuring common understandings and beliefs, and Sterling refers to this as adaptive learning as it enables the learner to better adjust to the structure of the world around them (2002: 15). First order learning contributes very little to sustainability if any at all. Second order learning though engages the learners in active questioning and examination of the assumptions and beliefs that frame what is learned in first-order learning, and this is achieved through the engagement of critical reflection. This type of learning is seen as contributing to the sustainability process because learners are able to react to new situations regarding the challenges of sustainability and may as a consequence, change their previous perceptions. Third order (epistemic) learning, or the transformative, creative learning that leads to a complete change of worldview/epistemology and the awareness of the presence of other worldviews, engages the learner in a process where knowledge frameworks are questioned for their overall validity in making meaning out of real world complexities and challenges. With regard to whether one sees sustainable development as an opportunity or crisis, especially the third order learning comprising the engagement of the cultural and educational systems to first transform in order to be transformative (in a double learning process) should be applied (Sterling, 2002: 15-6).

Learning however cannot occur without new knowledge, implicitly or otherwise (Hilden, 2011) and assumed to be "produced through experience and inquiry, rather than taught through lines of social interaction" (Henry, 2009: 135). And different processes and approaches of learning result in different knowledge types and knowing which in turn contribute to different change processes (Dieleman and Huisingh, 2006). According to Miller et al.,

> Sustainability knowledge has several characteristics including social robustness, recognition of system complexity and uncertainty, acknowledgement of multiple ways of knowing and the incorporation of normative and ethical premises… In order to produce sustainability knowledge, the knowledge production process itself must be changed to be more adaptive and engaged with society… Two organizing

> characteristics for institutions seeking to produce such knowledge are proposed – epistemological pluralism and reflexivity (2011: 177).

Linking knowledge (through learning) to action, identifying the different processes to how we learn and the types of knowledge we gain from these various dimensions is important as a precursor of action. The transition towards sustainability will require action and change that is guided by an understanding of the complexities that arise within an interconnected system, as well as the ability to collaborate with people from diverse backgrounds, while keeping an eye to the future (Frisk and Larson, 2011). Knowledge creation is however, affected/limited by the system (science, technology and social actions) properties: complexity, bounded rationality, limited predictability, indeterminate causality, and evolutionary changes and uncertainty (Garmendia and Stagl, 2010; Tauritz, 2012). In situations where decision-making is based on knowledge that is lacking or non-existent due to these limiting properties described, reliance on critical reflective processes and adaptive approaches should be considered (Garmendia and Stagl, 2010).

The process of learning:

The process of learning and the specifics of how we learn in the context of ESD is equally important, if not more important, than what we learn (Wals, 2012). The learning process comprises both the external factors – like the role of social influence and direct observation – and internal factors. Illeris (2004) points out the most basic assumptions of learning as including two significantly different types of process, namely "(a) an external interaction process between the learner and his or her social, cultural, and material environment and (b) an internal psychological process of elaboration and acquisition in which new impulses are connected with the results of prior learning" (Illeris, 2004: 81). As a result, she posits learning should always include three aspects "the cognitive dimension of knowledge and skills, the emotional dimension of feelings and motivation, and the social dimension of communication and cooperation—all of which are embedded in a societally situated context" (Illeris, 2004: 81). Henry points out at least four building blocks to the general process of learning. They include "the internal cognitive structure of agents, their outward networking behavior, the role of social influence, and the role of individual experience" (2009: 136).

According to Schon (in Loeber et al., 2007), what causes an individual to learn is the link between the actor and the situation encountered. Practically, learning takes place both in *action* and *interaction* and focuses on the cognition-action relationship rather than on increase in individual stock of knowledge. Schon integrates values and beliefs in the theory of learning and describes the process of learning as: "Observation and experience provide a continual flow of information through which one can come to reflect on one's goals and actions, and on the way in which these goals and actions relate to each other with regard to the context in which one operates" (Schon in Loeber et al., 2007: 87).

Foster (2008) describes sustainable development as intrinsically a learning process with a goal to make the future ecologically healthy and safe for humans to live in through a continuous development process of responsive learning. As a process that involves collaboration and reflection, learning is an extension of this into an inter-generational scale. Whether it is by the individual or a social group, a key point to note about effective learning is that it brings about tangible and immediately useful outcomes with regards to the sustainability elements, and it also reinforces the capability and motivation essential for further learning (Scott and Gough, 2010). Loeber et al. (2007) argue that conceptualising learning for SD as a social process is beneficial for engaging individuals in considering challenging or uncomfortable topics that alone they may actively avoid, as such learning in groups may bring about second order learning by pushing the individual to step beyond his or her own narrow conceptualisations.

One challenge of learning is the lack of room for experimentation by individuals, groups or institutions central to the problem to produce the needed change to solve real problems. And due to the financial, physical or intellectual resource constraints on those individuals living closer to the borderline of survival, engaging in rethinking their paradigm and behaviours is unlikely (Bernard and Armstrong, 1998). Understanding complexity as it relates to the planet, moderating normative beliefs and conflict of values, linking knowledge with action, and producing new values for sustainability are other learning challenges (Henry, 2009).

Learning/Educational Theories:

Although several educational learning theories exist, for the purpose of this report and in the context of the RCE concept, (educational) learning theories that bear relevance to the perspectives of sustainability/ESD will be emphasised. Perspectives and/or contexts that address action-oriented processes of learning in formal and non-formal educational settings will be underscored. The primary learning theories in education can be broken down into four overlapping categories of behaviourism, cognitivism, contructivism and humanism with differences usually found in the 1) purpose of education, 2) the definition of learning, 3) the role of the students, and 4) the role of the teacher (Isbell, 2012: 19).

- Behaviourism: Ivan Pavlov (1849-1936) and John Watson (1878-1958) established the foundation thinking in this field, and behaviorists are concerned with observable behaviours and ways of modifying those behaviours (Isbell, 2012). Behaviorism as a worldview conjectures that a learner is fundamentally passive and that he/she responds to environmental stimuli. At the beginning of education, the learner is viewed as a clean slate, thus behaviour can be moulded through either negative reinforcement or positive reinforcement (LTK, 2012). Both reinforcements assume increase in the probability of the reoccurrence of the previous behaviour. On the contrary, both positive and

negative punishments, i.e., the application of a stimulus and withholding of a stimulus, respectively decrease the probability of the reoccurrence of the previous behaviour. Learners thus want to avoid behaviours that are punished and feel bad and repeat those that are rewarded and thus feel good. Because negative implies the withholding of a stimulus and the positive means the application of a stimulus, behavioural change in the learner is considered as evidence of learning (LTK, 2012). In strict behaviourist understanding, the teacher is supposed to make the decisions and control the learning environment while the passive learner just responds to instructions without making any active individual or cooperative decision (Isbell, 2012).

- Cognitivism is viewed as a replacement to behaviourism in the 1960s and a shift in the dominant paradigm. Based on the premise that the human mind is valuable and necessary for understanding how people learn; people are viewed as rational beings that need to actively participate in order to learn and whose actions are a consequence of thinking, rather than as mere respondents to external stimuli (LTK, 2012). Cognitivism emphasises a linear path to knowledge gain and learning where information is taken in, it is then ordered by the individual's cognitive processes, and in turn it leads to new perspectives and actions. "Mental processes such as thinking, memory, knowing, and problem-solving need to be explored. Knowledge can be seen as schema or symbolic mental constructions. Learning is defined as change in a learner's schemata" (LTK, 2012: 29). Changes in behaviour are observed, but only as an indication of what is occurring in the learner's head. Cognitivism elucidates two approaches: 1) the receptive method where students are viewed as passive recipients of knowledge from the teacher who designs structured educational events for them; and 2) the discovery method where the students are engaged with active learning and can apply their own individual use of content in a unique way, while the teacher's role is guiding the students towards the educational objectives as a facilitator (Isbell, 2012).

- Constructivism maintains that learning is an active process in which learners construct much of what they understand based upon what they already know but by extending beyond the information provided to them in order to discover the key principles and ideas by themselves and therefore construct new knowledge (Isbell, 2012; Armstrong, 2011). Constructivism is a view in philosophy according to which all "knowledge is comprised of compilation of human-made constructions and are not the neutral discovery of an objective truth. From constructivism point of view, subject matter must be made personally relevant to the learner allowing for an opportunity for meaning-making whilst at the same time the subject matter must emphasize multiple perspectives" (Armstrong, 2011). The reason for the high suitability of the constructivist approach for instruction in learning is its ability to enable learners to engage with and learn from each other. Within

constructivism, learners are considered active in individual construction of their knowledge, thus the educational process must extend beyond mere knowledge transfer (as this is understood as a false or incomplete view of learning) and rather teachers should enable a rich variety of opportunities for interaction with and discussion on new information to encourage each student to engage with the information in multiple meaningful ways (Isbell, 2012).

- Humanism, a philosophy as well as a pedagogical approach that emerged in the 1960s and whose major proponents were Abraham Maslow (1908-1970) and Carl Rogers (1902-1987), focuses on human freedom, dignity, and learning viewed as a personal act to fulfil one's potential. A central assumption of humanism is that people act with intentionality and values (Huitt, 2001), and humanists believe that self-actualisation, autonomy and wholeness as an individual grows and develops should be the primary educational focus (Isbell, 2012; LTK, 2012). Humanists thus contrast the behaviourist argument that all behavior is the result of the application of consequences as well as the cognitive psychologist belief that knowledge discovery or constructing meaning is central to learning. In humanism, learning is student centred and personalised, and the educator's role is that of a facilitator. Affective and cognitive needs are key, and the goal is to develop self-actualised people in a cooperative, supportive environment, characteristics that are closely linked to ESD.

Related to the educational theory of humanism is Experiential Learning Theory (ELT), developed by Kolb and Fry (1975) and Kolb (1984). Sometimes it is understood as a bridge between behaviourist and cognitive learning theories because it encompasses attention, memory, and motivation (Gibson, 2004). Social learning theory (SLT) was proposed by Albert Bandura and is related to Vygotsky's social development theory and Lave's situated learning, both of which emphasise the importance of social learning. SLT posits that people learn from one another, by observing others' behaviour, attitudes, and outcomes of those behaviours, imitating, and modelling (LTK, 2012). The conditions for effective modelling being attention, retention, reproduction and motivation, one then forms an idea of how new behaviours are performed, and later on use this coded information to serve as a guide for action. SLT explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural, and environmental influences (LTK, 2012). These learning theories, ELT and SLT, along with additional theories that attempt to go beyond or combine the more archetypal positions of the meta-learning theories (i.e. behaviourism, cognitivism and constructivism) including communities of practice, critical theory, cooperative learning theory, critical pedagogy/praxis, transformative learning, social learning, problem-based learning, etc. will be discussed in detail in Section 3 of this report.

Although often not discussed, ESD draws strong links with and is mostly underpinned by education/learning theories and methodologies some of which already exist in current education systems but have not been integrated and hence used effectively. Many of the theories and methodologies that are identified in ESD would be considered as those that are progressive in nature or those that have been presented as a call for reform of traditional educational systems. For the overall effectiveness of ESD therefore, it would be beneficial to bring together these relevant theories and methodologies that ground ESD with respect to both the process and content of education through identifying the characteristics salient and relevant to the learner. Furthermore, by clearly linking with these existing calls for educational reform arising though from more traditional educational backgrounds, it is possible to more clearly articulate ESD's role in qualitative improvement for educational systems.

Traditional Educational Experience versus Envisioned Experience through ESD

Performance-based Testing (Standard Methods of Assessment) and its limitations:

Performance-based assessment, although representing a set of strategies for acquiring and applying one's knowledge, skills, and work habits by performing tasks, is not necessarily meaningful to students. Additionally, the literature is clear that present educational systems need a significant overhaul or a paradigm shift to provide learners with skills and knowledge to meet current and future challenges. According to UNESCO (2005a), the traditional methods of assessment fail to measure numerous aspects of quality education whose methods welcome holistic view of the overall quality of education including life skills, perceptions, behaviours and values. Addressing learning performance using standardised methods of assessment thus has been difficult in the face of the present environmental, social and economic challenges. The reasons for this difficulty include the following:

- The pedagogical objectives inherent in assessment and evaluation systems have a narrow focus as they rely on a few performance indicators, primarily test results;
- The curriculum is compartmentalised hence the subjects/disciplines are not integrated and are mainly dealt with in isolation often resulting in reductionist approaches kept in "silos" with power relations at play;
- The individual is assessed on the assumption that learning occurs independent of one's motivation and the environment;
- Teachers' concentrate mainly on helping students pass tests instead of offering the student a balanced education that will provide the knowledge and skills to address the real world because school systems as a whole are evaluated based on performance in such tests. Teachers' creativity and innovation in themselves are thus stifled;
- Only the aspects of learning that are easily quantifiable (e.g., knowledge memorisation) get measured while the affective aspects like values, respect, care, motivation and stewardship that are difficult to quantify are avoided;

- In the traditional context of education, teaching is conducted in ways that limit students' agency. Furthermore, alternative perspectives raised are limited in number; students who do not conform to the laid down rules or norms are marginalised; with the learning environment often separated far from the real world, and;
- It is also assumed/considered that power, privilege, and hierarchy prevail in the traditional learning setting and that teaching is considered a political act with teachers as political agents, and the pedagogical tools are rooted in politics and ideology (Columbia University, 2012).

The literature is replete with information that the current structures of many education systems are unable to meet the difficult and complex problems presently facing humanity and thus calls for its complete overhaul of educational systems in order to equip people with the capacity and ability to address such problems. In addition, UNESCO, the lead implementer of the Decade of Education for Sustainable Development (DESD) makes clear that "Traditionally, literacy, numeracy, and disciplinary knowledge are assessed using standardized tests and data are gathered related to enrolment and attendance; however, these do not measure many aspects of quality education. Missing are assessment and evaluation of life skills, perceptions, behaviours, and values, which are part of quality education" (UNESCO, 2005a: 4).

Mastering the challenges – environmental, socio-cultural, economic, ethical, temporal (Ofei-Manu and Shimano, 2012a) – that sustainability presents requires individual learning and also the processes of learning across the scales of human systems, namely groups, organisations, human societies and mankind (Senge et al., 2008; Garmendia and Stagl, 2010; Senge, 2006; Senge et al., 2004; Kilpatrick et al., 1999; Lee, 1993). It is hence necessary that sustainability learning is understood as a concept with multiple levels, and which consists of individual, group, organisational and societal learning. Sustainability learning should also be seen as processes of human learning across these levels and which places a strong emphasis on the role of transdisciplinarity (Hansmann, 2010; Scott and Gough, 2010) and also connecting of disciplines (interdisciplinarity) in a transformative dimension with local and global reach and incorporated with value orientation (Dlouha et al., 2011). One further point to note about the emerging education paradigm guided by ESD is the shift of emphasis on education towards learning (Scott and Gough (2010) and that learning rather than teaching should be emphasised (Raivo 2011; Wirth and Perkins, 2008).

Education for Sustainable Development (ESD) and New Forms of Learning

Conceptualisation of ESD:

Effective strategies for addressing sustainability issues from the local to global level are imperative, as there is broad consensus that education, including all its components must be the major driver for achieving sustainable societies (Hansmann, 2010). Thus, human resources are important for addressing these sustainability issues enabled through appropriate development of human capacity using a broad range of

educational means such as formal and non-formal education (and learning), training and public awareness raising (Landorf et al., 2008; IGES, 2005). ESD includes a complexity of concepts, theoretical constructs, policy prescripts and practical methods and tools that translate education and learning into multi-dimensions of sustainable development including socio-economic, ecological and cultural dimensions (Lenglet et al., 2010). ESD also concerns knowledge development, understanding, perceptions, and values that lead to the recipients being empowered and consequently enabled to participate in decisions about lifestyle changes and behaviours that will improve the quality of life at present and sustain the planet for future generations.

By providing the opportunity to address sustainability challenges through integrating the elements of sustainability, namely principles, knowledge, perceptions, values and practices directly into education, ESD becomes the total sum of different ways to become a 'learning society' where people learn with and from one another and together become more resilient to confront sustainability challenges that induce insecurity, complexity and risks (IGES, 2005; Wals et al., 2009). ESD is further advanced as a social process that grants people 1) the vision and ability to confront and solve problems that threaten their existence on the planet; 2) the ability to obtain values and principles of ESD and 3) the ability to see the complexity, integration and holistic aspects of the planet through the SD pillars (Didham and Choi, 2010). Furthermore, ESD is a lifelong learning process that is holistic and interdisciplinary in nature (McKeown, 2002); ESD is also strongly underpinned by values and local relevance and with the principles of critical thinking and problem-solving. In ESD therefore, the complex nature of its pedagogical objectives is at odds with the narrow focus inherent in standard assessment and evaluation systems that pertain in conventional education where mainly test results are relied upon (Kertesi, 2007). ESD thus dissuades standardised testing, while methods that speak to the holistic view of the overall quality of education are encouraged (Armstrong, 2011).

As a continuously unfolding concept as well as practice, the contribution of education and learning through ESD could result in improvement in the quality of life for people, help create resilient individuals, groups or society who are capable of thinking holistically, systemically and integratively, and able to adapt to adverse environmental conditions using their acquired knowledge, values and skills. According to Mehlmann et al. (2010), the two principal components of ESD are 1) the profound change in ways in which people and communities across scales use the biophysical or ecological resources of the planet and relate to each other in the context of sustaining the Earth's carrying capacity (transformation), and 2) the intellectually practical, life skills of learners to comprehend their world in its complexity and to contribute to the necessary collective and individual action required for transformation to occur and be effective (action competence). What needs to be considered as important is the effectiveness of the learning process and the consequent outcomes being achieved when evaluated.

Vare and Scott (2007) extend their argument on the types of learning approaches to cover what they term the "two sides of ESD" namely ESD 1 and ESD 2, considered inter-related and yet complementary. The characteristics of ESD 1 are described as follows: 1) promoting and facilitating changes in what we do, 2) promoting informed, skilled behaviours and ways of thinking, and 3) learning *for* sustainable development. They argue that ESD 1 a) links to Types 1 and 2 of learning approaches described earlier in this section; b) is a single loop learning as posited by Argyris and Schon (1996); c) is where learning to do things results in different and more efficient outcomes and often with guidance through incentives and penalties, and d) where the received view of sustainable development is expert-knowledge-driven with the learner doing as instructed. They argue that it is ESD 1 that is primarily driving the DESD and additionally, it is the way governmental agencies and NGOs seem to think presently about ESD's framing.

The characteristics of ESD 2 include the following: 1) building capacity to think critically about what is put out by experts and the ability to test SD ideas, 2) ability to explore the contradictions and dilemmas inherent in sustainable living, and 3) learning *as* sustainable development and seeing sustainable development as a process in relation to the emergent future ecology, social learning and continuity of the process (Vare and Scott, 2007). Being inherently educative and seen as a double loop learning where learning to do different things effectively is the hall-mark, ESD 2 involves the development of the abilities of learners to make sound choices at the backdrop of the future's inherent complexity and uncertainty.

ESD 2 is supported by Wal's (2011) emancipatory perspective of ESD based on capacity building and critical thinking to result in citizens who are capable of examining new challenges and acting on them. He contrasted this with the instrumental perspective which is used of ESD (i.e. through information provision, awareness raising and attitudinal change) to try and change peoples' behaviour which has not been enough to drive wider social change. According to Tilbury (2010) and Tilbury and Wortman (2004), dialogues linked to changes in behaviour and learning based on single issues are being overtaken by discourses on mindset transformation. A whole-system and integrated approach for ESD brings together the following: 1) agreements, laws and policies guiding society, the environment, economy and culture; 2) policies governing all levels of education, including training of staff; 3) existing ESD initiatives in state, private and civil society sectors; 4) the role and purpose of education through the local, regional and national lens; 5) issues in the context of social justice like marginalized groups and inequality (UNESCO, 2010).

Challenges facing ESD implementation

ESD implementation faces numerous challenges. These include the following: 1) the ability to orient present and future human behaviour toward more sustainable lifestyles and practices, 2) the ability to use critical, values-driven, systems thinking, interdisciplinary, multi-method, holistic, and participatory approaches to

solve problems and make decisions that are locally and culturally relevant, 3) the ability to use appropriate methods and indicators for monitoring and evaluation of ESD, 4) the unevenness of ESD implementation at the regional, national and even local level, 5) support for ESD-related research focused on performance improvement and capacity building, 6) Coordination and involvement of the media, 7) how to create awareness and understanding of ESD in the wider educational community and in the general public, 8) the re-orientation of curricula: whether to integrate ESD into the already existing subjects or let it stand alone, 9) lack of funds and the challenge to secure sufficient funds for the implementation of ESD programs, 10), lack of ESD resource personnel and ESD-competent teachers, 11) low level of political support at the local and national levels, 12) Lack of appropriate tools for ESD implementation, 13) existence of a weak inter-interagency collaboration and overall coordination and weak linkage between the top (policy) and the bottom (grassroots) due to lack of coherent policies, such as a guidance document or an action plan, and 14) lack of proper coordination of activities in the various education settings of formal, non-formal and informal education (Ofei-Manu and Shimano, 2010 and the references therein; Gross and Nakayama, 2010; Filho, 2010). The most significant conceptual challenge currently facing ESD is whether ESD should focus on capacity building and critical thinking or if it should aim for change in students' behaviours (Wals, 2011; Tilbury, 2010; Bourn, 2008; Vare and Scott, 2007).

Regional Centres of Expertise (RCEs) as Platforms for ESD-based Learning

The inclusion of the Regional Centre of Expertise (RCE) in this research was considered as important for a couple of reasons. The RCE serves as a learning system in addition to acting as a major implementer of ESD at the grassroots level. The RCEs in Asia-Pacific in particular are known by their trailblazing role regarding RCE initiatives in the larger picture of ESD implementation and their capability to propel the success stories globally through the international network of RCEs. Thus, the RCEs provided an ideal source for investigating ESD implementation at a local level and to identify the factors leading to good practice and effective learning.

The concept of Regional Centres of Expertise (RCEs) on Education for Sustainable Development emerged during a search for a strategy that would facilitate translation of the ESD agenda at the local level. It has been embraced by different actors since its first introduction by the United Nations University-Institute of Advance Studies in 2003-2004. There are currently 101 centres worldwide.

RCEs vary in size, affiliations and functions as an ideal regional centre of expertise acting as a microcosm of the region/area that should be capable of identifying issues that are of concern to the local citizens and address them in a holistic and integrated manner. Not being necessarily a physical centre but an institutional mechanism to facilitate capacity development for SD, an RCE is to serve as a framework for the production, harnessing, exchange and facilitation of vertical, horizontal and lateral integration of knowledge and

information through close co-operation with different institutions that include a majority of stakeholders in the region/local area. RCEs also support joint development of innovative programs towards ESD (Fadeeva et al., 2005; Mochizuki et. al., 2005; Ofei-Manu and Skerratt, 2009; Sanusi, 2010). The RCEs are regional initiatives that contribute to the local implementation of UN DESD (Fadeeva and Mochizuki, 2010).

In addition to redefining existing environmental activities in alignment with the principles of ESD at the local and regional levels, RCEs can also enable the duplication and dissemination of good practices (Ofei-Manu and Shimano, 2010). The RCE beyond being a platform for transformative education (Fadeeva et al., 2005) and regional learning (Fadeeva, 2007) also has among its vision and strategies the desire for collaborative sustainability research and learning including the ability to use indigenous technologies for low carbon societies (UNU-IAS, 2011). There is a need for knowledge/learning systems capable of producing outcomes for the enhancement of skills and competence to address the present uncertainties and upcoming changes by generating solutions to shape development trajectories of the future (Fadeeva, 2007).

The RCE has also evolved as a concept. Originally, it was supposed to serve "the purposes of managing knowledge, transferring knowledge and delivering ESD to the community" (Mochizuki and Fadeeva, 2008**).** Recently, at one end of the spectrum is the representation of the RCE as a "community of practice" and on the other end, a hub for information gathering and a platform for information exchange and sharing (Mochizuki and Fadeeva, 2008). An RCE is unique in its transdisciplinary nature for nurturing and encouraging learning processes while simultaneously enabling a multi-stakeholder engagement platform. Such distinctive traits enable an RCE to function as the best platform through which to address common problems in current educational and capacity building approaches that are more often than not segmented and incomprehensive (Sanusi, 2010).

As one of the five most important principles in addition to leadership, social networking, participation and research on which regional processes towards sustainability are based, education strongly integrates with these principles and thereby imply sustainability as a learning objective (Dlouha et al., 2011). Theoretically, learning processes towards sustainability in RCEs can be seen as a very significant, global scale experiment in social learning with learning occurring on an individual level, organisational level or at the level of society. Furthermore, this learning process incorporates a sustainable development *perspective* as a shared vision for communication and cooperative realisation (Ofei-Manu and Shimano, 2012a; Dlouha et al., 2011 and the references therein). In this manner, the relationships of the learners and the learning environment, their interactions with each other and learning society, and the social dimension of the learning process which is expected to lead to change become apparent. Most of the subcomponents of the core elements of the RCE, namely governance, collaboration, research and development (R&D) and transformation education (Fadeeva et al., 2005) are capable of serving as levers for capacity building. It has been proposed that the RCE should

also be seen through the lens of research as a social learning experiment with an empirical research agenda (Lotz-Sisitka et al., 2010; Ofei-Manu and Shimano, 2010; UNU-IAS, 2009). The RCE can be further understood as the main identifier of local best practices, success stories and data related to ESD. With deep local roots and simultaneously a global reach, the RCEs can identify those best practices and bring them to the centre stage at the international level (UNU-IAS, 2011).

The RCE aims to promote sustainable lifestyles and livelihoods in the region using transformative education while simultaneously networking with other RCEs around the world and sharing knowledge and insights with a focus on its core subcomponents including institutional mandates, visions and goals, management structure, involvement of leadership, actor engagement, R&D, knowledge sharing, strategies for partnerships, etc. (Ofei-Manu and Shimano, 2012a), hence the RCE can act as a platform for capacity building through multi-sectoral, multi-stakeholder partnerships and provide research, learning and other opportunities for all the societal components existing in the region. The RCE is also promoted as a community-regional level platform where "critical reflection, problem posing, and dialogue are central to allowing learners to transform society and thus their own reality" (Brooks, 2004: 216) and on which as Ledwith (2005) posits is able to create transformative change rather than the replication of the status quo.

The number of RCEs has steadily increased as the network has evolved. Reflecting back on the original vision of bringing together the educators within a community with experts who know about the sustainability challenges that communities face, the new vision and strategies seek to dwell on themes that have arisen on issues such as capacity-development, communication, research, influencing policy and engagement with international organisations and processes (UNU-IAS, 2011). Plans are underway to further develop the RCE community worldwide (from hence RCE Community) with a goal to upscale action research and transformative learning projects. Elements to be considered for the capacity development strategy include a re-visitation of the RCE vision and governance structure, ESD competencies and capabilities, principles of transformative learning, action research, thematic actions, marketing, fundraising and communication (UNU-IAS, 2011).

The RCE Community is also involved in collaboration with international processes and organisations in a bid to increase the visibility of ESD projects worldwide. In particular, the RCE Community has formed international partnerships with UN agencies namely UNDP, UNESCO, UNICEF and these were represented and invited to make contributions at the RCE Global Conference in the Netherlands in 2011. Currently, the RCE Community is exploring collaboration with UNICEF and UNDP around the issue of climate change; with the Convention on Biological Diversity (CBD) secretariat around the issues of biodiversity; with the Equator Initiative around issues of traditional knowledge; with International Association of Universities (IAU) around issues concerning higher education; with UNEP around issues of sustainable production and consumption

and sustainable livelihoods; with UNECE on the issue of ESD assessment and with Copernicus alliance network of European universities on the issue of higher education appraisal (UNU-IAS, 2011).

RCE Community also offers support to member RCEs through the RCE Global Service Centre located at UNU-IAS. The support services are as follows:

a) Encourages/enhances communication among the RCEs,
b) Facilitates links with international processes,
c) Acts as steward of the RCE road map,
d) Provides knowledge leadership to policymakers, and
e) Facilitates collaborative research projects (UNU-IAS, 2011).

RCEs in Asia Pacific (APRCEs):

The Asia-Pacific RCEs (APRCEs) organise regional meetings twice a year and participate in the annual global RCE conference. Self-promotion through direct contact with the RCE Global Service Centre has been one other means of information dissemination. Project initiatives and issues being addressed include:

- Community-based discussions on thematic areas of biodiversity conservation, schools and the youth, energy, teacher training, disaster mitigation, natural resources management, climate change, school curriculum reorientation, promotion of model schools;
- Sustainable waste management and environmental education;
- Adapting appropriate technologies to implement at the community level with the involvement of the youth;
- Writing of factsheets on the current status of the RCEs;
- Awareness creation of recent events in the region e.g. disaster resilience and ESD Sendai experience with the East Japan triple disaster;
- Organisation of sub-regional group meetings;
- Formation of APRCEs network to serve as a platform for collaborative work; and
- Publication of a white paper on APRCEs network (2007-2011).

RCE Community has its own challenges. They include the following: 1) how to scale up local level work to continental and global level; 2) how to make the concept of ESD understood by a larger audience; 3) limited inter-RCE collaboration; 4) lack of funding; 5) the challenge of diversity cultural, language, etc. within and across scales; 6) inability to use the RCE portal effectively 7) promotion of flow of information and knowledge between RCEs; and, 8) how to communicate effectively the work of the RCEs outside of the RCE network (Ofei-Manu and Shimano, 2012b).

RCEs and Collaborative Partnerships:

Partnership is a key strategy by which individual groups or organisations deal with common challenges (Pacheco et al., 2006). Collaboration is considered a form of partnership, a “network of relationships” (Sharma and Kearins, 2011). It also denotes developing new understanding by problem solving using

information with diverse insights (Lukman et al., 2009). The stages of collaboration are as follows: emergence, evolution, implementation and transformation (Pacheco et al., 2006). In addition, collaboration is characterised by the following principles: 1) commonality of interests of the partners; 2) familiarity of the constituent members of the partnership; 3) sense of ownership; and 4) honest, open communication (Pacheco et al., 2006). Added to the mutual trust and communication developed between stakeholders, collaborative partnerships are usually seen to be successful due to the clear definition of roles and responsibilities taken on by the stakeholders (Pacheco et al., 2006; Senge et al., 2008). To meet the RCE/ESD challenges already described requires that all forms of capital (social, natural, cultural, financial and technological/manufactured) (Slaus and Jacobs, 2011; Ekins, 2011) from all sectors in a region/local area are brought together through collaborative partnerships. It again requires making education/learning central to building capacity of the stakeholders (Ofei-Manu and Shimano, 2012a). And this is at the backdrop that collaboration is one of the four core elements an RCE is expected to address.

Learning /Social Learning and RCEs:

The learning approaches in an RCE set to deal with regionally and culturally-relevant issues are primarily to involve target SD actors/multi-stakeholders to develop the knowledge, skills and values to resolve locally, socially or culturally-relevant problems. This type of learning is likely to call for cooperative/mutual learning between both experts and practitioners and user/beneficiaries of the issues at stake. It is an approach that serves as an alternative to the expert-consultancy and/or technology transfer which have been found to be ineffective (HirschHadorn et al., 2008). Ofei-Manu and Shimano (2010) describe the social learning processes of a socio-ecological system in Osaki-Tajiri, one of the focal points for ESD in RCE Greater Sendai in Miyagi, Japan. The main objective was capacity building through learning for the sustainable/wise use of wetlands-paddies' goods and services. Here, the stakeholders' ESD-linked social learning processes were underpinned by: 1) their interrelationships with each other through knowledge transfer, co-production and exchange, adaptive learning and awareness creation, and 2) their interactions with the biophysical/ecological components. Consequently, outcomes consisting of values and change in attitude towards the natural environment, effective governance to maintain the integrity of these wetland-paddies, and a re-oriented method of agriculture were produced.

Reflecting on the idea of studying an RCE as a social learning experiment using an empirical research agenda set in RCE Makana, in South Africa, Lotz-Sisitka et al. (2010) presented an overview of the starting points of social learning by describing the key issues, educational foci and the areas of engagement to develop in the RCE. They also developed an open process framework that looks at sustainability practices and reflexive social learning through enquiry, action and deliberation in the classroom, school and community. "Through encouraging collaborative initiatives among its partners, RCE Makana and Rural Eastern Cape contribute to

the development of a range of change-practice approaches that set out to explore what could be done to improve quality of life with resources available in the region's communities" (Fadeeva et al., 2011: 4). To attain its goal of transformative education that promotes sustainable lifestyles and livelihoods in the region, RCE Saskatchewan conducted an investigation to identify ESD projects within its jurisdiction using an approach that was: 1) regional, 2) strength-based—to identify the regional ESD issue areas already existing so that productive networking could be built, and 3) institutional—by partnering with organisations to identify their ESD projects for collaboration (White and Petry, 2011).

Methodology and Process of Data Collection

Among the roles of RCEs are their ability to deliver identifiable improvements in the social, economic and environmental areas and their contribution to the creation of a new learning system for SD at the regional and global levels (Fadeeva, 2007). This contribution to DESD is partly in the form of embedding education in all spheres of life and encouraging collaborative learning processes between local actors and stakeholders across transdisciplinary knowledge and sectoral boundaries in a particular region to articulate a global vision of ESD in local terms (Mochizuki and Fadeeva, 2008; Fadeeva and Mochizuki, 2010).

As previously explained, this work is part of a larger project to develop regional indicators for monitoring and evaluation of ESD. The development of the selection criteria for the RCE practice cases was therefore tied to selection criteria for the ESD country status survey (presented in the preceding publication to this report on the *ESD Country Status Reports* (Didham and Ofei-Manu, 2012)). With five out of seven pioneer RCEs acknowledged globally located in the Asia-Pacific region, Asia-Pacific RCEs have played a leading role in ESD implementation and are helping to address and explore the question of how to evaluate the activities of RCEs. Consequently, the importance of the RCEs' involvement in this research process cannot be overemphasised. Although the project is expected to eventually cover all of the Asia-Pacific region, the geographic region was limited to East Asia and Southeast Asia during this initial scoping phase of the project. The countries selected for investigation were expected to be actively involved in the monitoring and evaluation of ESD process spearheaded by UNESCO regional bureau in Bangkok, Thailand. Also, the selected countries should each have at least one regional centre of expertise (RCE) on ESD. For a country providing more than one RCE case study, consideration was given to the collection of a diversity of approaches and variations to the ESD activities in those RCEs, for example based on the lead institution of the RCE, the date of establishment, or the geographical and cultural uniqueness.

The research presented in this report was framed to provide a qualitative investigation of learning performance, while the overall research project was conducted in two complimentary formats to achieve both qualitative and quantitative findings. To complement this, the research employed a mixed methods

approach using the mixed approach design (MAD). The design was guided by the overall systematic approach of grounded theory and the application of selective coding. The quantitative aspect of the research involved national ESD focal points participation in a quantitative country survey regarding the national context of ESD implementation. The findings from both studies are then triangulated during a further investigation of the important factors and components for a holistic M&E of ESD framework.

The questionnaire (see Appendix for original version) employed in the data collection from the RCEs was designed in a case-study report format and mainly consists of open-ended questions and some coded background questions. Areas of investigation include the following: 1) the major objectives, focus and activities involved in the initiatives of the various RCEs; 2) the benefits of multi-stakeholder partnerships and the learning methodologies, approaches and strategies applied to the initiatives; 3) the main outcomes and achievements of the RCE initiatives; 4) the major strengths and advantages and the primary weakness and constraints, and 5) how the ESD initiative addresses the three pillars of sustainable development. Data was also gathered through presentations and focus group activities in two workshops organised as a capacity building aspect of the research. The analytical approach used was investigating qualitative factors in effective learning performance through comparative assessment, inductive identification and reflexive testing as a form of collaborative inquiry. The selected thematic topics were partly underpinned by the themes that emerged for collaboration at earlier RCE discussions and those that followed (Aipanjiguly et al., 2008; UNU-IAS, 2010) as well as current emerging issues, particularly disaster reduction.

Good practice case studies based on a reporting framework sent to 10 RCEs in East Asia and Southeast Asia are presented in this report. They are as follows: 1) For East Asia, one from the People's Republic of China (RCE Beijing), one from the Republic of Korea (RCE Tongyeong) and the remaining three from Japan (RCE Chubu, RCE Okayama and RCE Kitakyushu); and 2) From South Asia, one each from the Philippines (RCE Bohol), Thailand (RCE Cha-am), Malaysia (RCE Penang), Cambodia (RCE Phnom Pehn), Indonesia (RCE Yogyakarta). RCE South Vietnam, the newest of the RCEs surveyed was unable to fill out the reporting framework, although it provided a document containing its preliminary activities.

Structure of the Report

The structure of the report is as follows:

- *Section One* consists of the introduction to the report. A background to relevant educational theories and learning approaches is presented in the form of a literature review. The important characteristics of ESD are then examined along with the nature of RCEs. This section also covers the methodology used in terms of the selection criteria developed, the method of data collection and the parameters measured.

- *Section Two* presents the good practice cases of the RCEs. Each case starts with a short background of the RCE, its structure and all of the initiatives that it is involved in. Following this overview of the RCE, a general description and background of the individual good practice case that was reported by the RCE is provided, and then the specific details addressed include the major objectives, focus and activities involved in the case, the benefits of the multi-stakeholder partnerships and the learning methodologies, approaches and strategies applied for the implementation of activities, the main outcomes and achievements of the RCE initiatives. Also, the major strengths/advantages, the primary weakness/constraints, and how the ESD initiative addresses the three pillars of sustainable development are also discussed.
- *Section Three* comprises: 1) a comparative analysis of the RCE cases on the basis of the educational/learning process and content of the parameters measured, 2) the conceptual background to the learning performance framework, the four elements and the elemental characteristics as well as a number of educational/learning theories and methods in which they are grounded, and 3) an attempt to link the practices from the various case studies with characteristics of the elements of the learning performance framework.

SECTION 2

Case Studies of Flagship Projects on ESD Learning Performance

RCE Beijing – People's Republic of China

Background to RCE: The Geography Education and ESD Centre at Beijing Normal University which was founded in 2003 is the secretariat for RCE Beijing. The ESD Centre began efforts to organise the partners and programmes for the RCE in early 2005 and several of its main projects started around this same period. RCE Beijing was officially launched though in January 2007. RCE Beijing constitutes several universities, secondary schools and non-formal organisations that collaborate with each other locally and sometimes internationally. Its vision is to build capacity to deliver, support and generate innovative ESD in the city of Beijing (and its surroundings). Its objectives include 1) Training in-service teachers about ESD; 2) Conducting environmental education research; 3) Strengthening schools sustainability programs; 3) Developing sustainable development-based curriculum for schools; 4) Enhancing outdoor environmental education; and 5) Coordinating existing activities, partnerships and networks. Although the goal of RCE Beijing is the integration of ESD into the formal and non-formal education in Beijing and its surroundings, the constituent members and types of activity it is currently involved in tilts RCE Beijing towards the formal approach to ESD. Its major partners are the Ministries of Education and Environmental Protection, China Environmental Science Publishing House, Yuntaishan World Geopark, and Beijing Zoo. The on-going ESD projects are as follows: 1) In-service teacher training on ESD; 2) Geography textbooks evaluation program; and 3) Disaster education for primary and middle school students.

Background to the Initiative: The title of the ESD initiative is "In-service Teacher Training Programme", and it began in 2003 prior to the launch of the RCE but was incorporated into the RCE's activities after its initiation. Three different multi-year ESD teacher training programmes have been conducted by RCE Beijing, and additional short symposiums have also on teaching ESD. RCE Beijing has provided the core training role for these various teacher training programmes in cooperation with several partners. The target learners are in-service teachers, especially geography teachers in middle schools. Since its commencement nine years ago, the sectors in which the initiative has been active are: 1) Secondary education; 2) Teacher education; and 3) Non-formal Education. The themes addressed by RCE Beijing are intercultural understanding, cultural diversity, environment, climate change education, water, biodiversity, natural resource management, disaster reduction education, governance, economy, sustainable production and consumption, sustainable urbanization, sustainable tourism, and responsibility in local and global context.

Regarding the activities, the first programme was initiated in 2004 in cooperation with the Beijing Academy of Educational Science. During this training, 29 teachers and principals from primary and middle schools received training in six courses every Saturday for two years and graduated in 2006. The six courses included:

1) Introduction to sustainable development; 2) Theories of ESD; 3) Implementation guide and activity design of ESD; 4) Evaluation of ESD; 5) Practice of ESD in schools; and 6) School management and school-based curriculum of ESD. Part of the training included organising the teachers to visit schools that have good practices of ESD and then discuss with the principals and teachers in these schools about their practices and experiences. The teachers have since implemented ESD into their daily teaching and daily management of their respective schools.

The second Graduate class on ESD was initiated in 2006 and graduated in 2008. Beijing Normal University in cooperation with Changping Education Committee involved 44 principals and teachers from primary and middle schools in Changping District in Beijing following the similar six courses listed below. The third programme was a bilateral training and exchange on the environment and sustainable development between China and Germany that was held once a year starting in 2004 and ran for five years. During this time a large number of Chinese teachers were able to learn about ESD practice in Germany and found the training very useful for strengthening their teaching ESD. Furthermore, 36 Chinese teachers participated in a symposium held from 3-5 July 2005 where eminent ESD experts in the persons of Charles Hopkins, the UNESCO Chair at York University in Toronto and the Senior Advisor to UNESCO on ESD and Rosalyn McKeown, Director of the Centre for Geography and Environmental Education, University of Tennessee, gave speeches on introduction of ESD implementation and activity design. Also, in June 2009, June 2010 and May 2011, RCE Beijing in cooperation with the Ministry of Education held one-month Geography Teachers' training on ESD for more than 1000 teachers as part of a national teacher training program.

Teacher training programme

Workshops on the creation of an RCE were held at Beijing Normal University in 2005 and 2006, and after the launch of RCE Beijing an International Forum on RCEs in ESD was held in Beijing from 15-16 August 2007. RCE Beijing also invited some experts in the field of sustainable development and ESD to give classes to the teachers on weekends as well as in regular workshops and meetings. Topics such as climate change, disaster education, sustainable consumption and production, renewable resources were taught at such meetings. Some of the classes involved games, particularly role playing, etc. Other workshops and meetings of RCE Beijing featured officials from Beijing government, Ministry of Environmental Protection, Ministry of Education and some NGOs who had been invited to talk about sustainability in their own fields. Teachers were also invited to visit green buildings (like the building of Ministry of Science and Technology) to know

how to save the energy through high technology. They also visited green farms to see how fruits and vegetables grow more naturally, and additionally they went on experiential nature field trips.

The methods and approaches used in the initiative included: 1) Lectures (given on six topics already mentioned followed by discussions on the topics); 2) Use of field trips. Teachers were invited to visit green buildings (like the building of Ministry of Science and Technology) to know how to save energy using high technology. Teachers visited green farms, and connected to nature; 3) Learning through experience and dialogue. Teachers also visited other schools with good ESD practices and communicated with the teachers/principals and consequently, established networks; 4) Use of games for the teachers to know more about sustainable development in practical terms for implementation in their daily teaching.

The main benefits that the multi-stakeholder partnership by the RCE has provided include the following: 1) The implementation of the in-service teachers' training programme on ESD that has benefitted several primary and middle schools, especially in Beijing due to the training of the teachers in these schools; 2) Facilitation of links: RCE Beijing organised teachers from different schools to visit schools like Beijing Changping Experimental Primary School that have good ESD practices to have a real experience of the concept and also hold discussions with the principals and teachers in this school about their own practical experience; 3) RCE Beijing also invited some experts in the field of sustainable development and ESD to give classes to the teachers on weekends as well as provide regular workshops and meetings during which topics including climate change, disaster education, sustainable consumption and production, renewable resources etc. were taught.

Regarding outcomes, using different educational methods and approaches with a focus on acquiring the theory and practice of ESD helped teachers to have a better understanding of the ESD concept, know how to teach students and also know how to communicate ESD to their peers, family members and the community at large. Consequently, the teachers acted as agents of social learning by embedding the skills into the communities of practice where they lived. Also, the teachers had the opportunity to reflect on the importance of sustainable development in their profession and lives as they gained increased awareness and motivation to apply it in their daily teaching and personal lives. Visits to schools with good ESD practices gave the teachers practical/hands-on experience in addition to related discussions with colleagues and principals of such schools and consequently, laying the foundation for networking and collaboration. Visits related to energy efficiency gave the teachers the chance to reflect and begin making smarter choices in personal consumption, especially regarding better usage of energy and furthermore, communicate that to their students and peers.

The initiative addressed the three pillars of sustainable development as follows: 1) Environment: Natural environment-related knowledge and skills were transferred to teachers together with increased appreciation of nature; 2) Economy: Teachers gained a better understanding of sustainable development and contrary to their old way of thinking, they could make smarter economic decisions regarding better usage of energy and other consumption choices, thereby saving money and simultaneously having better quality of lives; 3) Society: Participants learnt better communication skills through training programmes which became useful in their teaching of ESD to students in schools and also to other members of their communities. They had also obtained a high sense of responsibility towards the environment and were more eager to contribute as individuals towards achieving sustainability.

The major strengths of the initiative at the personal level were: 1) It granted opportunities to the teachers to think more about sustainable development and consequently, change in their world-view; 2) Teachers had the opportunity to reflect on their own daily teaching and hence considered finding better ways to teach sustainable development through the subjects they teach. In addition, the teachers had stronger awareness of sustainable development and implemented it in their daily teaching. At the institutional level, first, RCE Beijing has a lot of stakeholders in different fields and they work together closely and can learn from each other. Second, the Chinese government attaches more importance to ESD and is willing to provide financial support to the training of teachers on ESD. Third, the main organiser, Beijing Normal University has a good reputation and especially facilitates networking among the stakeholders of RCE Beijing, hence making training possible and successful. Some stakeholders recommended the training program to their partner schools and suggested to them to take part in the program, hence contributing to make the program a success. Help was also given by international institutions like UNU-IAS, Georg-Eckert Institute in Germany, UNESCO teacher training network, etc. as this makes the program go forward.

The primary weaknesses and constraints of the initiative are as follows: 1) Financial constraint: Participants had to pay tuition by themselves hence limiting the number of students able to participate; 2) RCE Beijing's invitation of many ESD experts to provide the training was also limited by the budget; 3) For the in-service teachers' training, the classes were only limited to the weekends because the participants had to work from Monday to Friday resulting in lower attendance than it would have been on a weekday; 4) Lack of full-time faculty members committed to the training programme.

The primary challenges and barriers included the following: 1) The trainee teachers found it difficult to pay to study ESD, a concept they initially found to be quite abstract; 2) Consequently, it took a lot of effort – going to the stakeholder schools and giving lectures to introduce ESD, organising workshops to invite the principals to come and talk on how important and useful the training program was and encouraging the principals to pay the tuition for the teachers to study – to win them over; and 3) In order to ensure the

continuation of the training programme, some stakeholders provided logistics like classrooms and places to visit like the green buildings and green farms for free. Besides the initiative described here, RCE Beijing also participated in discussions on environmental education (EE) policy issues, particularly helping pass a law on environmental education in a province. It was also involved in curriculum reform. Furthermore, RCE Beijing used research and subsequent writing of articles on ESD in journals to advance the concept and process.

Team Building during China-Germany ESD Teacher Exchange

International Forum on RCEs

RCE Chubu – Japan

Background to RCE: Established in October 2007, RCE Chubu's secretariat is hosted by Chubu University. RCE Chubu is the only Japanese RCE that spans three prefectures: Aichi, Gifu and Mie. Its partners besides Chubu University are Nagoya University and Chubu ESD-RCE Promoting Network (CERPN). Other sustainability issues RCE Chubu is involved in the region range from manufacturing to forest conservation, agriculture, and multicultural harmony. With support from the local government RCE Chubu's activities mainly focus on conservation activities with the Ise-Mikawa Bay Watershed Project as its flagship project, and where the various issues affecting the basins of eleven rivers flowing into Ise and Mikawa Bays are being addressed. RCE Chubu also contributed to the Tenth Conference of the Parties of the Convention on Biological Diversity (CBD-COP10), which was held in Nagoya, Aichi Prefecture in October 2010 during which it collaborated with local NGOs and took the lead in organising RCE input to COP10.

Background to the Initiative: The initiative which is conducted in two phases and titled: "Biodiversity Cyber Dialogue Project" (BCDP) began in 2009 and will end in 2012. The major partner is Chubu ESD-RCE Promotion Network (CERPN). The total budget for the two years is 200,000 yen (~2,500 USD). The initiative focused on non-formal education, civil society and community engagement sectors, and the target learners were members of civil society. The themes addressed by the initiative include gender equality, ethics, intercultural understanding, cultural diversity, peace, human rights and security, environment, biodiversity, corporate responsibility, sustainable production and consumption, and responsibility in local and global contexts.

The objective of the initiative was to engage in a dialogue and provide a global overview of biodiversity and in the process shape the direction for sustainable development and biodiversity conservation. The dialogue included providing a worldwide overview of the diverse ideas about biodiversity and opinions from the South and from different sectors of civil society who have less access to the global discussion among the State Parties to CBD. After the COP10, subsequent topics included focus on: 1) disaster risk reduction in relation to the triple disasters in Tohoku, Japan, 2) mass production/consumption and disposal, and 3) re-evaluation of traditional knowledge of indigenous and other local communities as stressed in the CBD. The Biodiversity Cyber Dialogue (BCD) Project focused on non-formal and informal education which served as a platform for interdisciplinary and multi-sectoral learning on a diversity of cross-cutting issues regarding biodiversity conservation in relation to the convention. Thus, the BCD was aimed at bringing on board different voices which are often unheard in shaping the direction for sustainable development and biodiversity conservation. More importantly, the BCD attempted to increase the level of engagement by

many actors and stakeholders to represent the widest range possible of opinions and views from all of society. Marginalised groups could then engage in a multi-cultural dialogue, just as well as other more visible groups invited by RCEs and other biodiversity related organisations. The active participation of activists and intellectuals from indigenous communities provided a rare occasion for an international dialogue between the victims of the triple disasters in Tohoku, Japan who are trying to revive traditional knowledge in their communities because such knowledge is important in supporting sustainable community development.

Forest health check-up

The initiative involved the use of a social networking service (SNS), an online platform that focused on building social relations among people who share similar interests and activities. The BCD in the context of ESD broadly invited individuals and/or groups concerned about the unsustainable global trends and developments to share their concerns and raise their voices so as to gain the attention of important actors/stakeholders including State Parties, the corporate sector, the media, and the research community on the various political, economic and socio-cultural dimensions that negatively impact or reduce cultural diversity and bio-diversity. Chubu RCE was thus actively involved in the activities during the COP-10 in Nagoya by holding 12 forums on several issues as side events themed “Global Dialogue Forum” and later posting the final deliberations at the site.

In order to attract a wider audience and to increase the level of engagement by many actors and stakeholders to represent the widest range possible of opinions and views representative of all the society as a whole, they created both English and Japanese sites, even though the Japanese site ended up becoming more active. There was input of specialised knowledge from university professors, NGOs and business into the dialogue. During the COP-10 process, RCE Chubu unveiled a document called the Appeal of the Citizens of Aichi-Nagoya Document. The document called for the preservation of life and its diversity and the eschewing of commodification of every natural resource due to our modern lifestyles. Using cross-boundary learning and social networking discussions as the learning/educational methods,

Global Dialogue Forum at COP-10

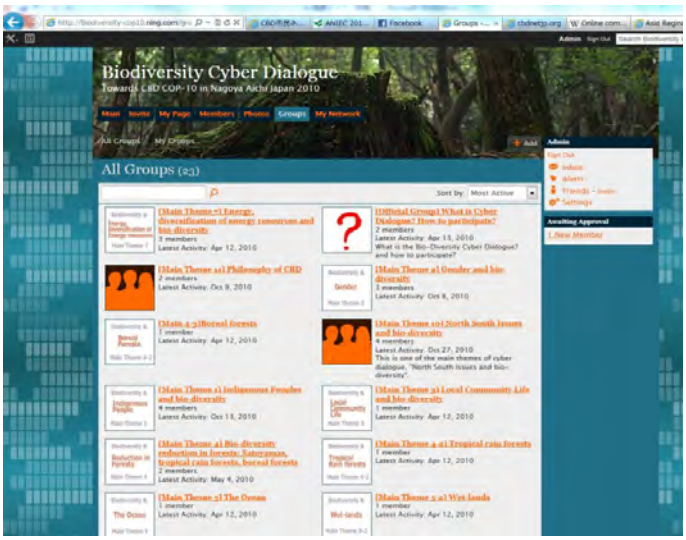
the BCD of RCE Chubu resulted in the input of pluralistic views on biodiversity, hence a broadening of perspectives across scales. The BCD also served as a platform for cross-sectoral, cross-cultural and multi-thematic issues like gender, minorities, indigenous people and indigenous knowledge, communication strategy on biodiversity. Although the main target learners of this project were members of civil society, many intellectuals, NGO members and people from the business sector participated in the project. Through the BCD which involved cross boundary learning, the participants learned the different views of multi stakeholders.

The main benefits the RCE-led multi–stakeholder partnership provided to the implementation of this initiative are: 1) The initiative could focus on both local and global dialogue; 2) The project was also conducted by the people who have different specialties and views on biodiversity; and 3) The dialogue was enriched by multi-stakeholders such as university teachers, NGO members or people from the private sector. The learning approach involved the use of the internet through cyber-dialogue for cross-boundary learning.

With reference to addressing the three pillars, The BCD covered environmental, social, and economic factors although the topic of biodiversity tended to be considered as an environmental issue. The topics such as “indigenous peoples and bio-diversity,” “gender and bio-diversity,” or “local community life and bio-diversity” were crucial issues in the cyber-dialogue that spanned across the sustainability pillars. Taking the theme “indigenous people and bio-diversity” as an example, two types of information-sharing were included/displayed on the site. One was the dialogue among indigenous peoples in different regions of the world on their specific and common issues, common and separate demands and recommendations, as well as common positions regarding bio-diversity and the CBD. A second sub-section dealt with the dialogue between the indigenous peoples and the non-indigenous peoples, including particularly the local community peoples mentioned in Paragraph 8j of the CBD. These dialogues covered common and diverse experiences, traditions, knowledge, innovations and customs that can help build a new vision about symbiosis between communities and life in nature.

The major outcomes and achievements of the initiative are as follows: 1) Cross-boundary, multi-thematic learning through dialogue among members of civil society especially among the members of Japanese NGOs who have diverse interests on biodiversity; 2) Since the members of RCE Chubu were active in this project and conducted a collaborative work with Japan Civil Network of Convention on Biological Diversity (JCN-CBD), a network of Japanese NGOs for biodiversity conservation, it was a good opportunity for RCE Chubu to expand its network in promoting ESD; 3) The Appeal of the Citizens of Aichi Nagoya was made public during the COP 10. There were two notable strengths to this project. First, the project led to multi-thematic and cross-cultural dialogue on biodiversity such that viewpoints that cut across minority barriers like gender and indigenous people were heard. Second, it facilitated ESD learning and fostered interactions among

participants at significantly low carbon-footprints. The challenges the BCD faced were mainly technical issues regarding the use of the SNS, including the lack of IT literacy of some participants, limitation of time to login at the SNS website, and language barriers which proved difficult to overcome. In terms of consensus building, the site was not very effective because the participants of the SNS did not want to have a virtual debate in public using the site; rather they preferred personal communication and face to face discussions at forums.



Biodiversity Cyber Dialogue portal

RCE Kitakyushu – Japan

Background to RCE: The vision of RCE Kitakyushu, established in December, 2006 is to make Kitakyushu a "World Capital of Sustainable Development", in which its one million citizens will understand the concept of sustainable development, become sustainability-literate and be empowered to take actions to achieve sustainable development goals, thus ultimately realising a just and sustainable society. RCE Kitakyushu organises working teams on ESD outreach projects, study and research, public relations and the youth. The secretariat was transferred to the City of Kitakyushu in 2009 from the Kitakyushu Forum on Asian Women, an NGO focusing on gender and international issues. The major partner is Kitakyushu ESD Council. The Kitakyushu ESD Council is the coordinating and implementing body of ESD activities in Kitakyushu area. The RCE consists of 71 member organisations and 37 individuals (as of December 2011). The 71 member organisations are composed of 4 categories: 16 educational & research institutes, 12 governmental agencies, 34 NGOs/CBOs (community-based organisations), and 9 business organisations. In addition, some of these member organisations have their own memberships, e.g. there are 158 nursery schools under the Kitakyushu Nursery School Federation and more than 100 community member organisations (30,000 individuals) under the Association of Kitakyushu Women's Organisations.

The on-going ESD projects of RCE Kitakyushu include 1) development of educational tools for outreach and monitoring by study and research and working team, 2) the youth initiatives involving the community people on Ai Island, 3) publication of newsletter and brochure by the public relations working team, and 4) networking with national and international RCEs. The target learners of Kitakyushu ESD Council, RCE Kitakyushu are the general public in the community. The activities have been conducted with Kitakyushu city government as the major partner.

Background to the Initiative: RCE Kitakyushu's ESD initiative entitled "ESD Outreach Project: Strengthen capacity and network of communities" began in 2006. The primary purpose was to strengthen the capacity and network of citizens and communities to promote ESD. The activities under this initiative include the following:

1) Promotion of ESD using the 132 community centres (*citizens' centres*) as nuclei of activities spread across the city to train ESD facilitators who would then lead ESD promotion activities in the community centres;
2) Development of educational aids (teaching materials) to promote ESD (e.g. cloth theatre) and working with the formal education sector (e.g. members of Kitakyushu ESD Council gave lectures at a university consortium);

3) Promotion of field activities to build a sustainable community which is in harmony with the natural environment, socially just and economically prosperous (e.g. tree planting, waste management and community beautification);
4) Development of capacity of RCE Kitakyushu members through exchanges within and beyond the RCE community;
5) Exchanges among RCE Kitakyushu members (e.g. use of ESD café where members would meet and discuss sustainability issues facing them and try to seek solutions to them, report meeting, field visits, study meetings);
6) Exchanges with other RCEs or entities outside RCE Kitakyushu (e.g. visits to RCE Tongyeong and *vice versa*, participation in the RCE conferences in Japan, Asia-Pacific and at the global level);
7) Use of various educational/learning hence capacity building approaches, based on collaboration, networking and other multi-stakeholder cooperative relationships to bring their members to enhance the organisational and operational capabilities of RCE Kitakyushu.

Thus RCE Kitakyushu provided extensive outreach to the community through a multi-stakeholder partnership, a consequent diversification of the activities in the RCE and a broadening of the scope of member organisations and individuals through ESD integration in their activities.

ESD activities in the community centres

Three main learning methods were used during this initiative. The first method focussed on learning through experience (e.g. field study visits) and other participatory activities, e.g. green map. The second method provided learning through teaching (e.g. selected RCE Kitakyushu members lectured at a university consortium and took on the role as facilitators in the community), while the final method structures learning through organised lectures, seminars and study meetings by inviting guest lecturers. RCE Kitakyushu also used the citizen centred approach to learning supported by academia by: 1) emphasising mutuality among members, 2) valuing each member's initiatives and collaboration, 3) thinking with/in a global perspective, and 4) translating learning into actions. One strategy RCE Kitakyushu embarked on was the use of "ESD Future Pallet", a nickname coined by the Kitakyushu ESD Council to paint an optimistic, colourful picture of the future. The benefits provided by the multi-stakeholder partnership were 1) provision of an extensive foundation for outreach to the community, 2) ability to respond to the varieties of needs of the community, and 3) diversification of ESD activities of RCE Kitakyushu. Furthermore, the scope of each member organisation and individuals was broadened through integrating ESD in their activities.

An example of how RCE Kitakyushu addressed the three pillars of sustainable development together is as follows: Youth migration in Edamitsu community had resulted in high percentage of the elderly population with vacant houses causing a sense of isolation and insecurity. The community was located on a hill, thus the elderly people had difficulty with mobility. Advice from a university professor resulted in the people taking various actions to revitalise and rebuild the community, starting from mapping the risks and problems. They identified evacuation spots in the case of disaster, cleaned the community roads and grew vegetables in abandoned lands. They planted lemon trees that they had developed from their own nurseries on the road sides with the hope to make a community full of fruits. The entire community, including the elderly people and children in nurseries jointly painted lemon trees on the wall of the community centres with the support of a school art teacher, hence resulting in intergenerational exchange and sustainability of the project. A mother worked to publish a book on a story of lemons for the next generation. They also served hot-lemon tea to the members of the community at a gathering using the fruits. These activities were mainly done voluntarily, but some created job opportunities for some members of the community. In addition, as the bond within the community strengthened, their support for each other intensified. For example, community members helped old people who live alone with their daily shopping. Consequently, in Edamitsu community, the three pillars of sustainable development were addressed together: while planting trees (environmental), residents strengthened their community ties (social) and created job opportunities (economic).

The main outcome and achievements are as follows:

- The level of awareness of ESD by the public has increased due to the activities of the RCE. Consequently, the number of member organisations of RCE Kitakyushu has increased, and the Kitakyushu City government recognised the importance of ESD promotion and has therefore increased their budget to promote ESD;
- Enhancement of capacity building of RCE members and ESD staff through collaborative learning: 1) RCE Kitakyushu members started new groups/initiatives based on collaboration among members; 2) Members conducted field visits to learn from each other through mutual experiential learning; and 3) Some members became lecturers by talking about ESD at a university consortium;
- The network of RCE Kitakyushu was expanded and intensified: 1) RCE Kitakyushu members visited Tongyeong RCE and RCE Kitakyushu has in turn been receiving groups from Tongyeong RCE every year, thus learning from each other's activities; 2) RCE Kitakyushu is connected with other national, regional and international RCEs through participation in meetings and conferences.

There were two major strengths and advantages of this initiative. The first strength is the spirit of voluntarism and high motivation of RCE Kitakyushu members. The second strength is the collaborative partnership built with RCE Tongyeong. The primary success factors were the existence of active multi-

stakeholders in the communities, motivated citizens to promote ESD, and leaders who brought the multi-stakeholders together. The weaknesses and constraints were: 1) difficulty in maintaining the youth so they can continuously commit to ESD activities in the community, 2) institutional linkage with formal education, especially primary and junior high schools is weak, 3) commitments of academia is not institutionalised but depend on individual capacity, 4) capacity to backing the practices in the communities with theory needs to be developed, and 5) global perspectives are limited because most activities are focused on immediate communities. The primary challenges and barriers include: 1) development of innovative methods to promote mutual learning and teaching, 2) securing human and financial resources of RCE Kitakyushu for the long term, 3) building capacity of both members and secretariat to promote ESD, so that they can support multi-stakeholders' initiatives and coordinate ESD activities, and 4) continuous support from government to promote ESD.

Painting of lemon trees on the wall of community centre in Edamitsu

ESD workshop with participants

RCE Okayama – Japan

Background to RCE: RCE Okayama is one of the seven global pioneer RCEs established in 2005. Its secretariat is hosted by the City of Okayama. RCE Okayama is a partnership network of community centres (*kominkans*), schools, universities, NPOs/NGOs, civil society (citizens group) organisations, businesses and more. With over 100 organisations currently engaged in activities within the network, RCE Okayama's work mainly focuses on the environment and international understanding. Drawing on the expertise and resources of local universities, support organisations and other groups, RCE Okayama has organised various awareness raising, networking and capacity development activities for the citizens of Okayama. Furthermore, Okayama University, one of the core members of RCE Okayama, has held a UNESCO Chair in Research and ESD since 2007, and this has greatly enhanced the University's collaboration with RCE stakeholders. Other on-going projects are as follows: 1) publicising ESD using the ESD café where individuals sit one on one or as a group and discuss sustainability issues, 2) celebration of ESD Week to enlighten citizens on ESD, 3) engagement in collaborative projects with the universities, schools, NGOs and municipalities and 4) provision of ESD-linked subsidy for citizens groups and communities.

Background to the Initiative: The title of the initiative – in fact a programme of initiatives – which began in 2005, is "Okayama ESD Project – Realising a sustainable society through a flexible network, starting with Okayama Region". The budget of over 2.4 M yen (~30,000 USD) for fiscal year 2011 was funded by Okayama Municipality. The major partners include six universities, five companies, several community centres, schools, NPOs/NGOs and civil society organisations. The target learners of this initiative were the residents of Okayama region. The sectors covered by this initiative are: primary education, secondary education, teacher education, higher/further education, non-formal education, civil society and community engagement, and business and private sector. The themes addressed by the initiative include gender equality, intercultural understanding, environment, climate change education, disaster risk education, biodiversity, and rural development.

The objectives of RCE Okayama's initiative are to deepen the understanding and knowledge of all people in Okayama region and thereby expand the circle of people interested in working towards realising a sustainable society; and to develop and enhance organisations that promote ESD. Through the initiative, RCE Okayama aims to create a network of primary organisations whose responsibility would be to provide the public with information, organise educational activities including holding networking events and workshops and support for residents in Okayama region and to increase their capacity towards building a sustainable

society. It also aims to encourage the exchange and sharing of information and practices with other RCEs and beyond through cooperation with the RCE Global Service Centre at UNU-IAS.

ESD Café

Separating waste during study of local pollution problems

Description of activities dubbed Fujita Challenge, Kyoyama Challenge and NPO Green Partner Okayama Challenge are as follows:

1) Activities towards the end-of-DESD Conference, being one of the selected venues together with Nagoya City in 2014;
2) Engaging in monthly ESD Cafés where people come together one-on-one or as small groups to talk, exchange ideas and opinions and consequently learn from each other;
3) Fujita Challenge: Children in high-school, junior high school and elementary schools promote ESD together by meeting regularly and developing a policy to integrate ESD into the curriculum in Fujita area in cooperation with Okayama City and Okayama ESD Promotion Commission while also supported by Okayama University. Fifth grade students of elementary schools visited local farmers and an agricultural high school for fieldwork experience and to connect with nature;
4) Kyoyama Challenge: Kyoyama Challenge involved support for students to experience nature and learn to take initiative. Although all levels of formal education from elementary school pupils to university students were involved in the events, junior high school students led the aspect of conducting an environmental survey and later reporting the results. Citizen groups and the kominkans worked together in various events to promote ESD. Residents and students joined the events, took a trip to experience nature and organised festivals to present what was done during the year. This was done in cooperation with Okayama City, Okayama ESD Promotion Commission, Okayama University and Kibi International University;
5) NPO Green Partner Okayama Challenge: The NPO Green Partner Okayama (GPO) deliberated with several stakeholders about regional environmental issues. For example, GPO worked with the

fishermen's cooperative association, Okayama University and the municipality. This preceded a collaborative project with the university and the municipality to deepen the understanding of the environmental issues surrounding the fishing industry. Local university students joined the project and taught the attendees, particularly the school children and facilitated the workshops;

6) Other activities of Okayama RCE include: A) Collaborative activities especially with Okayama University during which university professors gave ESD-related lectures to elementary school teachers and awareness raising campaign on ESD and biodiversity was conducted at the Autumn Festival, and B) Exchange camp where children from RCE Greater Sendai participated in an exchange camp with children from Okayama.

The main benefits that the multi-stakeholder partnership provided to the initiative's implementation include: 1) Provision of *kominkans* as venue for dialogue by the various stakeholders and consequently, creating a mutual learning platform for all participants; 2) Flexible networking makes it possible for any organisation or group to gather and join the project; 3) Increased the number of groups and people acting for ESD; 4) Members of the community derive meaning from the activities in which they have been involved; and 5) Universities acting to support the communities. Universities join, cooperate and support the local activities while members of the community are able to utilise the special knowledge of the universities.

RCE Okayama addressed the three pillars of sustainability in the following manner. For the environmental pillar, they include dealing with environmental issues facing the fishing industry and inculcating in the youth the importance of sustainable agriculture, experiencing nature and conducting scientific inquiry on the environment. For the social pillar, focus is on enhancement of social interaction through increased collaboration, networking and exchange among member organisations using the community centre as well as between RCE Okayama and other RCEs. Also, nurturing the next generation of farmers by keeping them in close touch with the present farmers and also with nature. The economic pillar is considered, although this was not clearly stated, it could be inferred from the report that the support from faculty to the fishermen regarding the environment will eventually translate into economic value.

The major outcomes of the initiative(s) are as follows: 1) Use of the *kominkans* (community centres) for ESD learning and promotion offered the right atmosphere for cooperative learning; 2) Students learned about the regional agriculture, industry and regional history from that experience; 3) There was also the benefit of capacity building of members and staff and meaning-making through reflection out of the activities performed by the stakeholders themselves; 4) The use of the ESD café created mutual knowledge/learning in the form of dialogue between people; 5) RCE Okayama promoted ESD using various events and involved all levels of formal education and several other forms of learning; 6) There was mentorship of students in

primary and secondary schools by the university students; 7) Citizen scientists were encouraged through the scientific survey conduction; 8) People learned about nature through direct experience opportunities; 9) There was also collaboration between the university and the municipality that yielded deeper understanding of environmental issues. In summary, the activities in RCE Okayama thus resulted in increase in multi-stakeholder involvement, a sense of community, grassroots based ESD promotion, capacity building support from the university, provision of place for educational/learning theory and practice, participation and support from local government by establishing full-time position of ESD coordination, and hence supporting ESD promotion.

The strengths and advantages of the initiative are as follows: 1) Various groups and persons coming from a wide segment of the local population including the universities, schools, NPO/NGOs and communities are involved in Okayama ESD Project thus ensuring a continuous ESD promotion and wider coverage by the municipality (Okayama City); 2) The availability of a full-time ESD coordinator to support the groups and persons involved in RCE Okayama; 3) The provision of the *kominkan* for ESD promotion and learning; 4) Capacity support from the local universities; and 5) Granting of subsidy to groups that are engaged in the promotion of ESD.

The main weaknesses of the initiative include the following: 1) The theme and field are limited mainly to environmental issues; 2) Uncertainty of maintaining a ESD coordinator for a long period due to funding limitation; 3) Training method of "local key-persons" is still in its infancy; 4) Members of faculty capable of teaching ESD are few and so are the areas of ESD that they can teach. The initiative was challenged by efforts to broaden the theme and field as ESD, to establish an evaluation process and to scale up the management of the program by Okayama City.

Student visit to local farm and acquiring traditional knowledge

RCE Tongyeong – Republic of Korea

Background to RCE: With its mission as: "Learning and sharing for sustainable future", RCE Tongyeong is one of the early RCEs recognised in October 2005, with the facilitation of the Government of Tongyeong City in the Republic of Korea and in collaboration with Yonsei University and Gyeongsang National University. Even though RCE Tongyeong's secretariat was separated from the municipal office as an independent entity, namely the Tongyeong ESD Foundation in 2010, continual maintenance of links with the local government assists it to invite a wide range of local stakeholders to take part in its activities including the Office of Education and the media.

The activities of RCE Tongyeong are categorised into four objectives: 1) nurturing talent for sustainable future, 2) supporting happy life-long learning society, 3) promoting edu-tourism industry, and 4) promoting Asia-Pacific path towards sustainability.

Currently, the many (twenty-six in total) on-going projects in RCE Tongyeong include the following:

- Informal Education Sector: lifelong learning group activities, youth program 'Bridge to the World', literacy program for the elderly, English camp for under-privileged youth, Saengsaeng informal ESD program grants, Sumshimsarm Recharging program for NGO activists, 'Our Village School' – a local community centre ESD program, and TongTong Humanities lecture series.
- Formal Education Sector: ESD model schools from kindergarten to university, extracurricular ESD program, ESD teacher training, and ESD project class.

Furthermore, RCE Tongyeong offers scholarships to deserving members and also engages in research and development. The R&D activities include 1) Asia Pacific ESD Sejahtra Fellowship; 2) the production of Traditional Knowledge booklet series; 3) running of education centres (Seopirang EduCentre/ Suryukteo EduCentre) and also the RCE Eco Park and Sejahtra Centre, 4) the development of Local ESD Index Evaluation, and 5) production of RCE Tongyeong 5-year White Paper.

Background to the Initiative: The ESD initiative titled "Youth Program Bridge to the World, Tongyeong Youth Global Challenge Program" attempted to present the vision of sustainable development to the youth who are the future leaders of the city and the region. It started from 2008 as an annual program to the present. The major partners are comprised of 17 middle and high schools of Tongyeong, Tongyeong City Government, mentoring groups, and the global RCE network. An annual funding of 90,000 USD is provided by Tongyeong City Government. The themes addressed by this initiative include intercultural understanding, cultural diversity, citizenship, peace, human rights and security, environment, climate change education, biodiversity, sustainable production and consumption, sustainable tourism, responsibility in local and global context, and

career development. The sectors the initiative was active in were Secondary education and Non-Formal education and the target learners were the youth aged between 13 and 19 years. Being the first of its kind in Korea and solely developed and implemented by RCE Tongyeong, the program has offered opportunities to the youth for a self –researched and designed study trip abroad to an RCE city of their choice to experience and study aspects related to the chosen topic. Over the past four years, the 'Bridge to the World' program has sent 13 teams of 100 young people to 13 RCE cities across the world. The objective is to present the vision of sustainable development to future leaders, the youth of Tongyeong.

The main objective of the program is to act as a gateway to the world for the young people and open their eyes to the road for a sustainable future. It is one of the first overseas research program solely targeting secondary school students in Korea. This program distinguishes itself from other conventional overseas training and observation programs in that the participating students select the research RCE cities and topics which relates to sustainable development. During the program which lasts for thirteen months, the participants collaborate with NGOs, schools and institutions of Tongyeong and their chosen counterpart RCE city. In order to explore various issues related to sustainable development theme, the participants tap into the RCE's local, national and global networks. Partner groups were asked to share expertise and knowledge with the participating youths in the form of study visits, consultation meetings and lectures. On their return, the youth share the knowledge and experience of the trip with the general public by producing and distributing reports and holding dissemination workshops.

Student workshop presentation by coexistence team

As regards to addressing the three pillars of sustainable development, key economic issues related to sustainable development were taught through lectures, during the study visits and research activities. One team for example researched a traditional market in Egypt in collaboration with RCE Cairo with the aim of revitalising it focussing on the context of how youth could actively participate in the process of commerce. In addressing the social pillar, 1) Key social issues related to sustainable development were taught through lectures, study visits and research; and 2) The youth participated in various activities including i) local festivals (RCE Toronto), ii) career development (RCE Yokohama), iii) the movie industry and local community (RCE Kodagu), iv) educational system and youth participation (RCE Denmark), v) 'independence movement' of Korea and the role of Tongyeong (Reedly City, CA., USA), and vi) RCE youth networking (RCE Kitakyushu). The initiative

further addressed the environmental pillar by 1) having key environmental issues taught through lectures, study visits and research, 2) organising campaigns to raise awareness on environmental problems, 3) youth visitations (e.g. islands linked to climate change outcomes (RCE South Pacific), Island for the Youth program (RCE Okayama), and eco-city (RCE Munchen)) as part of the research, and 4) providing basic environmental education to all participants, including the "empty plate" movement.

Multiple learning methods and strategies have been applied during this initiative. Self-planned research is one of the mainstays of this programme and through student-led initiatives (with limited guidance) provides a unique opportunity for students/youth to enhance ownership and responsibility of the selected areas of investigation. Problem-based learning is applied to addressing the challenges of sustainable development issues. Action-based program provides direct engagement with identifying solutions to contribute towards a sustainable future. With the multi-stakeholder partnership of RCE Tongyeong as the basis of this program, this partnership provides opportunities to learn from various activities and expand the ideas of young people. Hence having connected with the RCE's local, national and global networks, partner groups were asked to share expertise and knowledge with the participating youths in the form of study visits, consultation meetings and lectures.

With regard to outcomes and achievements, there are four notable points. First, over the past four years, 'Bridge to the World' has sent 13 teams of 100 young people to 13 RCE cities. The program has now been established as one of the most popular youth programs in the city, training young leaders on sustainable development. The program has been acknowledged by Korean National Commission for UNESCO as 2011 ESD Official Project, based on its role in promoting ESD and understanding of sustainable development. Second, in regard to the outcome of team-based research activities, some of the proposals made by the youth materialised after the program. Third, under the education system of Korea, young people are often treated as ignorant and in need of parental guidance until they enter the university. Thus, this program based on self-management and self-responsibility of youth, is considered as a challenge to both participants and their parents. The initiative helped students fulfil this goal by gaining the ability and values to self-manage problem solving processes that require multiple skills including self-discipline, critical and systemic thinking, ability to communicate and collaborate with others, understand an issue and search for information to address it with limited guidance. They can later report back and share their acquired knowledge and experience with the local community. RCE Tongyeong has thus focused on future leadership of sustainable development through youth involvement in action-based activities resulting in knowledge, skills and values acquisition.

The major strengths of this ESD initiative is that it is a self-managed, problem-solving process that requires multiple capabilities including self-discipline, ability to communicate and collaborate with others, understand

an issue and search for information, and acquisition of basic foreign language skills. The primary success factors for this initiative include active participation of the youth, financial and policy support from the local government, understanding of parents and teachers involved, support from RCE partner organisations and the global RCE network, and dedication of coordinating teachers. The primary constraint for the initiative is the issue of encouraging self-managed activities among young people who are used to being instructed what to do in a traditional route based manner. The primary challenges and barriers include time-constraint of youth participants to complete a busy work schedule, misunderstanding of some parents and teachers who discouraged participation in activities not related to learning the central curriculum and subjects for entrance examinations, and possibilities of travel accidents and injuries that may potentially lead to serious damage to the credibility of the program.

BTW Project launching for 2010 participants


International students enjoying an outing

RCE Bohol – the Philippines

Background to RCE: RCE Bohol was established in September 2011. In partnership with the local community, the Red Cross Youth and ACCES Development organisations, RCE Bohol membership comprises academia, youth, government agencies, NGOs, media, business sector, and the local governmental unit (LGU). Other on-going ESD projects of RCE Bohol are climate change orientation and organic farming education.

Background to the Initiative: The title of the initiative is "Bohol Socio-Economic and Environment Awareness Education Program." It started in the year 2012 and will run for a period of 5 years. The members and partners of the initiative consist of the academia, youth, the local government unit, government agencies, media and business sector. The budget is 500,000 PHP (~ 12,000 USD). The sectors involved in the initiative are early childhood, civil society and community engagement, and out-of-school youth. The themes addressed by the initiative are overcoming poverty, health promotion, environment, climate change education, and natural resource management. The target learners of the initiative are the local communities; especially focussed on school children, housewives, and out-of-school youth. Although clear waters and white beaches abound in the region, there are several problematic issues to be dealt with and improved. These include foul-smelling garbage found on the north islands of Bohol, the unavailability of comfort rooms (toilets), the presence of a single drinking well serving a population of almost two thousand people, an overall shortage of drinking water which forces the need for people to buy water to drink, and child malnourishment. The mangroves along the coast also require restoration.

After conducting a needs assessment, an initial activity was implemented by a volunteer physician from Romania by conducting a one-day lecture on hygiene practices. Regarding the learning methodologies used, home visitation was done to get first-hand information through one-to-one interviews. Some members of staff stayed for three days with people in the community through immersion to observe their activities and also experience the actual situation on the ground. Documentary analysis was also carried out by accessing the documents of the local government unit (of the Jetafe municipality) about the socio-economic status of the people of Banacon district of Jetafe.

The initiative's knowledge-based learning objectives are: 1) promotion of health including proper nutrition and sanitation of family members, utilisation of indigenous food in the locality, childcare, care of pregnant and lactating mothers, use of comfort rooms, proper waste management, care, nutrition and sanitation, and 2) enhancing knowledge relating to the environment, natural resources and climate change adaptation and mitigation. The objectives of skill-based learning are to apply the knowledge acquired into real life situation and develop skills in adapting to and mitigating the effects of climate change. Value-based learning

objectives are to 1) inculcate in the beneficiaries the value of the environment and natural resources, and 2) inspire the beneficiaries to internalise the importance of sanitation, waste management and good health. The benefits provided to the beneficiaries by the implementation of the initiative are the participants' service, time and resources mutually contributed to this initiative that helped in the realisation of the objectives of ESD. The multi-stakeholders therefore cooperatively worked for a common goal.

This picture is the basis of having Solid Waste Management project for ESD

The multi-stakeholder partnership was able to support the beneficiaries with a large diversity of information to address their local challenges such as climate change adaptation and mitigation, preserving the environment, promoting health, overcoming poverty by learning more entrepreneurial skills, and increased awareness and concern for the environment.

The major outcomes for achieving ESD learning and contributing towards sustainable development have so far been promotion of a healthy community, enrichment and improvement of people's well-being, knowledge and skills gained for solving problems like health improvement, climate change mitigation/ adaptation and poverty reduction, and proper implementation of what the beneficiaries learned like education on solid waste and waste management, health and sanitation execution.

RCE Bohol discussed the preservation of the environment and natural resources as well as waste management as the environmental pillar. Regarding the social pillar, the beneficiaries were taught that the depletion of natural and social capital may have non-linear consequences. The beneficiaries were taught how take care of their natural resources since this will give them economic value. The initiative however, did not appear to have practically addressed the three pillars of sustainability as presented in the report. The major strengths and advantages of the initiative include both the availability of experts and other human and material resources and a strong sense of collaboration and enthusiasm of the members and partner agencies. The primary weakness is uncertainty of constant flow of funds for the initiative. The major challenge is strengthening the coordination of constituent member organisations. The major barrier facing RCE Bohol as far as ESD principle is concerned is the need to instil consistency as some members have not internalised the concept.

There is a need to have Mangrove Ecological Education to help protect the mangroves in the island

RCE Cha-am – Thailand

Background to RCE: Established in March 2008, the key member of RCE Cha-am is Sirindhorn International Environmental Park. Other partners and supporters are the Ministry of Energy of Thailand and other organisations from governmental and private sectors from within Thailand and abroad. Other on-going educational/ESD projects are: 1) energy for environment, 2) mangrove ecosystem and rehabilitation, 3) wastewater treatment system (constructed wetlands), 4) coastal erosion protection, 5) inland ecosystem and tree planting, and 6) biodiversity.

Background to the Initiative: The initiative titled Sirindhorn International Environmental Park (SIEP) was started in 2007. Sirindhorn International Environmental Park was the major member of the initiative and other supporters/partners include the National Energy Policy Office (NEPO) of the Ministry of Energy, Thailand, the Office of Natural Resources and Environmental Policy and Planning (ONEP), the Ministry of Natural Resources and Environment, Thailand, the Mrigadayavan Palace Foundation, the Border Patrol Police Bureau, and the Institute for the Promotion of Teaching Science and Technology (IPST) of the Ministry of Education, Thailand. The annual budget is approximately 968,000 USD. Funding for this project is provided by the Energy Conservation Promotion Fund, the National Energy Policy Office (NEPO) of the Ministry of Energy, Thailand, the Institute for the Promotion of Teaching Science and Technology (IPST), the Wastewater Management Authority (WMA), other organisations from governmental sector (e.g. Ministry of Natural Resources and Environment and Ministry of Agriculture and Cooperatives), other organisations from private sectors and private companies (sponsoring companies) from within Thailand and abroad, and individual donations**.**

The target learners are students of all levels of education, staff members of governmental organisations, private sector and the general public including foreigners. The initiative was active in all sectors listed except Early Childhood and included the addition of Government Sector as suggested by the RCE. The themes addressed by the initiative were environment, climate change education, water, biodiversity, natural resource management, disaster reduction education, sustainable production and consumption, and Sufficiency Economy philosophy. Focusing on conservation of energy, alternative energy, natural resources and environment and Sufficiency Economy philosophy, the objectives of the initiative are:

1) To publicise HRH Princess Maha Chakri Sirindhorn's honorable deeds and ingenuity in conservation of energy, alternative energy, natural resources and environment to both Thais and foreigners;
2) To promote the development of innovation about energy, alternative energy, natural resources and environment, and apply to the public uses;

3) To develop and rehabilitate the environment in the Park's area, and to enhance biodiversity and relationships between flora and fauna and the balanced ecosystem, to enable SIEP to serve as sustainable learning center;
4) To efficiently promote and develop the potential of eco-tourism in SIEP and arrange the eco-tourism activities that enhance the public awareness on conservation of energy, alternative energy and natural resources and environment;
5) To develop the knowledge and technology about energy and natural resources and environment, and enable the Park to be an important learning center of national and international standards.


Practicing mangrove restoration

This initiative by RCE Cha-am involves energy for environment exhibitions, educative exhibitions on Sufficiency Economy philosophy, energy learning centre on Sufficiency Economy philosophy, alternative/ green energy (solar, wind power, and wave energy), wastewater treatment system (constructed wetland), prevention of the coastal erosion, the HRH Princess Sirindhorn Mangrove forest, training camps on energy and environment conservation, tree planting activities (mangrove, land and beach forests in SIEP and in schools and temples in local community areas), and organising meetings, seminars, and conferences at local, national and international levels. The main benefits from establishing a multi-stakeholder partnership by the RCE towards the implementation of the initiative are networking and collaboration, provision of funds, manpower and ideas for further development.

The learning methods and approaches used include 1) Exhibition and demonstration (Energy and Environment); 2) Field study of natural resources in SIEP; 3) Research and data collection on mangrove, water treatment, soil quality improvement and tree plantation; 4) Conducting training courses on energy and natural resources conservation; and 5) Organising meetings/seminars and conferences for exchanging of knowledge and establishing networking. Knowledge-based learning objectives of the initiative include knowledge about: 1) Green Energy generated by solar power; 2) Wind power, and wave energy; 3) Energy for environment; 4) Natural resources and environment; 5) Wastewater treatment system (constructed wetland); 6) Sufficiency Economy Philosophy; 7) Conservation and rehabilitation of coastal ecosystem and biodiversity (mangrove, birds and other flora and fauna species); and 8) Protection of coastal area. Skill-based learning objectives are 1) Energy Saving Methods; 2) Proper way for conservation of energy, natural resources and environment; and 3) Enable to apply "Sufficiency Economy Philosophy" into daily life and the conservation of energy and natural resources and environment. Furthermore, value-based learning

objectives consist of the following: 1) Green Energy; 2) Energy saving; 3) Sufficiency Economy Philosophy; 4) Value of natural resources and environment (mangrove, coastal ecosystem, biodiversity); and 5) Environmentally friendly method of wastewater treatment system.

Regarding the three pillars of sustainable development, SIEP's ESD initiative has worked to address each of these pillars. In regard to the environment, SIEP's objective is to promote innovative development on energy, alternative energy, natural resources and environment, and avail it for public use. It also aims to develop and rehabilitate the environment in the Park's area, and to enhance biodiversity and relationships between flora, fauna and a balanced ecosystem, to become a sustainable learning centre. Economically, the initiative aims to develop knowledge and technology about energy, natural resources and environment as well as to efficiently promote and develop the potential for eco-tourism in the Park and organise eco-tourism activities that raise public awareness on conservation of energy, alternative energy, natural resources and environment. As regards to the social pillar, garnering inspiration for the above objectives and SIEP's implementation of "Sufficiency Economy philosophy, initiated by HM the King Bhumibol" for sustainable development is considered the primary objective. SIEP's implementation of the initiative to achieve the above objectives and also disseminate knowledge about Sufficiency Economy philosophy to raise awareness among the students and general public will lead to sustainable development and as a result, sustainable happiness. The report stated that all RCE Cha-am's ESD learning activities are expected to lead to sustainable development. Also, the conservation of energy, natural resources and environment, several promotional activities and the application of the Sufficiency Economy philosophy which double as the initiative's strengths and advantages, all promote SD.

The primary success factors in the implementation of this initiative have been the increase in public awareness and knowledge on energy saving and use of green energy in SIEP, on conservation of natural resources and environment, and on Sufficiency Economy philosophy. A further success factor of this initiative is the enhancement of biodiversity in the Park. The primary weaknesses include a low level of capacity of staff and personnel and unavailability of manpower. The major challenge/barrier has been securing funding and maintaining the collaboration and networking among the member organisations across all levels (from local to international).

Learning methods: Conservation training camp

Field experience and observing nature

RCE Greater Phnom Penh – Cambodia

Background to RCE: RCE Greater Phnom Penh (RCE GPP) was established in December 2009 and its member organisations include the Ministry of Agriculture, Forestry and Fisheries, the Ministry of Rural Development, the Ministry of Education, Youth and Sports, several elementary schools in Phnom Penh and Kampong Cham, and private sector partners. RCE GPP is also supported by the following external advisors: Institute of Environmental Rehabilitation and Conservation, Japan (ERECON), Tokyo University of Agriculture, Japan (TUA), and the Association of Environmental and Rural Development, Thailand (AERD). Furthermore, RCE GPP is in partnership with Secretariat Committee of the Royal University of Agriculture (RUA) and the Institute of Environment Conservation and Rehabilitation, Cambodia Branch (ERECON CaM). The main ESD projects of RCE GPP are: 1) enhancing education on food, agriculture and environment in elementary schools, 2) facilitating sustainable agriculture for local farmers, and 3) promoting sericulture (silk farming) for deepening environmental awareness and income generation.

Background to the Initiative: The title of the initiative is "Project on facilitating sustainable agriculture for local farmers and enhancing education on food, agriculture and environment for elementary schools." It was started in April 2011 and will end in March 2016. Japan International Cooperation Agency (JICA), ERECON, ERECON CaM, TUA, RUA are all partners of the initiative and the project has received a guarantee of 5 years of financial support from JICA. The target learners of the initiative are the local people of 11 villages (consisting of 1,714 households) in Samroung Community, ten schools of Sro Nge school cluster (86 school teachers and 2,714 students), and Samroung Prenprey AC, Cambodia. The sectors addressed in this initiative are primary education, teacher education, and non-formal education. The main themes addressed are overcoming poverty, environment, and sustainable production and consumption.

RCE GPP has been focusing on local farmers in Kampong Cham province in Greater Phnom Penh and students in the elementary schools to promote sustainable agriculture based on natural resource circulation with low chemical input. The aim is to build public awareness and perception of the importance of bringing harmony between agricultural development and conservation of the natural environment. This is because over the past ten years, agriculture in that area has been associated with the use of increasing amounts of synthetic fertiliser and pesticides. Although this has contributed to increasing agricultural productivity in the short term, the degradation of soil and water environments has intensified. Additionally, local farmers have suffered from several related diseases such as throat pain or dermatitis. Although there are many farmers who are eager to move to sustainable farming practices based on natural resource circulation, their low level of knowledge and inadequate resources are a hindrance.

The activities and the corresponding learning methods and approaches used during the first round of these initiatives are numerous. First conditions were set for the activities by conducting a baseline survey, evaluation, reviewing and modifying activity contents. Second, the necessary materials were put together, the regulation and management protocol and system for implementing activities were set up. Third, farmers' groups were formed through cooperation with an external advisory panel, and facilitators implemented technical trainings on sustainable agriculture based on natural resource circulation with low chemical input. Fourth, farmers' groups held workshops on 'Introduction to sustainable agriculture' and transferred the know-how to farmers who do not belong to the farmers' groups. Fifth, promoting the distribution and sales of products with low chemical input, hence resulting in the increase of local farmers who sell the products in the area. This was done by holding meetings for the surveying team, conducting surveys on the agricultural products on the market, analysing and reporting the outcomes/results of the survey to the evaluation team. Sixth, promoting education on food, agriculture and environment for agricultural successors by focusing on sustainable agriculture based on natural resource circulation. This activity provides training environment for agricultural successors. Seventh, establishing and managing school organic gardens. With support from farmers' groups, school teachers establish and manage an organic garden and compost box at each school. Eight, as a part of the food, agriculture and environment education, school teachers hold workshops for students or youth groups in the area. Ninth, conducting training on food, agriculture and environmental education for teachers. Through cooperation with external advisory panel, facilitators implement training on sustainable agriculture based on natural resource circulation for school teachers. Tenth, production of teaching materials for food, agriculture and environment education by RUA, ERECON CaM, school teachers, facilitators, etc. Eleventh, strengthening the network for promoting sustainable agriculture based on natural resource circulation in Cambodia through annual meetings by participants on activity evaluation and future implementation. Twelfth, the publication and distribution of newsletters including the contents of activity and the outcomes from activity evaluation.

Construction of compost boxes for schools

There are three expected outcomes to be achieved during the duration of the initiative and before activity terminates in March 2016. First, farmers' groups will be formed by local farmers and pellet compost centre set up in the commune to promote sustainable agriculture based on natural resource circulation at Samroung community in Kampong Cham province. It is expected that at least 25% of all households in the community will promote sustainable agriculture based on natural resource circulation, where half of the agricultural chemicals will be substituted with organic materials. Second, significant increase in agricultural

products with low chemical put on the market, hence enhancing the image of sustainable agriculture. These products with low chemical input are expected to be sold at the market at least twice per week. Third, strengthening education on food, agriculture and environment as a part of life skill education and networking for promoting sustainable agriculture. School teachers are expected to acquire the teaching skills on food, agriculture and environmental education and extend this through networking to all schools in Sro Nge school cluster and beyond.

Regarding the main benefits that the multi-stakeholder partnership established by the RCE has provided to the implementation of this initiative, RCE GPP serves as a platform for the participation of all stakeholders – school teachers, professors at higher education institutions, environmental NGOs, scientists, researchers, governmental officers, representatives of local enterprises, volunteers, civil associations and individuals who work in many spheres of sustainable development. Furthermore, through cooperating with an external advisory panel, facilitators in RCE GPP conduct technical trainings on sustainable agriculture.

The initiative in its first year addressed the three pillars of SD as follows. The environmental pillar was addressed by decreasing the amounts of agricultural chemicals and increasing organic fertiliser as well as bio-pesticide applied in farmlands. Accordingly, the activity has been focused on promoting sustainable agriculture based on natural resource circulation. The amounts of agricultural chemicals applied such as synthetic fertiliser and pesticides had rapidly increased in the last ten years resulting in soil and water contamination and the introduction of several diseases, thus the project aims to address these environmental issues directly. The social pillar is addressed against the backdrop of a tragic history of a civil war and genocide in Cambodia and hence an increase in the level of mistrust that has affected community organisation. However, against such odds farmers' groups have been formed to promote sustainable agriculture based on natural resource circulation with low chemical input. This activity has contributed to fostering the social bond among the locals. Consequently, farmers' groups are encouraged to hold the workshops 'Introduction to sustainable agriculture based on natural resource circulation with low chemical input' for local farmers who do not belong to the farmers' groups, as well as to establish and manage model farms. The economic pillar is addressed by promoting sustainable agriculture based on natural resource circulation, one of the incentives for local farmers is to decrease the expenses for purchasing agricultural chemicals. In addition, the value-added products with organic or low chemical input are produced and sold at higher prices in the markets.

The objective of knowledge-based learning is to promote education on food, agriculture and environment for future farmers by providing a training series on sustainable agriculture as a part of life skills education in elementary schools. Another objective is to make local farmers and residents including consumers understand the bad effects of synthetic agricultural chemicals especially pesticides on human health and the

natural environment so that they will implement organic agriculture and simultaneously promote the sales of agricultural products with low chemicals. The skill-based learning objective is to promote sustainable farming practices with practical training for farmers to acquire the needed skills. In this activity, farmers' groups are formed and training in sustainable agriculture based on natural resource circulation with low chemical input is provided. Furthermore, skill development is aimed at supporting farmers to produce and sell value-added products with organic or low chemical input at higher prices in the markets. Also, local farmers are expected to learn how to add the value of their agricultural products by responding to market demands. The values-based learning objective is to encourage local residents/consumers to appreciate both the health and environmental benefits of sustainable agriculture practices, and thus feel a strong desire to support and encourage local farmers' transition to low-chemical farming through their consumer selection.

The main outcomes and achievements of this initiative are as follows: 1) School teachers received training on food, agricultural and environmental education established and managed school organic gardens and compost boxes and also held workshops on 'Education for agricultural successors (i.e. future farmers)' for students; 2) Farmers' groups were formed by local farmers in Samroung Community in relation to practicing sustainable agriculture based on natural resource circulation with low chemical input with farmers who do not belong to the farmers' groups also benefitting from the initiative; 3) Meetings for the promotion of sales of products with low chemical input were held among Samroung Prenprey AC, farmers' groups, RUA, ERECON CaM, ERECON, TUA etc. The major strength/advantage of the activity is high motivation of local farmers to adopt and practice sustainable agriculture based on natural resource circulation. Other strengths associated with the success of the initiative include the following: 1) Farmers have benefitted from the activity through learning and are planning to continue the program/system even after the term of the initiative expires due to satisfaction with the experience they gained; 2) Teachers and students have learned about ESD through sustainable agriculture; 3) Teachers, in particular, and students integrate sustainable agriculture in school curriculum; and 4) There are now relatively stronger linkages between sustainable farming and sustainable livelihood through learning. The primary weakness/constraint is that the marketing system of the value-added products with organic or low chemical input is not yet established well in Cambodia. The primary challenges for the initiative are the needs to set up a marketing system for supplying the value added agricultural products and to provide further education for consumers who tend to choose low priced inorganic products over organic ones even though they understand high priced products are of better quality.

Conducting market survey for agri-products

RCE Penang – Malaysia

Background to RCE: RCE Penang, one of the oldest RCEs, was established in June 2005 with Universiti Sains Malaysia (USM) as the leading institution. The partners and supporters of RCE Penang are World Wide Fund Nature Malaysia (WWF-Malaysia), Don and Mylene Theseira, Water Watch Penang (WWP), Malaysian Nature Society, Penang Branch (MNS), Penang Environmental Working Group (PEWOG), Socio-Economic and Environmental Research Institute (SERI), Regional Centre for Education in Science and Mathematics (SEAMEO RECSAM), the Taiping Peace Initiative (TPI), Association for Science and Mathematics Education, Penang (ASMEP), and Sahabat Alam Malaysia (SAM). The current ESD projects of RCE Penang are enhancing sustainable lifestyle within USM and its surrounding neighbourhood, vulnerability and adaptation to flood in Kuala Nerang, Kedah, Malaysia, showcasing Balik Pulau as sustainable village, Eco-Institute Program (with World Wildlife Fund- Malaysia), and SD training for small-to-medium enterprises (SMEs).

Background to the Initiative: The title of the initiative is "Enhancing Sustainable Lifestyle within Universiti Sains Malaysia and its Surrounding Neighbourhood". The initiative lasted one year beginning April 2011. The main partners were as follows: 1) Centre for Global Sustainability Studies, USM (as leader), 2) School of Industrial Technology, USM, 3) RCE Penang, 4) Penang Municipal Council, 5) Solid Waste and Public Cleaning Management Corporation, Penang, 6) Bukit Jambul, Bukit Gambir and Datuk Haji Mohd Nor Ahmad Secondary Schools, 7) Sungai Gelugor, Minden Heights, and Bukit Gambir Primary Schools, 8) Residents' Associations of Jalan Akuarium, Taman Tun Saardon, and Sungai Gelugor, 9) Giant Hypermarket, Bayan Baru, Penang, 10) Cincaria Sdn Bhd, 11) Green Crusaders [community-based recycling activists], and 12) Consumer Association of Penang, CAP [NGO]. The budget for the initiative was 350,000 MYR (~112,000 USD), provided as a research grant from USM. The target learners include the USM community, school students, neighbouring residents, and workers at SMEs. The initiative covered non-formal education, civil society and community engagement, and business and private sectors. The main themes addressed included the environment, climate change education, corporate social responsibility, economy, sustainable production and consumption, sustainable urbanisation, and responsibility in local and global contexts.

With the focus on reducing solid waste that goes to landfill and to enhance sustainable lifestyles on campus and in the neighbouring communities, the major objectives of this project were to: 1) promote and disseminate sustainable lifestyle from within USM to the neighbouring communities, 2) encourage participation at all levels of communities as regards the sustainability agenda, 3) create an environment that is focused towards a sustainable community, and 4) identify challenges and barriers to implement a comprehensive sustainable lifestyle. The activities conducted in this project were divided into three phases.

Phase 1 involved conducting a situational analysis to determine existing recycling and composting practices, identifying relevant stakeholders and partners, and conducting a logical framework analysis with the stakeholders to identify strengths, weaknesses, opportunities and threats (SWOT) to implement the activities. Phase 2 dealt with the university-community engagement activities which involved meetings and discussions, logical framework analysis with stakeholders and community outreach. Community outreach activities carried out were the sustainable lifestyle awareness campaigns, knowledge transfer programs and hands-on composting demonstration. Concurrently, Phase 3 covered monitoring and evaluation aspect of the project and was also carried out to improve and address challenges in implementing the activities.

The main benefits of the RCE partnership in implementing the project are in terms of obtaining research funding and sharing experiences, knowledge, and information, as well as creating a space for this interaction. The Centre for Sustainability Studies was granted 350,000 MYR by USM to conduct an action research on urban sustainable lifestyles. Knowledge on best practices in recycling and composting were shared by the multi-disciplinary experts within the university, municipal council, solid waste authority, community-based organisation and NGOs. Data on previous activities implemented by other partners which have become best practices due to their ability to suit local environmental context and needs were also shared to assist and improve the entire ESD programme. The partners were active in providing feedback such as problems and suggest solutions during discussions and meetings which were important to improve the ESD initiatives and approach. Another main benefit was the accessibility to conduct ESD activities at partner schools and residential neighbourhoods. In addition, some partners also provided assistance in kind such as recycling bins, space and booths for exhibition and campaigns.

This initiative was designed as an action research to promote sustainable lifestyle in the community. Non-formal education methods were applied throughout the project. Due to the wide range of the target groups of this initiative – secondary students, primary students, university students, residents, SME workers and public at large – different approaches were used for different types of community. Activities in schools were conducted at two different levels. First, general campaigns towards sustainable lifestyle (watching video, singing and talks) during school assembly with large numbers of students were used. Second, learning by doing activities with smaller numbers of students (group work activity, composting demonstration, recycling) were also

Student group investigation and project planning

used. The students involved in this initiative were assigned by the school principals and are mostly from the schools' Environment Clubs or the Environment Cadets. Thus, most of the student activities were carried out during the co-curriculum hours.

Student representatives from the different schools in USM had a special programme organised by the research team. Talks on various issues of sustainable lifestyles were given by the project researchers and NGOs. The students were then asked to suggest sustainable lifestyle initiatives to be implemented in the university. A special session with the café operators – another stakeholder group in the university – involved a talk by NGOs and demonstration of a compost unit. A functional unit was later set up near the café and the operators provided organic waste such as fruit peels for the compost system. With regard to the public, awareness was created using an exhibition booth at the GIANT Hypermarket during the "Cleaner, Greener Penang Campaign" organised by the Penang State Government and also at the Penang Botanical Garden organised by Consumer Association of Penang. Furthermore, talks and awareness campaigns for residential areas were conducted for collaborative clean-up efforts in the area.

Regarding how the initiative addressed the three pillars of sustainable development, the environmental pillar was addressed by promoting sustainable lifestyles towards a zero waste society. Reducing generation of waste and recycling of waste can prolong the life of landfills. Additionally, environmental pollution due to degradation of waste at landfill, e.g. methane and leachate, can be reduced. Recycling of materials can also contribute to less usage of natural resources and prolong natural resources reserves. Composting activities give positive impact to the environment as it enriches topsoil and at the same time reduces the use of chemical fertilisers for plants. For the social pillar, the ESD initiative enhanced the connection between university-community engagement and collaboration with other stakeholders. The activities conducted within the community increased awareness on sustainable lifestyle that led to healthier life of the community. This is an important aspect for urban communities because the urbanites are exposed to work or study stress that can lead to health problems. Recycling and composting activities could also inspire humanity and independent values among the community. The initiative addressed the economic pillar by introducing to the society the potential of waste as an alternative resource for producing new products. Recycling also can be an income generating activity for community and schools. It was also proved by schools in Penang that compost from canteen food waste can be sold outside of the school and thus contribute funds for school activities and hence serves as an incentive to the students.

Knowledge-based learning objectives were: 1) to understand the importance of recycling to reduce waste**,** 2) to understand the importance and the process of composting to reduce waste**,** 3) to understand the concept of degradation of material, and 4) to understand that different material have different degradation rates**.** Skill-based learning objectives were: 1) to develop the skill to identify recyclables and non-recyclables, 2) to

develop the skill to manage recyclables, 3) to develop the skill on different methods of composting,; and 4) to develop the skill on composting processes involved in different types of composting. Finally, value-based learning objectives were as follows: 1) to understand that sustainable lifestyle starts with the individual within the community, 2) to understand that community plays an important role in promoting sustainable lifestyle, 3) to promote sustainable consumption, and 4) to instil in participants/members the concept of "from waste to wealth".

There were five main outcomes and achievements of this initiative. First, it led to an increase in the knowledge of students on the processes and importance of composting and recycling. Second, it created a recognition and adoption of the initiative's composting and recycling content by university lecturers as part of the teaching pedagogy. Third, it also created recognition by the neighbouring community of the need to make efforts in composting and recycling to enhance sustainable lifestyle. Fourth, the initiative supported knowledge transfer from university to the community via informal and non-formal learning. Fifth, the initiative has initiated a multi-disciplinary approach to ESD with focus on composting and recycling activities. Regarding the outcomes and achievements in the promotion of SD, based on the monitoring conducted by the research team, discussion with some partners and observations, it can be concluded that this initiative achieved to a certain extent its objective to promote sustainable development with focus on sustainable lifestyles. This is buttressed by the fact that the project is receiving more invitations to conduct talks, open exhibition booths and demonstrate to schools and also residents. In addition, more students are showing interest in organising and managing the composting and recycling stations around the university campus. The team is also expanding its networking with other organisations and initiatives in the region. Lastly, this ESD initiative contributed to strengthen the university-community engagement.

The major strengths and advantages of the initiative include the following: 1) Team work and cooperation given by the multi-stakeholders involved throughout this initiative enabled the planned activities to be carried out successfully; 2) Contribution and collaboration from multi-disciplinary experts were crucial in this initiative as the experts were involved in the design stage and also assisted to improve the pedagogy used in the initiative; 3) The financial and management support received from USM Centre for Global Sustainability Studies ensured the availability of materials and human resources to implement the activities; 4) A major milestone achieved in this initiative was the construction of a functional four chamber composting system (for garden waste) and a functional two chamber composting system (for food waste from café). These composting units doubled as laboratories for student learning and research; and 5) Continued interest and participation of all partners throughout the research period and hopefully beyond.

The primary weaknesses and constraints experienced during this ESD initiative were: 1) Time constraint due to strict time regulation in the formal education sector and hence limited time given and number of students allowed to participate in the activities; 2) The high level of contamination of the recycling bins on the school premises and university campus during the recycling activities; 3) Lukewarm response towards the activities by some community members partly due to lack of information sharing and dissemination between the residents' association and the communities before starting the programs and activities; and 4) The need to overcome the dependency of the partners on the research team in the maintenance of the recycling bins and composting systems set up on their premises. More efforts therefore were needed to empower the partners to operate and maintain the systems independently and lead sustainable lifestyles.

Eco Youth presentation on waste oil treatment

Initiating recycling activities on the USM campus

RCE Yogyakarta – Indonesia

Background to RCE: RCE Yogyarkarta was established in March 2008 with the mission to "Develop the concept and technology supporting sustainable development and implement it based on community empowerment". It is supported by and in partnership with RCE Tongyeong, RCE East Kalimantan, and RCE Chubu; Provinces of Jambi, East and Central Kalimantan, Yogyakarta, and Riau; Ministries of Marine and Fisheries, and Forestry; Local government offices of Marine and Fisheries, Forestry, Tourism and Creative Economy, and Trading; National Oil Company (Pertamina) and the Governmental Bank BRI; and Pharmaceutical Company SOHO. RCE Yogyakarta collaborates with 9 major partners with funding primarily from Universitas Gadjah Mada (UGM) and other organisations. RCE Yogyakarta is involved in other ESD projects including ESD-based community development at Kemadang village, ESD implementation through herbal medicine development at Yogyakarta, community based reforestation development at Jambi, East and Central Kalimantan, Central Java, ESD implementation and community forest development at Gunung Kidul District, and ESD on disaster adaptation and mitigation.

Background to the Initiative: The title of the initiative is "Zero Waste Integrated Farming on Gadjah Mada University Farm." The initiative started in 2009 and is on-going. The major members of the initiative and partners include staff of the university farm, lecturers from 18 faculties in UGM, researchers from Agricultural Training Research and Development Station (KP4), students from several national and international universities, the local community, students of primary and secondary schools. The total budget of the project was 775 million IDR (~82,000 USD), and the respective sources of the budget are Ministry of Agriculture, Ministry of Forestry, Ministry of Education and Culture, and Ministry of Public Works. There were additional contributions by BRI Bank, Pertamina National Oil Company, and Head of sub-district government. The target learners comprise of teachers, school students, university students, local governments, the farming community, researchers, non-formal education groups and local youth-community organisations, and national and international government officials. The initiative covers all the sectors listed in the survey in addition to national and international government officials as suggested by RCE Yogyakarta. The following themes are addressed by the initiative: health promotion, environment, climate change education, biodiversity, natural resource management, economy, sustainable production and consumption, and sustainable tourism.

The major objective was to reorient the mind-set of people towards the three sustainability components of environmental quality, economic equity and social justice. The initiative was focused on sustainable integrated farming using several principles such as the Six M's (man, money, materials, method, machine

and market) with the production of many materials in the University Farm of Gadjah Mada on the basis of the Six M's and the Seven R's (reduce, reuse, recycle, replant, replace, repair and report) in order to realise zero waste sustainable integrated farming.

Regarding the activities, participants were first shown the conservation methods and development of several animals and vegetation by research in the university farm. These include Bali cows, milk cows and other cattle, Pelung chickens and other chickens, goats, fish, Yogyakarta orchids, several fruit plants (melon, corn, dragon fruit, matoa, and durian), and several herbal plants (including Rochelle tea). Second, participants prepare the materials for organic farming including organic leaf compost, liquid fertilisers, several types of manure, organic seed pots, and vertical agriculture (verticulture). Third, the participants work with energy products like renewable energy (biogas) and low energy water pump. Demonstrations of applying the seven R's to the items already mentioned is also conducted. Participants are also introduced to some innovative activities/ideas including ecotourism and farm tourism, farm training, collaborative research, and training for trainers.

Checking on rice plants in the nursery

The main contributions provided by the RCE's multi-stakeholder partnership to the initiative are the overall increase in participants' knowledge of the RCE concept and a change of mind-set of the participants who will go on and serve as agents of change in their communities, places, company or regions. The learning methods applied for this ESD initiative were mainly practical, hands-on training based that included pre-activity slide shows on the step-wise approach regarding the training. The main learning objectives regarding knowledge-based learning is to increase the knowledge and understanding of ESD, particularly zero waste agriculture. The skill-based learning objectives are for the target population to experience how to manage eco-friendly agriculture and apply the techniques and methods of zero waste agriculture. For value-based learning the objective is to encourage the idea that people can contribute through their actions to realise zero waste agriculture in the environment, thereby promoting and expanding the importance of this practice to society.

Regarding addressing the three pillars of sustainable development, the environmental pillar is addressed through the application of the zero waste method of agriculture such as bio-fertiliser, bio-herbicides, bio-pesticides which are beneficial to the environment because the methods are non-destructive to the plants and soil. The social pillar is addressed by helping to foster inter-personal relationships among the participants during the training period. While the economic pillar aims at raising participants' awareness that the zero waste methods and techniques could result in increase in income in addition to minimising the

negative impact on the environment. The ESD initiative thus showed how people can engage in farming sustainably, increase their income and also live in harmony with the environment and their neighbours.

There are two main outcomes/achievements of this initiative. First, participants' awareness of the importance of applying the multi-pillar concept of ESD through their actions is increased. Second, after completing the study in integrated farming, the trainees emerged as the agents of change by changing their own behaviours and then impacting other people's behaviour to manage the environment and practicing sustainable agriculture in their own company or regions towards sustainability.

The primary successes of the initiative are as follows. The application of Zero Waste method has been internationally recognised and adopted by a number of countries across the globe. For example, farmers in Namibia, Africa have successfully applied this method in large areas. The use of environmentally friendly seed pots for tree planting in the coastal area of Ngawi, East Java forest. The KP4 Agricultural Training Research and Development Station has successfully provided certified padi seeds for local farmers. Major strengths and advantages of the initiative are: 1) KP4 (UGM Farm) has many examples of zero waste agriculture application such as bio-fertiliser, bio-herbicide, bio-pesticides which are methods beneficial to the environment due to its non-destructiveness to the environment. This example of agriculture land and management were used by other relevant parties to imitate and apply the same techniques and management to other areas; 2) These techniques increase the income of local farmers; 3) The method of zero waste agriculture has been recognised internationally, and people from a number of countries such as Australia, Korea, Japan, Tasmania and Namibia have come and learned this method; and 4) The researchers in KP4 also have promoted the successful practices of this program to other regions in Indonesia and overseas. The primary weaknesses include the limited number of resource persons to upscale the method and the need to upgrade the tools and facilities for training. The primary barriers for implementing the initiative are the language barrier, particularly English since the targeted trainees also come from overseas and the need to certify more varieties of padi.

Lecturing on the 7Rs approach

International cooperation and sharing good practices

RCE Southern Vietnam – Vietnam

RCE Southern Vietnam was established in September 2011 at a launching ceremony in Vietnam National University's International University (VNU-IU), Ho Chi Minh City as the newest RCE in this report. Its major partners come from:

- Formal educational institutions: Open University, Ho Chi Min City (HCM); University of Technology; University of Natural Sciences; University of Social Sciences and Humanities; University of Information Technology; and Institute of Environmental and Resources, Vietnam National University (VNU) - HCM; and
- Non-formal educational institutions including the Institute of Educational Research, University of Education, HCM; Institute for Environment and Resources, VNU-HCM; and Department of Resources and Environment, HCM.

The objectives of RCE Southern Vietnam are to 1) develop formal education curricula on key areas that affect the human and environment; 2) enrich student's knowledge, experience, attitude and skills to act towards sustainable development; 3) engage policy makers and other stakeholders in dialogue on public transport, environmental pollution and climate change adaptation in the region; 4) mobilise schools and college, communities in ESD; 5) undertake research on issues relevant for higher education; and 6) strengthen cooperation on ESD within the region.

In the short term, RCE Vietnam is focused on: 1) inspiring/encouraging its partners to strengthen the network, 2) joining the RCE global network, especially in the region, to strengthen the relationship among RCE network as well as follow RCE organisation's objectives, 3) maintaining connection to the RCE virtual network, 4) integrating content of ESD into IU's undergraduate curriculum, 5) discussing with the School of Biotechnology on finding grants on projects related to sustainable development, and 6) collaborating with the Department of Industrial System Engineering on research related to Traffic and Hospital in Ho Chi Minh City.

The general planning schedule of the upcoming activities and the general networks of knowledge, namely climate change, sustainability education and public training, and other ESD-relevant activities, at the International University (IU) consist of:

- ESD in Teaching Curricula: For example, for ESD in teaching curricula, the RCE centre studies the syllabus of each school and faculty in IU to see whether the integration of the concept of SD into the syllabus is suitable or not. ESD is then integrated into the curriculum after discussions with the courses' lecturers and deans of the schools. A report is then sent to the rector for approval after

which teaching of the course could begin. Consequently, ESD is being integrated across the board, from natural sciences to social sciences and humanities. Specific courses where ESD has been integrated includes business, ethics and society in *Business Ethics course*; corporate social responsibility in *Strategy Management course*; conservation and aquaculture management in *Introduction of Management and Development of Aquaculture Resources course*; and microorganisms for safety food in *Introduction of Sciences and Technologies for Foods course*.

- ESD in Seminars: IU organises seminars particularly on climate change, food science and renewable energy.
- ESD in Research: In order to bridge the gap between academia, industries and the local community, IU conducts research on human resource development, environment, and applicable technology.
- ESD in Extra-Curricular Activities: IU is engaged in two types of extracurricular activities. First, IU provides awareness activities on leading ethically-led lifestyles. These include "Please be polite on campus", "Say NO to bad behaviour in teaching and learning", and "Green-clean-beautiful in Vietnam National University areas". Second, IU provides opportunities for volunteering in the community. These include Green Summer campaign, teaching for underprivileged children, teaching English for workers in industrial parks, and environmental sanitation campaign.

The plan of activities RCE Southern Vietnam intends to implement in 2012 is as follows:

- Within the RCE: 1) documenting RCE Southern Vietnam's mechanisms, 2) organising a meeting of RCE Southern Vietnam partners and network, 3) studying syllabus in other schools to integrate ESD, 4) searching and studying materials related to ESD, and 5) building and updating a website for RCE Southern Vietnam.
- Outside the RCE: 1) maintaining relationship with RCE global network by attending workshops on "UNU-IAS & IGES Joint Research Project on Monitoring and Evaluation of ESD" and "Integrating Sustainability into existing Engineering and Built Environment Curriculum", 2) continuously connecting with other RCEs via virtual media, and 3) cooperating with other partners to strengthen the RCE's activities.

Being a new RCE, RCE Southern Vietnam faces several limitations and challenges for implementing their proposed activities. Among these are lacks of experience, unavailability of capable ESD human resources, and very limited funding at the moment.

Launching ceremony of RCE Southern Vietnam

SECTION 3

Comparative Analysis and Learning Performance Framework

COMPARATIVE ANALYSIS OF THE RCE CASES

Section 3 reviews and compares the main aspects of the good practice cases presented in section two in order to identify the important features that support effective learning performance for ESD. This first part of Section 3 provides a comparative analysis on several educational/learning processes and contents identified from the parameters used in the reporting survey including the objectives/foci, methods/ approaches, activities, main outcomes and achievements. Furthermore, the major strengths and weaknesses and how the three dimensions of SD are addressed by the initiatives are discussed. It should be noted that the analysis is based on the single initiatives reported by each RCE that were self-selected as exemplar ESD learning performance cases, and the evaluation was primarily based on the data self-reported by the RCEs.

This investigation of exemplar cases provides important benefits for identifying the important features that support ESD learning performance. However, it is also important to recognise some of the limitations of this approach. First, as the cases were self-selected by the RCEs, the judgment of effectiveness is based on a qualitative understanding by the individual RCEs. Second, as no attempt was made to quantify the level of effectiveness, the cases are rather viewed as exemplar practices from each RCE although there may be major differences between the cases and their achieved learning performance, along with the scope and coverage of each case. Third, the broad differences present among these cases thus makes it difficult to investigate for correlative factors in this analysis, but as this was not the expressed goal of this study it was deemed an acceptable limitation.

Table 1 shows the summary of the background information on the RCEs evaluated in East and Southeast Asia. They differed in their date of establishment, composition of member organisations, composition of the major partners and supporters, the number and types of ongoing projects/initiatives with regard to covering the sustainability pillars, etc. The number of RCE member organisations ranged from one to several. The major partners and supporters also differed in number. While some RCEs were established soon after the launch of the DESD in 2005 (RCE Okayama, RCE Penang and RCE Tongyeong), others were established less than a year at the writing of this report (RCE Bohol and RCE South Vietnam).

Regarding the lead institution(s) involved in their establishment, out of the 11 RCEs representing 25% of the total RCEs in the Asia-Pacific, six are affiliated with higher education institutions (RCE Beijing, RCE Chubu, RCE Penang RCE Phnom Penh, RCE Yogyakarta and RCE South Vietnam), two are affiliated with local governments (RCE Okayama, RCE Cha-am), one is affiliated with the local government and university (RCE Bohol) and two which are largely autonomous with affiliations with the local governments and universities (RCE Tongyeong and RCE Kitakyushu). In 2010, the leading institutes of the then 28 RCEs in Asia-Pacific were categorised as follows: twelve were led by higher education institutions, eight by local governments, six by NGOs, and two by research institutes (UNU-IAS, 2010). In spite of the significant variation in the composition,

TABLE 1: SUMMARY OF BACKGROUND INFORMATION ON RCES

RCE	RCE's Date of Establishment	RCE Member Organisation/Members	RCE Major Partners & Supporters	What are the current on-going Educational/ESD projects of the RCE?
RCE Beijing	January 2005 (But officially recognised by UNU-IAS in January 2007)	Not determined	Ministry of Education, Ministry of Environment Protection, China Environmental Science Publishing House, Yuntaishan World Geopark, Beijing Zoo, etc.	1. In service teacher training on ESD; 2. Geography textbooks evaluation program; 3. Disaster education for primary and middle school student
RCE Chubu	October 2007	Not determined	Chubu University, Nagoya University, Chubu RCE-ESD Promoting Network (CREPN)	Biodiversity Cyber Dialogue
RCE Kitakyushu	December 2006	Not determined	Kitakyushu ESD Council.	1. ESD outreach project: Strengthen capacity and network of communities; 2. Research & development: Develop educational tools for outreach and conduct monitoring; 3. Youth: Initiatives by the youth, mainly Ai no shima (Ai Island) project; 4. Public relations: Networking with national and international RCEs
RCE Okayama	June 2005	Not determined	School, University, NPO/NGO, Kominkan (Community Centre), Citizens Group, Municipality, Companies	1. Subsidy: subsidy for citizens groups and communities; 2. Publicity: ESD café (Venue of dialogue), ESD week ; (Enlightenment for citizens); 3. Collaboration: Collaboration project with universities and NPOs, schools and municipalities
RCE Tongyeong	October 2005	Not determined	Tongyeong City, Gyeongsang National University, Yonsei University	Informal Education: 1. Lifelong learning group activities; 2. Youth program Bridge to the World; 3. Pe+cademy: traditional art training course for youth; 4. Teach for Island: (a) Literacy program for elderly (b) English camp for the under-privileged youth; 5. Saengsaeng informal ESD program grants; 6. Sumshimsarm recharging program for activists; 7. Our Village School: Local community centre ESD Program; 8. TongTong humanities lectures Formal Education: 1. School ESD modael schools: kindergarten ~ university; 2. Extracurricular ESD program; 3. ESD teacher training; 4. ESD project class; 5. Atti-school project Scholarship: 1. Tongyeong young leader scholarship for artists and athletes; 2. Mentoring program for scholarship awardees. R&D: 1. Traditional knowledge booklet series; 2. Dongpirang EduCentre/ Suryukteo EduCentre; 3. Local ESD Index evaluation; 4. RCE Tongyeong 5-year white paper RCE Eco Park,& Sejahtra Centre: 1. Program & site development.
RCE Bohol	September 2011	Academe, Youth, LGU, Governmental & Non-Government Agencies, media, Business, Local Government Unit	Community, Red Cross Youth, ACESS Development	1.Climate change Orientation; 2.Organic Farming Education

RCE Cha-am	March 2008	The Sirindhorn International Environmental Park	Ministry of Energy, Thailand and other organizations from governmental and private sectors (from within Thailand and abroad)	1. Energy for environment; 2. Mangrove ecosystem and rehabilitation; 3. Wastewater treatment system (constructed wetland); 4. Coastal erosion protection; 5. Inland ecosystem and tree planting; 6. Biodiversity
RCE Penang	June 2005	University Sains Malaysia	1. World Wide Fund Nature Malaysia (WWF-Malaysia); 2. Don & Mylene Theseira; 3. Water Watch Penang (WWP); 4. Malaysian Nature Society, Penang Branch (MNS); 5. Penang Environmental Working Group (PEWOG); 6). Socio-Economic & Environmental Research Institute (SERI); 7. Regional Centre for Education in Science and Mathematics (SEAMEO RECSAM); 8. The Taiping Peace Initiative (TPI); 9. Association for Science and Mathematics Education Penang (ASMEP); 10. Sahabat Alam Malaysia (SAM)	1. Enhancing sustainable lifestyle within Universiti Sains Malaysia and its surrounding neighbourhood; 2. Vulnerability and adaptation to Flood in Kuala Nerang, Kedah, Malaysia; 3. Showcasing Balik Pulau as sustainable village; 4. Eco-Institute Program (with World Wildlife Fund- Malaysia); 5. SD training for SMEs
RCE Phnom Pehn	December 2009	Royal University of Agriculture (RUA) and Institute of Environment Conservation and Rehabilitation, Cambodia Branch (ERECON CaM). Member: Ministry of Agriculture, Forestry and Fisheries, Ministry of Rural Development, Ministry of Education, Youth and Sports, several elementary schools in Phnom Penh and Kampong Cham and private sectors	External advisor: Institute of Environment Rehabilitation and Conservation, Japan (ERECON), Tokyo University of Agriculture, Japan (TUA) and Association of Environmental and Rural Development, Thailand (AERD)	1. Project on enhancing education on food, agriculture and environment in elementary schools; 2. Project on facilitating sustainable agriculture for local farmers; 3. Project on promoting seri-culture for deepening environmental awareness and income generation
RCE Yogyakarta	December 2007	Dr. Puji Astuti, M.Sc., Apt	1. RCE Tong Yeong, RCE East Kalimantan, RCE Chubu; 2. Provinces of Jambi, East and Central Kalimantan, Yogyakarta, Riau; 3. Local government offices of Marine and Fisheries, Forestry, Tourism and Creative Economy, Trading; 4. Ministries of Marine and Fisheries, Forestry; 5. National Oil Company (Pertamina); 6. Governmental Bank BRI; 7. Pharmaceutical Company SOHO	1. Training on "Zero Waste Integrated Farming" by University Agricultural Field Laboratory; 2. ESD-based community development at Kemadang village, Gunung Kidul District, Yogyakarta, Indonesia; 3. ESD implementation through herbal medicine development at Yogyakarta; 4. Community based reforestation development at Jambi, East and Central Kalimantan, Central Java; 5. ESD implementation on community forest development at Gunung Kidul District; 6. ESD on Disaster adaptation and mitigation
RCE Southern Vietnam	September 2011	RCE Tongyeong, RCE East Kalimantan, RCE Chubu		

TABLE 2: SUMMARY OF BACKGROUND INFORMATION ON SELECTED GOOD PRACTICES

RCE	Title of ESD Initiative	Starting Year & Duration of Initiative	Major Partners in the initiative	Amount of Budget and Funding Sources
RCE Beijing	In-service teacher training program	2003, 9 years	China Ministry of Education, education administration in different cities in China	Not stated: Ministry of Education, SINO Map Press
RCE Chubu	Biodiversity cyber dialogue	2009-2010 (Phase 1: until CBD COP11) 2011-2012 (Phase 2: until CBD COP11)	Chubu ESD –RCE Promotion Network (CERPN)	100,000 yen (2010); 100,000 yen (2011) (~1275 USD per year)
RCE Kitakyushu	ESD outreach project: Strengthen capacity and network of communities	2006-present	Kitakyushu City Government	314, 000 yen per year (~ 4,000 USD); Kitakyushu City Government
RCE Okayama	Realizing a sustainable society through a flexible network, starting with Okayama region	Starting year: 2005 Duration of Initiative: N/A (not limited)	Schools, Universities, NPOs/NGOs, Kominkans (Community Centers), Citizens Groups, Municipalities (Prefecture, city), Companies	2,425,000 yen (~ 31,000 USD) (Fiscal year 2011); Municipality (Okayama City)
RCE Tongyeong	Bridge to the world (BTW)	2008-present	17 middle & high schools of Tongyeong, Tongyeong City Government, Mentoring groups, Global RCEs network	100 million KRW (~90,000 USD); Tongyeong City Government
RCE Bohol	Bohol socio-economic and environmental awareness education program	2012 5 years	Academe, Youth, LGU, Government Agencies, Non-Government Agencies, Media, Business, Local Government Unit	Php 500,000 (~12,000 USD)
RCE Cha-am	The Sirindhorn International Environmental Park	2007	1. The Sirindhorn International Environmental Park; 2. The National Energy Policy Office (NEPO), Ministry of Energy, Thailand; 3. Office of Natural Resources and Environmental; Policy and Planning (ONEP), Ministry of Natural Resources and Environment, Thailand 4. Mrigadayavan Palace Foundation; 5. Border Patrol Police Bureau; 6. The Institute for the Promotion of Teaching Science and Technology (IPST), Ministry of Education, Thailand	Approx. 30,000,000 Baht per year (~967,740 USD) Funding sources: 1. The Energy Conservation Promotion Fund, National Energy Policy Office (NEPO), Ministry of Energy, Thailand 2. The Institute for the Promotion of Teaching Science and Technology (IPST) 3. Wastewater Management Authority (WMA) 4. Other organizations from governmental sector e.g. Ministry of Natural Resources and Environment, Ministry of Agriculture and Cooperatives, Thailand etc. 5. Other organizations from private sectors/companies from/ within Thailand and abroad- Individual donation

RCE Penang	Enhancing Sustainable Lifestyle within Universiti Sains Malaysia and its Surrounding Neighbourhood	April 2011 1 year	1. Centre for Global Sustainability Studies, Universiti Sains Malaysia (Leader); 2. School of Industrial Technology, Universiti Sains Malaysia; 3. RCE Penang; 4. Penang Municipal Council; 5. Solid Waste and Public Cleaning Management Corporation, Penang; 6. Several primary, secondary schools and communities	RM350,000.00 research grant from Universiti Sains Malaysia
RCE Phnom Penh	Project on Facilitating Sustainable Agriculture for Local Farmers and Enhancing Education on Food, Agriculture and Environment for Elementary Schools	April 2011-March 2016	ERECON, ERECON CaM, TUA, JICA, RUA	5 years financially supported by Japan International Cooperation Agency, Japan
RCE Yogyakarta	Zero Waste Integrated Farming on Gadjah Mada University Farm	2009 to present	1. Staff of University Farm; 2. Lecturers from 18 Faculties in Gadjah Mada University; 3. Researchers from Agricultural Research Station; 4. Students from several national and international universities; 5. Community and students of primary and secondary schools	Rp 750 million (~ 78, 000 USD) Rp. 75 million, - From Ministry of Agriculture Rp. 100 million,- From Ministry of Forestry Rp. 100 million,- From Ministry of Education and Culture Rp. 500 million,- From Ministry of Public Work Contribution of CSR from BRI Bank and From Pertamina National Oil Company; also from the Head of Sub District Government

operations of the RCEs (Fadeeva, 2007), care ought to be taken toward the selection of the RCE core members for balance of power relations and fair representation of the region's available structures, institutions and issues.

In regard to starting of future projects, due to the limitation of funds, expertise, material resources and also to avoid duplication, conducting inventory to catalogue and document ESD projects in the region, particularly the area under the jurisdiction of the RCE is important. The use of an inventory to advance RCEs' functionality will be appropriate for the following reasons: 1) focus on the RCE geographic region with regard to the local livelihood and supported by the regional ecosystem, 2) utilising the strength of the RCE by identifying the already-existing regional ESD issue areas for the building of productive networking, and 3) forming partnerships with organisations for identifying collaborative ESD projects (White and Petry, 2011).

Table 2 indicates the summary of the background information on the reported good practice cases. The cases reported ranged across the sustainability spectrum and the general objective was capacity building through learning. The duration of the initiatives also varied among the RCEs. Some of the initiatives were medium-term of 5 years (RCE Bohol, RCE Phnom Pehn), others were in short-term phases (RCE Chubu) or for one year (RCE Penang) and the rest are ongoing with no specific time of completion. The reported initiative of one RCE (RCE Beijing) was incorporated into its programs after the RCE's launch as the initiative had already begun two years before the establishment of the RCE. Furthermore, while RCE Beijing and RCE Phnom Penh failed to state the amount provided for the implementation of the initiative, RCE Bohol did not provide information on the source of funding of the initiative.

Target learners of the RCE cases: Table 3 shows the target learners of the RCE cases. Generally, RCEs in Southeast Asia covered a wider range of learners than those in East Asia. Students/Youth and Community were two groups of learners most commonly targeted by the RCEs.

Types and levels of education and sectors covered: Table 4 shows the distribution of education types and levels covered by the RCE cases. RCE Yogyarkarta, Cha-am and Okayama covered most of the sectors compared to the rest. Although the results in Tables 3 and 4 provide a window to see the distribution of the measured parameters, the limitation is that the results do not cover all the other initiatives being conducted by the RCEs, but rather those initiatives that were self-selected by the RCEs to present as exemplar cases. Hence our knowledge of the general pattern of coverage of the target learners, education levels and types of education is limited in this study by the small selection of exemplar cases and may not reflect the overall coverage of the total initiatives being conducted by these RCEs.

TABLE 3: TARGET LEARNERS OF THE RCE CASES

	Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Students[●] Youth [○]				● ○	● ○	● ○	●	●	●	●○
Teachers[●] [Assumed ◊]	●			◊	◊	◊	◊	◊	●	●
Community		●	●	●		●		●*	●	●
Local Government			●				●			●
Private sector							●	●		
Other						House wives				Nat & Int. officials

◊ Not stated but assumed that the class teacher(s) at least will be present

TABLE 4: ESD EDUCATION TYPES AND LEVELS COVERED BY THE RCE CASES

Education types and levels	Beijing	Tongyeong	Kitakyushu	Chubu	Okayama	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Early Childhood						●				●
Primary Education					●		●		●	●
Secondary Education	●	●			●		●			●
Teacher Education	●				●		●		●	●
Higher/Further Education			●		●		●			●
Non-Formal Education	●	●	●	●	●		●	●	●	●
Civil Society and Community Engagement			●	●	●	●	●	●		●
Business and Private Sector					●		●	●		●
Other										National & Inter-national

Figure 1 shows the summary of education types/level covered at the sub-regional level. Overall, the coverage of non-formal education and civil society & community engagement sectors was higher than the other sectors. Although the overall coverage of education for children and youth in the region was low, there was little or no coverage of primary education and early childhood education respectively by the RCEs in East Asia. This is noteworthy because forming good habits (HMUK, 2005) and acquiring sustainability literacy/knowledge (Ofei-Manu and Shimano, 2012a) at an early age help develop sustainability skills for life-long learning. Furthermore, the coverage of higher education and business & private sectors was low. Attention therefore ought to be paid to incorporating these two sectors into the RCE programs because their contributions could significantly enhance the overall ESD implementation (Wals, 2012) in the regions.

FIGURE 1: Summary of education types/level covered by RCE cases at the sub-regional level

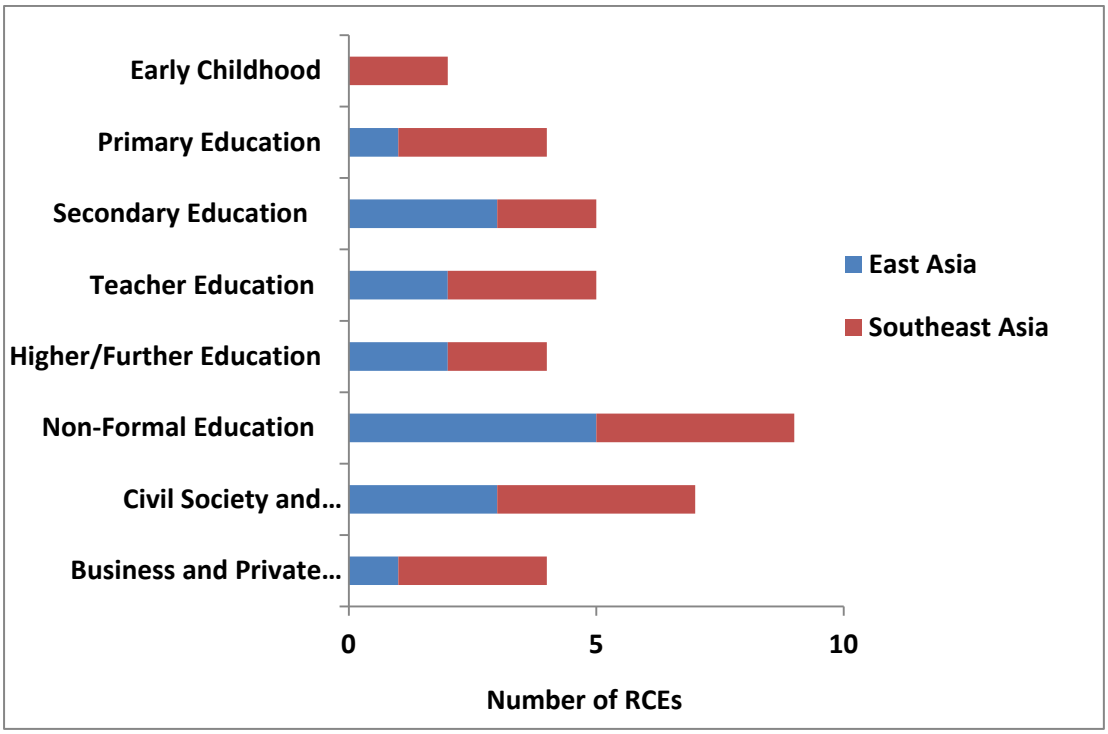


Table 5 (on the following page) indicates the ESD themes covered in the survey and the distribution of coverage across the RCEs. Generally, East Asian RCEs covered more ESD themes than their counterpart Southeast Asian RCEs. Ethics, governance and justice were covered by only one RCE each and HIV/AIDS and democracy were not covered at all. Some strong social issues like intercultural understanding, cultural diversity, peace, human rights and security, and particularly gender equality were not addressed by all the RCEs in Southeast Asia. All three Japanese RCEs surveyed had gender equality on its agenda suggesting Japan like many Asian countries with issues regarding gender equality (Sugimoto, 2002; Ofei-Manu, 2009) is now willing to tackle this issue from the grassroots.

TABLE 5: ESD THEMES ADDRESSED BY THE RCE CASES IN EAST ASIA AND SOUTHEAST ASIA

(The green colouration depicts environmentally-related themes, the blue colouration depicts socio-cultural themes and the orange colouration depicts economic-related themes)

ESD Themes	Beijing	Tongyeong	Kita kyushu	Chubu	Okayama	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Overcoming poverty		■				■			■	
Gender equality			■	■	■					
Health promotion						■				■
HIV and AIDS										
Ethics				■						
Intercultural understanding	■	■		■	■					
Cultural diversity	■	■		■						
Citizenship		■		■						
Peace, human rights and security	■	■	■							
Environment	■	■	■	■	■	■	■	■	■	■
Climate change education	■	■	■		■	■	■	■		■
Water	■		■				■			
Biodiversity	■	■	■	■	■		■			■
Natural resource mgt	■					■	■		■	■
Disaster reduction education	■		■		■		■			
Democracy										
Governance	■									
Justice			■							
Corporate responsibility			■	■				■		
Economy	■		■					■		■
Sustainable production and consumption	■	■	■	■			■	■	■	■
Sustainable urbanization	■		■					■		
Sustainable tourism	■	■	■							■
Rural development			■		■				■	
Responsibility in local and global context	■	■	■	■				■		
OTHER		Career development			Community development		Sufficiency Economy Philosophy			Community development

Figure 2 (on the following page) shows the summary of the ESD thematic topics as covered according to sub-regions. The first 3 themes were equally covered by the two sub-regions. At the backdrop that RCEs are supposed to deal with locally-relevant issues, it was a bit surprising (at the wake of the 2004 tsunami in Southeast Asia plus other disasters, particularly flooding) that disaster risk education was not adequately covered by Southeast Asian RCEs. Also, given the rich flora and the importance of green tourism/ecotourism in the region, it was expected that sustainable tourism would be a priority ESD theme. It should be noted however that RCE Cebu which was not involved in this survey has been engaged in ecotourism promotion since 2008 (UNU-IAS, 2010).

Three out of four of the themes most covered are on the environment. The order of frequency of coverage of the themes by the RCEs in descending order is as follows: Environment, climate change education, sustainable production and consumption, biodiversity, natural resources management, responsibility in local and global context, disaster risk reduction, sustainable tourism, economy, inter-cultural understanding, cultural diversity, gender equality, peace, human rights and security, water, corporate responsibility, overcoming poverty, citizenship and health promotion. Other themes not covered by the survey but mentioned by the RCEs are: career development, community development and Sufficiency Economy Philosophy. It should be acknowledged that the important themes of energy and food systems/security were inadvertently omitted even though some RCEs in Asia-Pacific were reported to be engaged in projects/issues covering energy (UNU-IAS, 2010).

With categorisation solely based on the title of the project which potentially can be misleading with respect to the actual context of the initiative, an evaluation of all of the project/initiatives being conducted by each, using 1-2 projects for each sustainability pillar per RCE, showed that those projects focusing mainly towards the environment were found in RCEs in Southeast Asia while those from RCEs in East Asia tilted towards the social and economic aspects of sustainability (Table 6). RCE Tongyeong showed the highest number of ongoing projects.

FIGURE 2: Summary of ESD thematic topic as covered by sub-regions

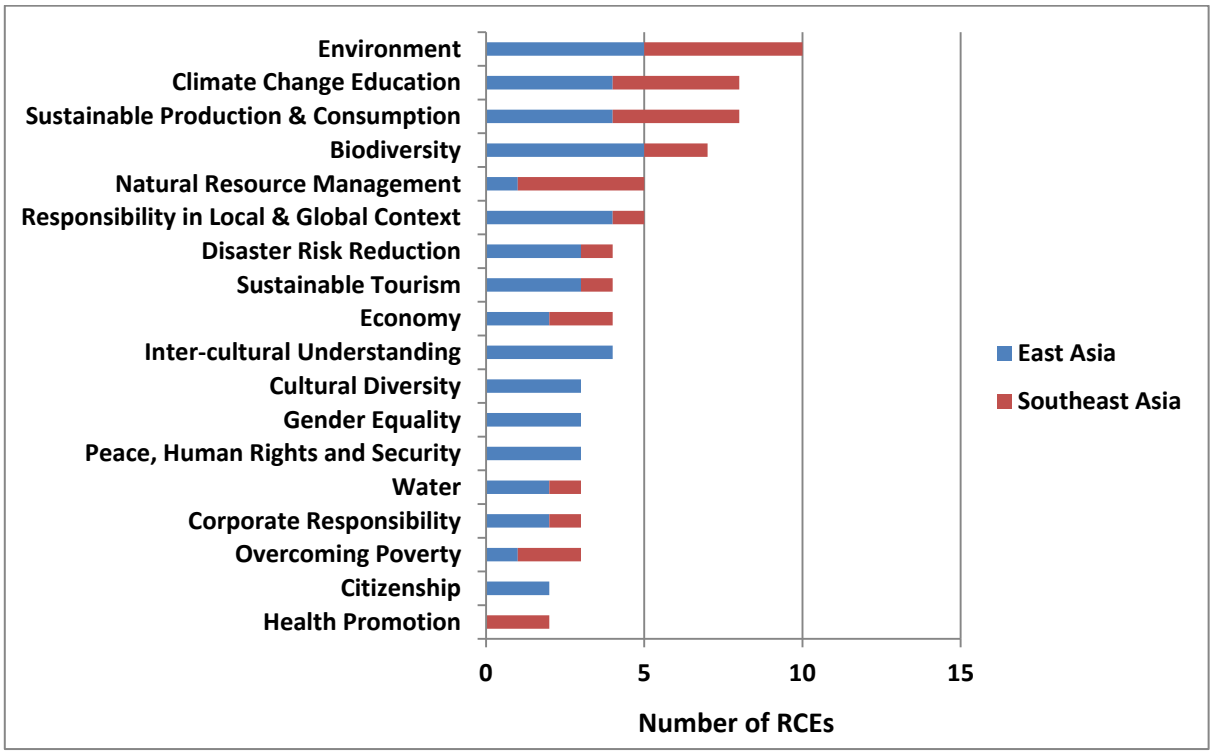


TABLE 6A: DISTRIBUTION OF THE RCE PROJECTS/INITIATIVES WITHIN THE THREE PILLARS AND THEIR COMBINATIONS

(SEE APPENDIX TABLE 6B FOR TEXT)

	Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Environment	1	2			2	2	7	2	3	3
Social – [Cultural]			1		4					
Economic				1	3					
Both Social & Environment	1		2	1	5					2
Both Social & Economic					1					
All three areas	1		1	3	3	1		3		
Other					3					

* The categorisation was made based solely on the titles of the initiatives

Comparative evaluation of the initiatives based on educational/learning process and content within the parameters of objectives and foci, methods and approaches, activities, outcomes and achievements

A comparative evaluation of the RCE cases is conducted in this section based on the assessment of the following parameters (i.e. factors): 1) objectives and focus, 2) educational/learning methods and approaches and strategies applied, 3) ESD activities, and, 4) main outcomes and achievements. The components of these factors were however, identified and grouped based on their educational/learning characteristics, both process and content.

As already pointed out, the structure and context within which learning occurs and also the content and process of learning are of importance and the processes and content of learning focused on sustainability/ESD are neither confined to formal nor informal educational contexts. This is because acquiring the competence to address the challenges of sustainability depends on the pedagogical approaches and learning processes of individuals and learning processes of human systems at the multi-level of groups, organisations, and nations (Hansmann, 2010).

Tilbury's report on ESD Expert Review of Processes and Learning describe four accepted learning processes:

1) processes of collaboration and dialogue
2) processes which engage the whole system
3) processes which innovate the curriculum
4) processes of active and participatory learning (2011: 7).

The definition of 'processes' in the report and also that in Wals (2012) refers to "engagement opportunities, pedagogical approaches or teaching and learning styles adopted to implement ESD at different educational levels and in varied educational settings" (Tilbury, 2011: 13).

One difficulty Tilbury encountered in her report was the problem of access to data on ESD processes and learning opportunities due to their lack of detail in the literature. She came across abundant information on specific objectives and outcomes of initiatives/projects but also found a lack of data to show how these objectives and outcomes were achieved. She admitted to the newness of the field and hence the lack of overview on comparison and evaluation that provides a good picture of effective processes and approaches (2011: 8). A critical question posed in the report relates to the dimension (extent and depth) of link between choice of processes in ESD initiatives and actual contributions (outcomes) to sustainable development.

On the basis that the reported initiatives generally differed significantly across the RCEs, evaluating them based on process and content of education/learning classification was considered appropriate and if successful, could serve as a tool for future comparative studies of ESD practices that vary significantly within an area or region. The education/learning process and content types (hereafter referred to as ELPC)

identified are as follows: 1) education and knowledge transfer – where the RCE serves as the education/knowledge provider, 2) knowledge acquisition, research and training – where the RCE's individual members/member organisations receive education/knowledge from other sources as well as from the RCE, 3) good practices and practical experience, 4) information sharing and awareness raising, 5) platform for dialogue and community engagement, and 6) multi-stakeholder partnership and networking. There were also: 7) conferences, workshops and meetings (found in methods, approaches and strategies factor and ESD activities factor only), 8) capacity building and training (objectives and focus factor only), and 9) role play and games (methods, approaches and strategies factor only). It should be noted however, that almost all the elements listed are capacity building measures/processes. Capacity building was included in the list because it was mentioned a few times but with no additional information to include it under any of the ELPC types identified.

Parameter: Objectives and Focus (Foci):

Table 7a is the summary distribution of ELPC of the RCE cases under the objectives and focus factor. The objectives of the RCE cases were concentrated within education and knowledge transfer ELPC among the East Asian RCEs. The foci of the cases were evenly spread both vertically and horizontally within the table.

Table 7b and (Tables 7c-f:, see the appendix) shows the summary of the (components of) individual RCE objectives and focus factor in relation to the ELPC types identified. Under education and knowledge transfer ELPC (Table 7b), the objectives include knowledge transfer to equip recipients with skills and awareness to get on with their ESD-related work of outreach, teaching, conduction of research and reduction of solid waste. The foci generally followed a similar trend. With regard to research and knowledge acquisition and training ELPC (Table 7c), the objective was to receive knowledge to better understand ESD and SD and the foci were on receiving knowledge skills to independently select one's own topic, conduct research and disseminate the results and also, to be able to reduce solid waste that goes to the landfill. For good practice and practical experience ELPC (Table 7d), the foci were to learn through experience good ESD practices in schools, act to reduce landfill solid waste and to promote sustainable agriculture including integrated farming. The focus linked to platform for dialogue and community engagement ELPC (Table 7e) was to create a framework for cyber-dialogue. The foci of the RCE cases linked to information sharing and awareness raising ELPC (Table 7f) include sharing the Sufficiency Economy Philosophy, better communication to students and their parents by teachers, information sharing/exchange within RCEs and also with other RCEs through UNU-IAS. With regard to multi-stakeholder partnership and networking ELPC (Table 7g), the foci were on cross boundary, multi-sectoral learning and multi-stakeholder engagement, strengthening of networks including creation of information exchange network. Capacity building ELPC (Table 7h) focused on strengthening capacity through information provision and educational activities for residents.

TABLE 7A: SUMMARY OF THE MAJOR OBJECTIVES [O] AND FOCI [●] OF THE RCE CASES
(see Appendix Tables 7c-h for text)

Learning processes and content (ELPC) components	Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Education and knowledge transfer	o o ● ●		o	o o	o o ● ●	●	● ●	●	●	
Research & knowledge acquisition	o				●			o		
Good practices and practical experience	●							●	●	●
Platform for dialogue and community engagement		o								
Information sharing and awareness raising	o			●			●			
Multistakeholder Partnership & networking		●	●	●						
Capacity building			●	●						

TABLE 7B: THE EDUCATIONAL/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE OBJECTIVES AND FOCUS FACTOR: EDUCATION AND KNOWLEDGE TRANSFER ELPC (OBJECTIVE [O] & FOCI [●])

RCE Beijing	o Raising teachers' awareness of SD o Teachers knowing how to teach better o Understanding the concept and theory of ESD • Acquisition of knowledge about international trends
RCE Kitakyushu	• Realisation of a just sustainable society by using the initiative to Increase the number of active pro-sustainability citizens
RCE Okayama	o Expanding the circle of people who address the challenge toward sustainability o Developing and enhancing organizations that promote ESD
RCE Tongyeong	o Self-research study trip for experience and topic competence o Presenting vision of SD to future leaders • Acquisition of knowledge for research and disseminating it later
RCE Bohol	• Educating the community on climate change adaptation, mitigation, health and Natural resource management
RCE Cha-am	• Conservation of energy • Alternative energy, natural resources and environment
RCE Penang	o Reduction of solid waste
RCE Phnom Penh	• Promotion of sustainable agriculture based on natural resource circulation

Parameter: Competency-based objectives [knowledge, skills, and values]:

This aspect of the report was designed during the second leg of the scoping process and is therefore applicable only to Southeast Asian RCEs. The question referred to how applying the competency-based objectives to the RCE cases (as opposed to the more generalised objectives in the first scoping) would lead to more specific ESD competency outcomes. Tables 8a-c show knowledge-, skill- and value-based objectives of the reported initiatives from RCEs in Southeast Asia.

The terms found to be linked to knowledge-based objectives include: "to develop knowledge", "to promote knowledge", "to transfer knowledge", "to increase knowledge", "learning about", "to educate", "to promote education". The terms associated with skill-based objectives include: "to apply knowledge learned", "to put knowledge into practice", "to develop skills (for adaptation)", "to develop ability to", "to promote", "to learn proper ways of", and "to learn how to". The terms related to value-based objectives are as follows: "to internalise", "to value", "to apply (Sufficiency Economy Philosophy)", "to understand", "to promote", "to contribute", and "to instil in people". These phrases can be considered as 1) practically-oriented and related to ESD competency building, and 2) are mostly tilted towards the affective aspects of ESD.

TABLE 8A: KNOWLEDGE-BASED OBJECTIVES OF THE REPORTED CASES FROM SOUTHEAST ASIAN RCES

RCE Bohol	• Develop beneficiaries' knowledge and theories about environment and natural resources; • Promote members' knowledge about the principles of health (including proper food for family member, utilization of available indigenous food in the locality, good sanitary practices at home or anywhere, child care, care of pregnant and lactating mothers, use of comfort rooms); • Educate the beneficiaries about the climate change adaptation and mitigation.
RCE Cha-am	• To learn about the different activities taking place in SIEP: (1) Green energy generated by solar power; (2) Wind power, wave energy; (3) Energy for Environment; (4) Natural Resources and Environment; (5) Wastewater Treatment System (Constructed wetland); (6) Sufficiency Economy Philosophy; (7) Conservation and rehabilitation of coastal ecosystem and biodiversity (mangroves, birds and other flora and fauna species); (8) Protection of coastal area.
RCE Penang	• To understand the importance of recycling to reduce waste; • To understand the importance and the process of composting to reduce waste; • To understand the concept of degradation of material; • To understand that different materials have different degradation rates.
RCE Phnom Penh	• To promote education on food, agriculture and environment for agricultural successors as a part of life skill education; • Transfer of knowledge to local farmers and residents to understand the bad effects of agricultural chemicals especially pesticides on human health and natural environment.
RCE Yogyakarta	• To increase the knowledge, understanding of the principles of education in the field of ESD particularly in zero waste agriculture.

TABLE 8B: SKILL-BASED OBJECTIVES OF THE REPORTED CASES FROM SOUTHEAST ASIAN RCES

RCE Bohol	• To apply the knowledge learned in the lecture to their actual life situation; • To put into practice all the knowledge gained; • To develop the skills for adapting to and mitigating climate change.
RCE Cha-am	• Energy Saving Methods; -Learn the proper ways for conservation of energy, natural resources and environment; Develop the ability to apply "Sufficiency Economy Philosophy" into daily life and the conservation of energy and natural resources and environment.
RCE Penang	• To develop the skill to identify recyclables and non-recyclables; • To develop the skill to manage recyclables; • To develop the skill on different methods of composting; • To develop the skill on composting processes involved in different types of composting.
RCE Phnom Penh	• To promote sustainable farming practices based on natural resource circulation; Local farmers to learn how to add the value of their agricultural products for responding to market demands.
RCE Yogyakarta	• How targeted people manage eco-friendly agriculture and apply the techniques and methods of zero waste agriculture.

TABLE 8C: VALUE-BASED OBJECTIVES OF THE REPORTED CASES FROM SOUTHEAST ASIAN RCES

RCE Bohol	• To internalize the importance of good environment and natural resources; • To value the importance of sanitation, waste management and good health.
RCE Cha-am	• Green Energy; - Energy saving by applying Sufficiency Economy Philosophy; Value of natural resources and environment (mangrove, coastal ecosystem, biodiversity); environmentally friendly method of wastewater treatment system.
RCE Penang	• (1) To understand that sustainable lifestyle starts with the individual within the community; (2) To understand that community plays an important role in promoting sustainable lifestyle; (3) To promote sustainable consumption; (4) To instil in people the concept of "from waste to wealth".
RCE Phnom Pehn	• (1) To understand the importance of selling value-added products with organic or low chemical input at higher prices in the markets.
RCE Yogyakarta	• People can contribute to the action and benefit of zero waste agriculture to the environment, promoting and expanding the importance of this practice to the society.

Parameter: Learning methods, approaches and strategies:

Table 9a is the summary of distribution of the ELPC of the RCE cases under learning methods, approaches and strategies factor. Except RCE Chubu and RCE Bohol, all the other RCEs used learning methods/approaches that could be identified in more than four ELPC types with the most found in RCE Okayama, RCE Tongyeong, RCE Penang and RCE Phnom Penh followed by RCE Kitakyushu, RCE Yogyakarta, RCE Beijing and RCE Cha-am. Education and knowledge transfer, knowledge acquisition, research and training, good practices and practical experience, and platform for dialogue and community engagement were the methods applied the most while role play and games, conferences, workshops and meetings and information sharing and awareness raising were methods used the least.

TABLE 9A: SUMMARY OF LEARNING METHODS OF THE RCE CASES *[see appendix Tables 9b-i for text]*

	Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Education and Knowledge transfer	●	●*	●	●	●	●	●	●	●	●
Knowledge acquisition, research and training	●		●	●	●	●	●	●	●	●
Conferences and meetings, etc.							●	●	●	
Good practices and practical experience	●		●	●	●	●	●	●		●
Information sharing and awareness raising				●	●*				●	●
Platform for dialog and community engagement	●	●*	●	●	●*		●	●	●	
Multi-stakeholder partnership and networking		●	●	●	●*			●	●	●
Role play & games	●									

* Not stated in the report but was inferred/implied.

Tables 9b-h (see appendix) show the summary of the aspects/components of learning methods, approaches and strategies of the RCE cases in relation to the ELPC types identified. The most common education and knowledge transfer based ELPC is teaching based on lectures. Added to that is a number of innovative examples like training of participants, provision of several other non-formal and informal education approaches, and use of teaching materials. The main method used in knowledge acquisition, research and

training ELPC was research but was applied in several ways: citizen research, action research and self-planned research with limited guidance. This method/approach was followed by receiving lectures from experts. Meetings and discussions, campaigns, workshops, conferences and seminars and talks were the methods used for conferences, workshops and meetings ELPC. For good practice and practical experience ELPC, the most common methods and approaches used were: field trips/field study, visitation (to schools or home) and action-based problem solving, hands on training/learning by doing. Use of ESD café, network-based information dissemination and use of newsletters were the methods and approaches used regarding information sharing and awareness-raising ELPC. Exhibitions, campaigns and festivals were the methods and approaches used for platform for dialogue and community engagement ELPC. With regard to multi-stakeholder partnership and networking ELPC, networking and collaboration were the main methods used. They include: social networking, institutional networking and networking based on transfer of methods. The different types of collaboration used were: individual, group and organisational/institutional collaborative partnerships.

Parameter: ESD activities of the RCE Cases:

TABLE 10A: SUMMARY ESD ACTIVITIES OF THE RCE CASES *[see Appendix Tables 10b-h for text]*

	Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Education and knowledge transfer	•	•	•	•	•	•	•	•	•	•
Knowledge acquisition, research and training	•		•	•	•	•	•	•	•	•
Workshops/Meetings etc.	•		•	•	•	•	•	•	•	
Good practices and practical experience	•		•	•	•	•	•	•	•	•
Platform for dialogue and community engagement	•	•	•	•	•		•	•		
Information sharing and awareness raising			•	•	•		•	•	•	•
Multistakeholder Partnership & networking	•	•	•	•	•		•	•	•	*
Other	•		•	•			•			

*RCE Yogyakarta stated collaboration as a learning outcome in Table 11a

Table 10a shows the summary of the distribution of activities of the RCE cases with each educational/ learning process and content (ELPC) type identified. Generally, all the ELPC-related activities identified occurred in at least 70 percent of the RCE cases. Tables 10b-i show the summary of activities of the RCE cases under each ELPC type identified. The main activities involved in education and knowledge transfer ELPC (Table 10b) were: teaching/giving lectures to participants under the auspices of the RCE using the classroom, learning/community centres, practical teaching materials and presentation slides, suggesting the use of formal, non-formal and informal settings in the process. Regarding research, knowledge acquisition and training ELPC (Table 10c), different types/methods of research and training activities were used. Holding meetings and organising workshops were the main activities involved in conferences, workshops and meetings ELPC (Table 10d).

The main activities involved in good practices and practical experience ELPC (Table 10e) were: 1) field visits to schools with good ESD practices, green buildings to help reshape perception towards sustainable living, homes to see the real situation in peoples' lives, eco-farms and doing eco-tourism; 2) implementing several agricultural and environmental management practices; 3) use of cafés and community centres for promoting ESD activities and dialogues, and 4) use of research to build sustainability/ESD capacity and also to promote ESD. The main activities involved in information sharing and awareness raising ELPC (Table 10f) were promotional campaigns, lifestyle awareness and exhibitions. In regards to the platform for dialogue and community engagement ELPC (Table 10g), there was the use of symposiums, and ESD Week for interaction with the general public as well as communicating ESD physically to the members of one's community or through the internet using cyber-dialogue.

The main activities involved in multi-stakeholder partnership and networking ELPC (Table 10h) were 1) exchanges among local RCE members and member organisations or among different RCEs, 2) multi-stakeholder engagement in collaborative project/research both local and international, and 3) use of networking to promote ESD activities. Activities that fall under 'other' are use of games and role playing to study ESD and monitoring and evaluation of research towards 'local' indicator development.

These pedagogical approaches were used in both formal and non-formal situations with a greater number of them tilting towards the non-formal setting. Cotton and Winter suggest the following ESD pedagogical approaches and/or strategies in the in formal education that can be used to plan ESD activities: role plays and simulations, group discussions, stimulus activities, debates, critical incidents, case studies, reflexive accounts, personal development planning, critical reading/writing, problem-based learning, and field work. They however admit the presence of barriers to engaging in such approaches: the need for significant amount of time, prior adequate preparations and the need for small groups for effectiveness (2010: 45-49).

Parameter: Main outcomes and achievements:

The main outcomes and achievements of the initiatives were grouped under: 1) learning/educational content – increased awareness, increased knowledge, increased skills and increased values, 2) learning/ educational process – improved ESD learning, improved ESD teaching, ESD integration into curriculum, 3) multi-stakeholder interaction – increased participation, increased collaboration, increased networking, and wider community of practice etc., 4) new vision for the future and changes in perceptions, 5) increased support, and 6) capacity building (Table 11a). The numbers shown in the table in the columns of the RCEs represent the various learning outcomes/achievements identified within each RCE.

TABLE 11A: SUMMARY OF THE MAIN OUTCOMES AND ACHIEVEMENTS OF THE RCE CASES
[see Appendix Tables 11b-11p for text]

	Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
LEARNING/EDUCATIONAL CONTENT - Increased awareness [1] - Increased Knowledge [2] - Increased Skills [3] - Increased Values [4]	1, 2, 3, 4	1, 2	1, 2, 3	1,2, 3	1, 2, 3, 4	2, 4	1, 2, 3, 4	1, 2, 3	1, 2, 3, 4	1,2 , 3 ,4
LEARNING/EDUCATIONAL PROCESS -Improved ESD Learning [5] -Improved ESD Teaching [6] -ESD integration into curriculum [7]	5, 6, 7	5	5 , 6, 7	5, 7	5, 6	5	5, 6	5, 6, 7	5, 6, 7	5, 6
MULTI-STAKEHOLDER INTERACTION - Increased participation [8] - Increased collaboration, [9] - Increased networking, [10] - wider community of practice etc. [11]	8, 11	8,10	8, 9, 10, 11	8, 9, 10,	8, 9, 10, 11		8, 9 10,	8, 9, 10, 11	8, 9,10, 11	8, 9, 11
New vision for the future/ Changes in perceptions [12]	12	12			12		12			12
Increased/Further Support [13]			13	13	13					
Capacity building [14]	14	14	14	14	14	14	14	14	14	14
Improved practices [15]			15	15		15	15	15	15	15

The extended summary of the main outcomes and achievements can be found in Tables 11b-p (appendix).

1. Regarding the mainly content aspect of the outcomes (Tables 11 b-e),
   (a) All the RCEs reported an increase in awareness of the issue(s) in context except RCE Bohol even though it was written in the survey report conclusion that seminars, workshops, trainings and forums were organised. Areas of enhanced awareness include ESD, SD and its pillars, environmental protection, biodiversity, environmental issues, energy savings, natural resource management and environmental conservation and Sufficiency Economy Philosophy (SEP).
   (b) All the RCEs reported an increase in knowledge. There was an increase in knowledge (in terms of both process and content). They include: 1) sustainability consciousness, 2) achievement of set sustainability goals through action research, 3) through collaborative learning using the *kominkans*, ESD cafés and several formal educational programmes. There was an increase in knowledge of ESD and its concepts, waste management, health and sanitation, energy savings, biodiversity, conservation of natural resources, the environment and SEP.
   (c) An increase in skills was observed in eight RCEs with respect to teaching ESD to students, the ability to lead in conducting ESD activities in the community centres, skills for conducting research, skills for systems thinking, skills to become independent, practical skills for composting and recycling, applying the zero waste method of sustainable agriculture.
   (d) Six RCEs reported an increase in values including sustainability consciousness, practicing SEP, putting concepts (knowledge) into action and change in perceptions of other cultures after visiting RCEs abroad.

2. For the process aspect of the outcomes (Tables 11 f-g),
   (a) All ten RCEs reported improved learning, including examples such as expert input on ESD-related biodiversity issues (e.g. minorities and biodiversity) across boundaries and learning from each other through farm visits. Also, there was an improvement in learning through acquiring information on an ESD issue, conducting research with little guidance and obtaining results.
   (b) Teaching was found to have improved in seven RCEs due to improvements in teaching methods, learning how to teach by teaching, adopting hands on/practical methods as part of the teaching pedagogy, applying to teaching what is learnt through experiencing nature and from available resources, obtaining research results and being able to transfer the knowledge to others.
   (c) Promoting and helping to integrate ESD into mainstream curriculum (like it occurred in RCE Beijing, RCE Okayama, RCE Penang, RCE Kitakyushu and RCE Phnom Pehn) improved in five RCE cases.

3. Multi-stakeholder interaction (Tables 13 i-l) led to:

(a) Increased participation which was recorded in nine RCEs. They include youth participation in several ESD activities during their trips abroad, participation in cyber-dialogue to discuss biodiversity and related pertinent issues including minorities.

(b) Increased collaboration, reported in seven RCEs included the following: youth were involved in several collaborative activities during their visits abroad, an increase in collaboration between universities and the municipality and between university and community to solve locally pertinent problems, and also collaboration between farmers that led to the formation of farmers' group.

(c) Increased networking which was reported in seven RCEs include: networking among RCE members/member organisations and also among RCEs, youth forming networks with the youth of other RCEs they visited and also over the internet.

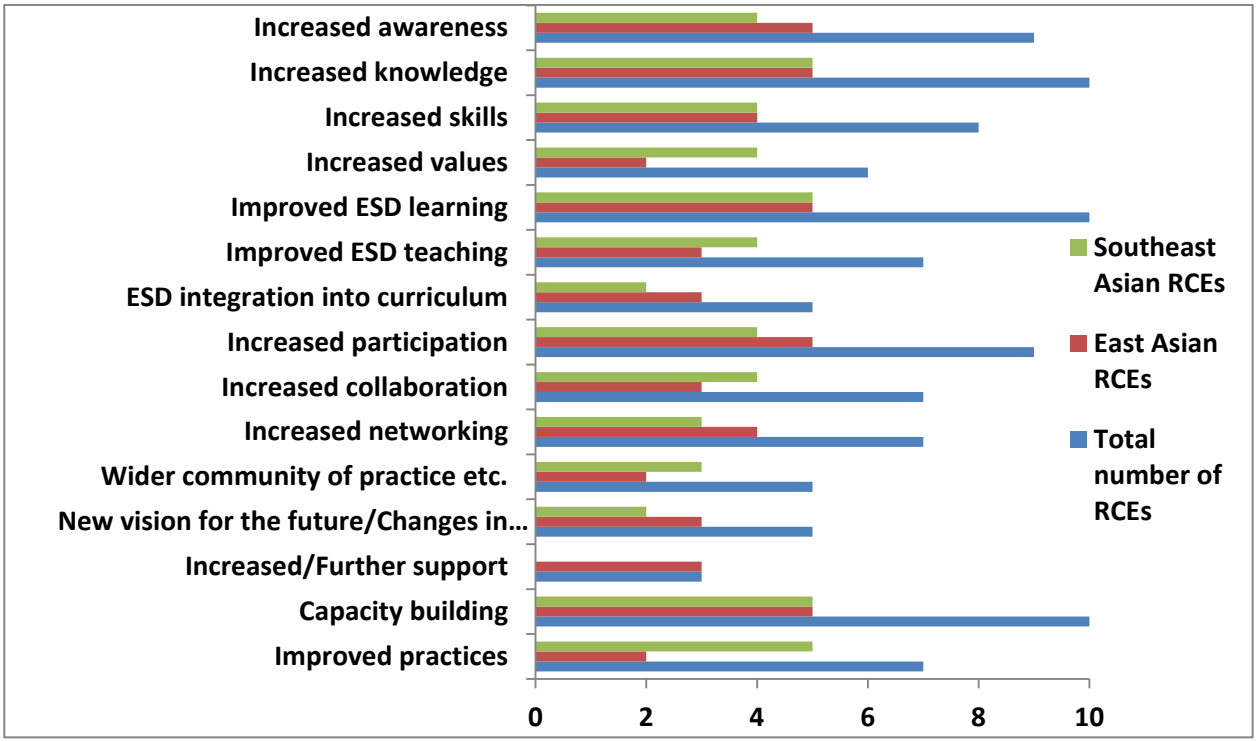
(d) Increased interaction with the wider community of practice reported in four RCEs: teachers acted as agents of social learning by embedding knowledge, skills and values in the larger community through students and parents; trainees acted as agents of change in the communities/regions by introducing methods of sustainable agriculture; and youth presented their experience and results of their research to the larger community at the end of their one year programme.

4. New visions for the future (Table 11m) and change in perceptions which was reported in five RCEs resulted in the following as examples: readiness to change one's way of living, e.g. energy use; and realisation and acceptance of cultural relativism due to youth's experience with other cultures and the subsequent change of their world-view.

Other major outcomes and achievements are: increase in budgetary and institutional support (Table 11n), enhanced capacity building of RCE members (Table 11o) and 'other' (Table 11p) which include several good practices (see appendix).

Figure 3 (on the following page) depicts the distribution of the educational/learning outcomes according to the total number of RCEs and by sub-region. Increased awareness and knowledge and improved ESD learning were the highest. Capacity building whose definition here is loose because it encompasses a number of the outcomes mentioned was among the highest. New vision for the future, ESD integration into the curriculum, values, participation and engagement with community of practice were among the lowest.

FIGURE 3: Individual educational/learning outcomes in total number of RCE cases and by sub-region



Benefits of multi-stakeholder partnerships in the RCEs

The summary of the main benefits of the multi-stakeholder partnership as a result of the implementation of the initiatives are as follows:

- Enhancement of participation and networking or the provision of the opportunity for future networking;
- Strengthening of collaboration among member organisations in the RCEs. Some RCEs formed collaborative partnerships. Certain activities also provided the opportunities for further collaboration among member organisations or RCEs;
- Creation and exchange of knowledge, skills and values transfer/acquisition through lectures and practical, hands on learning through experiences;
- Provision of venue (e.g. community centres) for multi-stakeholder engagement/dialogue and enhancement of outreach through multi-stakeholder partnerships;
- Broadening the scope of the RCEs' membership;
- Support in the form of human resources by experts resulting in capacity building; and
- Support in the form of funding and other additional resources.

This type of collaboration is one of the four core aspects that an RCE is expected to address towards meeting the DESD goals, as it is appropriate to bring together the various forms of capital (social, natural, cultural, financial and technological/manufactured) available in the region to meet the local ESD challenges (Slaus and Jacobs, 2011; Ekins, 2011) through collaborative partnerships and by making education/learning central to building capacity of the stakeholders.

TABLE 12: SUMMARY OF THE BENEFITS THE RCE MULTI-STAKEHOLDER PARTNERSHIP PROVIDED TO THE IMPLEMENTATION OF THE INITIATIVES *(For details refer to Section 2)*

RCE Beijing	• Provision of lectures by experts to teachers at the weekends on ESD thematic topics, holding of workshops and meetings and symposiums enhanced participation and networking; • Provision of opportunity for networking, collaboration, good practice and experience for in-service teacher training in ESD program through visitation to schools with good practice of ESD by teachers and discussions with principals and other teachers.
RCE Chubu	• Broadening of perspective i.e., focus on both local and global dialogue; • Input of pluralistic views regarding biodiversity; • Input of specialised knowledge e.g. university teachers, NGOs & business into the dialogue.
RCE Kitakyushu	• Extensive outreach of RCE Kitakyushu to the community through a multi-stakeholder partnership; • Provision of extensive foundation for outreach; • Enablement to respond to various needs of the community; • Diversification of the activities in RCE Kitakyushu; • Broadening of scope of member organisations and individuals through ESD integration in their activities.
RCE Okayama	• Provision of venue for dialogue for multi-stakeholders; • Flexibility in networking that allows orgs and groups to join the project; • Creation of mutual knowledge/learning through dialogue; • Resultant increase in the number of pro-sustainability people; • Local ESD promotion by the community centres; • Provision of right environment for SD learning; • Making meaning out of the activities; • Capacity building of staff; • Support from universities to communities.
RCE Tongyeong	• Skills of participants to tap into RCE local, national and global networks; • Sharing expertise and knowledge with/ by participating youth in the form of study visits; • Participants collaborate with NGOS, schools and institutions of Tongyeong, Korea and an RCE city of their choice resulting in opportunities to learn from various activities and expand their ideas.
RCE Bohol	• Knowledge was gained by the beneficiaries in solving their problems like: 1) climate change adaptation and mitigation, 2) preserving the environment, 3) promoting health, 4) overcoming poverty and rather learning more entrepreneurial skills, and 5) increased awareness and concern for the environment.
RCE Cha-am	• Networking and collaboration among stakeholders were strengthened; • There was provision of funds, manpower and ideas for the development of future plans.
RCE Penang	• Obtaining research fund, experiences, knowledge transfer and sharing, information sharing and also availability of space for interaction; • Sharing knowledge on best practices in recycling and composting the multi-disciplinary experts within the university, municipal council, solid waste authority, community-based organisation and NGO; • Active involvement of partners in providing feedback such as problems and suggestion of solutions during discussions and meetings; • Accessibility to conduct ESD activities at partner schools and residential neighbourhoods.
RCE Phnom Pehn	• RCE GPP serves as a platform for the participation of all stakeholders who work in many spheres of sustainable development – and facilitates collaboration among institutions at the regional or local level in a RCE for promoting ESD jointly; • Through cooperating with external advisory panel, facilitators in RCE GPP conduct technical trainings on sustainable agriculture for recipients/beneficiaries/participants.
RCE Yogyakarta	• Increase in participants' knowledge of the RCE concept that has resulted in increased change of mind-set of the participants who will go on and serve as agents of change in their communities, places, company or regions.

TABLE 13A: ADDRESSING THE PILLARS OF SUSTAINABLE DEVELOPMENT BY THE RCE CASES

	Environment	Social	Economic
RCE Beijing	ʘ	ʘ	ʘ
RCE Chubu	ʘ	ʘ	
RCE Kitakyushu	ʘ	ʘ	ʘ
RCE Okayama	ʘ	ʘ	ʘ
RCE Tongyeong	ʘ	ʘ	ʘ
RCE Bohol	ʘ	ʘ	ʘ
RCE Cha-am	ʘ	ʘ	
RCE Penang	ʘ	ʘ	ʘ
RCE Phnom Pehn	ʘ	ʘ	ʘ
RCE Yogyakarta	ʘ	ʘ	ʘ

All RCEs address the environmental and social pillars, all but two RCEs (RCE Chubu and RCE Cha-am) also address the economic pillar (Table 13A). Although the environmental and social pillars were generally clearly described in most cases and addressed across all cases, the description of the economic pillar was sometimes brief, not clear, or not talked about at all on a couple of occasions. The economic pillar was addressed mainly through job creation, an adoption of an innovative method that will result in work improvement and/or income generation, lifestyle changes or application of a new pro-environmental technique that will lead to income savings. The social pillar was addressed by fostering participation, increasing support, building inter-personal relationships and hence trust among members, garnering inspiration by adopting a sustainability-related philosophy, improving collaborative engagements and nurturing the next generation of custodians of the environment (Table 13b). Some RCE initiatives addressed the pillars at the level of knowledge acquisition/transfer, e.g. RCE Bohol, RCE Cha-am and RCE Chubu. Others addressed some of the pillars practically while others at the level of knowledge gain, e.g. RCE Tongyeong and RCE Yogyakarta. A third group addressed the sustainability pillars through practical learning and putting knowledge into action, e.g. RCE Beijing, RCE Kitakyushu, RCE Okayama, RCE Penang and RCE Phnom Penh.

There has been a steady rise in the literature pointing to the need for the sustainability pillars to also emphasise the cultural and temporal (time) aspects of sustainability. The incorporation of time dimension into what Lozano (2008, 2012) terms the First Tier Sustainability Equilibria (FTSE) results in the interaction of the three dimensions of environmental, social and economic in the present. The FTSE then proceeds to interact dynamically with the short, intermediate and long-term perspectives of these three dimensions resulting in a Two Tier Sustainability Equilibria (TTSE). A socio-cultural or cultural relational perspective on learning and change is important because it "recognises that it is in the interactions between past, present and future, between mind and body, between individual and collective, between powerful and less powerful, between human and other-than-human that our agency, learning and change come to be constituted" (Olvitt, 2012: 106). Regarding the continuous role of RCEs in helping to embed ESD and sustainability at the local level and with many projects/initiatives including a long term perspective, it would be beneficial to implement locally and culturally relevant initiatives that seek to balance these five overall dimensions.

TABLE 13B: HOW THE RCE CASES ADDRESS THE THREE PILLARS OF SUSTAINABLE DEVELOPMENT

	Environment	Social	Economic
RCE Beijing	Natural environment-related knowledge and skills were transferred to teachers together with increased appreciation of nature	Participants learnt better communication skills through training programmes which became useful in their teaching of ESD to students in schools and also to other members of their communities. They had also obtained a high sense of responsibility towards the environment and were more eager to contribute as individuals towards achieving sustainability	Teachers gained a better understanding of sustainable development and contrary to their old way of thinking, they could make smarter economic decisions regarding better usage of energy and other consumption choices, thereby saving money and simultaneously having better quality of lives
RCE Chubu	BCD addressed mainly biodiversity issues	Issues covering the socio-ecological aspects of biodiversity, particularly those related to minorities like women, indigenous people, etc. were discussed.	Was not directly addressed
RCE Kitakyushu	They identified evacuation spots in the case of disaster, cleaned community roads and planned vegetables in abandoned lands. They planted lemon trees on the road sides starting with nurseries hoping to make a community full of fruits	The entire community jointly painted lemon trees on the wall of community centres, hence resulting in intergenerational exchange and sustainability of the project. They also served hot-lemon to the community people at a gathering using the fruits. The bond within the community strengthened, their support for each other intensified, e.g., helping old people who live alone with their daily shopping	These activities were mainly done voluntarily, but some created job opportunities for some members of the community
RCE Okayama	1) Dealing with the environmental issues facing the fishing industry; 2) Inculcating in the youth, the importance of sustainable agriculture and also experiencing nature and conducting scientific inquiry on the environment leading to producing citizen scientists to monitor the environment	1) Enhancement of social interaction due to Increased collaboration, networking and exchange among member organisations using the community centre as well as between RCE Okayama and other RCEs. 2) Nurturing the next generation of farmers by keeping them in close touch with the present farmers and also with nature	1) Although not clearly stated, it could be inferred from the report that support from faculty to the fishermen regarding the environment will eventually translate into economic value
RCE Tongyeong	Participants performed campaigns to raise awareness on environmental issues; visited islands linked to climate change (RCE South Pacific), visited the Island for the Youth (RCE Okayama) and Eco-city (RCE Munchen)	Youth participation at local festivals (RCE Toronto), in career development (RCE Yokohama), in the movie industry and local community (RCE Kodagu), education system and youth programs (RCE Denmark)	For example on revitalizing traditional market in RCE Cairo

RCE Bohol	Preservation of the environment and natural resources as well as waste management	The beneficiaries were taught that the depletion of natural and social capital may have non-linear consequences	The beneficiaries were taught how take care of their natural resources since this will give them economic value.
RCE Cha-am	SIEP's objective is to promote the development of innovation about energy, alternative energy, natural resources and environment, and avail it for public use. It also aims to develop and rehabilitate the environment in the Park's area, and to enhance biodiversity and relationships between flora and fauna and the balanced ecosystem, to become a sustainable learning centre	Garnering inspiration for the above objectives and SIEP's implementation of "Sufficiency Economy Philosophy, initiated by HM the King Bhumibol" for SD	Economically, the initiative aims to develop the knowledge and technology about energy and natural resources and environment as well as to efficiently promote and develop the potential on eco-tourism of the Park and arrange the eco-tourism activities that raise public awareness on conservation of energy, alternative energy and natural resources and environment
RCE Penang	Promote sustainable lifestyle towards zero waste. Reducing generation of waste and recycling of waste can prolong the life of landfills. Additionally, environmental pollution due to degradation of waste at landfill, e.g. methane and leachate can be reduced. Recycling of materials can also contribute to less usage of natural resources and prolong natural resources reserves. Composting activities also give positive impact to the environment as it enriches topsoil and at the same time reduces the use of chemical fertilizers for plants	ESD initiatives enhance university-community engagement and collaboration with other stakeholders. The activities conducted within the community increased awareness on sustainable lifestyle that led to healthier life of the community Recycling and composting activities could also inspire humanity and independent values among the community	Recycling also can be an income generating activity for community and schools. It was also proved by schools in Penang that compost from canteen food waste can be sold outside of the school and thus contribute fund for the school activities and hence served as an incentive to the students
RCE Phnom Pehn	By decreasing the amounts of agricultural chemicals and increasing organic fertilizer as well as bio-pesticide applied in farmlands	Socially, formation of farmers' groups to promote sustainable agriculture has contributed to fostering the social bond among the locals. Consequently, farmers' groups are encouraged to hold the workshops on sustainable agriculture for local farmers who don't belong to the farmers' groups, as well as to establish and manage model farms	Economically, in promoting sustainable agriculture based on natural resource circulation, one of the incentives for local farmers is to decrease the expenses for purchasing agricultural chemicals. In addition, the value-added products with organic or low chemical input are produced and sold at higher prices in the markets
RCE Yogyakarta	Environmental pillar: The application of the zero waste method of agriculture such as bio-fertiliser, bio-herbicides, bio-pesticides are beneficial to the environment because the methods are non-destructive to the plants and soil	Social pillar: The initiative helped foster inter-personal relationships among the participants during the training period	Economic pillar: Participants became aware that knowledge acquisition of the zero waste method and mastering the techniques involved could result in increase in income in addition to minimising the negative impact on the environment

Major strengths of the RCE cases

The major strengths and advantages of the RCE cases, the summary of which is shown in Table 14a, were categorised as follows:

- Networking, multi-stakeholder participation/engagement and collaborative partnership. Different types of networking identified were: 1) networking among individuals, between member organisations and between/among the RCEs, 2) multi-stakeholder participation and engagement involve individuals, groups and organisations, 3) collaborative partnership, and 4) provision of a platform for ESD theory and praxis (community centres) or for cross sectoral dialogue;
- Self-efficacy resulting in the 1) ability to self-manage, research and attempt to address sustainability issues (agency), 2) organising promotional activities related to ESD, 3) members exhibiting the spirit of voluntarism, 4) the stakeholders acquiring a high sense of motivation in the learning process, and 5) support and understanding from other actors to keep the project on course; and
- Support from the universities and experts, local governments and businesses.

TABLE 14A: SUMMARY OF THE MAJOR STRENGTHS OF THE RCE CASES
(each dark circle represents one strength/advantage; *see Table 14b in the Appendix for text*)

	-Networking -Multi-stakeholder participation and engagement -Collaborative partnership	-Self-efficacy -Self-motivation -Voluntary spirit -Promotional activities	Support from -University and Experts -Local government - Business	Other
RCE Beijing	●	●		●
RCE Chubu	●			●
RCE Kitakyushu	● ●	● ● ●		●
RCE Okayama	● ●	●	● ● ●	
RCE Tongyeong	●	● ●	●	●
RCE Bohol	●		●	
RCE Cha-am		● ●		
RCE Penang	● ● ●		●	●
RCE Phnom Penh	● ●	●		● ●
RCE Yogyakarta			●	●

Weaknesses and Constraints of the RCE Cases

The major weaknesses and constraints experienced by the various RCEs, with the summary in Table 15a, were categorised as follows:

- Financial constraints including: Insufficient funding and uncertainty of sustained source of funding for the future, and unavailability of funds to support and train individuals or to successfully run the RCE project. The problem for RCEs in regards to inadequate funding can be attributed to a couple of reasons including lack of strong 'advocacy' towards the policy makers and business (UNU-IAS, 2011; IGES, 2012) and failure to use existing opportunities within the RCE for collaborative partnerships especially with businesses (Ofei-Manu and Shimano, 2012a).
- Limited capacity of ESD experts and technical expertise. There was a limited number of ESD experts to train potential leaders for ESD programs and ordinary members, to develop theory to support ESD practice at the local level, and to develop tools to measure progress. Further strengthening of collaboration with institutions of higher education, especially those conducting teacher training and research will help address this issue significantly (Ofei-Manu and Shimano, 2012b).
- Time constraint. There was limited time for participation especially by stakeholders/actors from the formal education sector and university faculty. Additionally, there was lack of continuity particularly from the youth due to relocation for educational purposes. Finally, there was lack of commitment from some stakeholders in sustaining the initiative(s).

TABLE 15A: SUMMARY OF THE PRIMARY WEAKNESSES AND CONSTRAINTS OF THE RCE CASES
(each dark circle represents one weakness/constraint; *see Table 15b in the Appendix for text*)

	Financial constraint: -Inadequate funding, -Uncertainty of future funding	**Low/ Limited capacity of -ESD personnel -Technical expertise**	**Time constraint: -Limited continuity -Limited commitment -Narrowness of theme/ focus**	**Other**
RCE Beijing	●	●	●	●
RCE Chubu		●		
RCE Kitakyushu		●	●	●
RCE Okayama		●●*		● ●
RCE Tongyeong	●	●●*	● ●	●
RCE Bohol	●		● ●	
RCE Cha-am	●	●		
RCE Penang			● ●●	
RCE Phnom Pehn		●		
RCE Yogyakarta		●●●*		●

* Receive support but capacity development is currently low

Evaluation of the RCE background information generally showed some differences. Similarities were observed to some extent with regard to dates of establishment for some RCEs and the composition of the major partners and supporters. Furthermore, evaluation of the background of the RCE cases including the major partners and supporters, target learners, duration of the implementation of the initiative, the educational sectors addressed and the main sustainability themes covered also showed some differences. Coverage of the primary education sector, higher education sector and business and private sectors were insufficient suggesting future implementation of initiatives should take this into consideration. Furthermore, a more balanced coverage of social and environmental issues is needed in the future. The RCE cases addressed the three pillars of sustainable development although the economic pillar in some cases was not clearly or adequately addressed. Relating the evaluation to the details of the cases presented in "Section Two", it could be said the RCEs were able to deliver identifiable improvements in the social, economic and environmental lives of the people and also serve as a new learning platforms for SD at the regional level.

The increasing roles of the RCE as a major implementer of ESD that is locally and culturally relevant, and consequently, the eventual success of ESD implementation and achievement of the sustainability goal from the local to global levels cannot be overemphasised. To fulfil this important RCE role however will depend on adequate funding of the RCE initiatives, adequate and capable full-time ESD personnel and effective collaborative partnerships – including introducing or strengthening of existing Public Private Partnerships particularly with the corporate sector and the universities and schools – and networking among the RCEs across scales.

LEARNING PERFORMANCE IN EDUCATION FOR SUSTAINABLE DEVELOPMENT

Introduction

This section discusses the conceptual background to the learning performance framework, and argues that there are key aspects of ESD with several characteristics that are expressed in ESD practice and are also seen in a number of relevant educational/learning theories and methods. These key ESD aspects and their corresponding characteristics are identified and synthesised into a framework of reference. The Framework of ESD Learning Performance (LP) presented in this work has been developed as an original interpretation of the holistic attributes that contribute to ESD learning performance. However, it is also heavily supported by existing educational/learning theories and methods, and where possible elaboration of the individual elements and characteristics identified in the framework are provided based on supporting literature. These additional reviews of supporting educational/learning theories and methods are presented not as the exclusive attributes of this framework, but rather they are to provide some additional understanding and entry points for further exploration of these various characteristics. This section also attempts to link the practices from the various RCE case studies (in the form of educational/learning process and content) with the elemental characteristics of the learning performance (LP) framework. This is done though with the understanding that current implementation of ESD initiatives pays little attention to the theoretical underpinnings of education/learning process and content and consequently the effectiveness of ESD LP.

Earlier attempt to produce a framework of ESD learning outcomes was made by Jucker (2011). He presented a comprehensive list from several sources and categorised them under the following headings: 1) learning and teaching approach for ESD and 2) knowledge, skills, values and action. The following authors or institutions also presented an array of frameworks, lists, or checklists of learning outcomes: a) Washington Centre Sustainability Learning Outcomes[1] b) Learning for Sustainable Future (LSF), Canada[2], c) ESD Learning outcomes from Kindergarten to Grade 10, Government of Manitoba[3], d) Department of Water, Heritage and the Arts Australian Government (DOE) Sustainability Curriculum Framework[4], e) The Handbook of Sustainability Literacy (Stibbe, 2009), and f) Huckle (2005).

In trying to evaluate citizen science learning outcomes, Jordan et al. (2012) developed a framework of learning outcomes at three levels: individual learning outcomes, programmatic outcomes and community-level outcomes. Developed by Clemens Mader, the Graz Model for Integrative Development is another

[1] [http://www.evergreen.edu/washcenter/resources/upload/Sustainability_Learning_Outcomes_2008.doc]

[2] [http://www.lsf-lst.ca/en/what-is-esd/esd-learning-outcomes]

[3] [http://www.edu.gov.mb.ca/k12/esd/correlations/index.html]

[4] [http://www.environment.gov.au/education/publications/pubs/curriculum–framework.pdf]

framework that specifically targets stakeholders in higher education – students, staff and representatives of society and aimed towards transformative practice through understanding the model's components and levels that represent multi-dimensional, whole-system ESD engagement. It includes education and learning as one of the five components namely leadership and vision, social network, participation, and research integration (Mader, 2012).

Although the Graz model is good for development processes toward sustainability and for its target audience, similar to the other frameworks already mentioned, it is limited in scope with regard to the comprehensiveness required on education. We hereby for the first time present a framework comprising the elements and their corresponding characteristics that underpin effective ESD LP in practice and support them with several educational and learning theories and methodologies in the contexts of both educational/learning process and content.

The Four Elements of ESD Learning Performance

Though international collaboration and local to regional initiatives have provided exemplars of how learning and education can contribute to sustainability, questions remain about the extent to which these practices have been mainstreamed across education systems and, how effective content and processes of learning and the outcomes of ESD have been (Tilbury, 2010). Moreover, the call for a new educational/learning order or ESD behoves us to take a new look at the underlying educational theories, methodologies and approaches of the current educational system. Some of them are not at odds with this new paradigm of education, except that they have been used in the wrong context until now. They include Kolb's experiential learning theory, critical theory, critical praxis and pedagogy, social learning theory, communities of practice, cooperative learning and cooperative inquiry, problem-based learning, situated learning, etc.

Results of the various initiatives implemented in the RCEs reveals aspects of processes and content of education/learning strewn across them. Evaluating the effectiveness of these initiatives and hence monitoring their progress and contribution to SD without any framework of reference can be difficult. As a result, in trying to understand what constitutes effective ESD learning performance (LP) through the development of an actionable conceptual framework we have attempted to identify the c*haracteristics* (or *aspects*) of effective ESD learning to provide an overall definition to the concept and are grounded in several educational theories and learning methodologies and approaches, what we call *Elements of ESD Learning Performance*. In other words, through the integration of learning domains that speak to (ecological) knowledge and skills as well as values (social norms and beliefs about behaviours), we sought to develop an educational LP framework that resonates with core competencies for sustainability (Frisk and Larsson, 2011) regarding both process and content aspects of ESD. This framework of the elemental characteristics was

developed through an action-reflection process – considered central to the SD learning process (Ballard, 2005) – by trying to relay the characteristics to the RCE practical cases and with an equal interplay between real world and educational theory.

Action and reflection, often going together result in a dynamic, continuous cycle that goes through critical questioning lead to critical knowledge and thoughtful action, thus engaging the elements that form the basis of transformation and praxis (Brooks, 2004; Ballard, 2005; Ledwith and Springett, 2010). Action Reflective Cycle of PAR is an assessment and learning technique that allows for progressive conceptual development through real-world testing and application, along with regular evaluation and refinement. The basic cycle is highlighted through four steps of planning, acting, observing and reflecting. If the active participation of primary actors for ESD implementation and monitoring and evaluation are secured, then the enhancement of this approach to include aspects of Kolb's experiential learning theory for example could increase the learning potential from this process for participating members (Didham, 2007).

Regarding the ESD elements as seen in Figure 3, there are four areas to the conceptual framework that try to highlight the difference between process and content orientations of these elements – each orientation within which two elements are explained. The two elements under process side of learning and education are: progressive pedagogies and cooperative learning relationships.

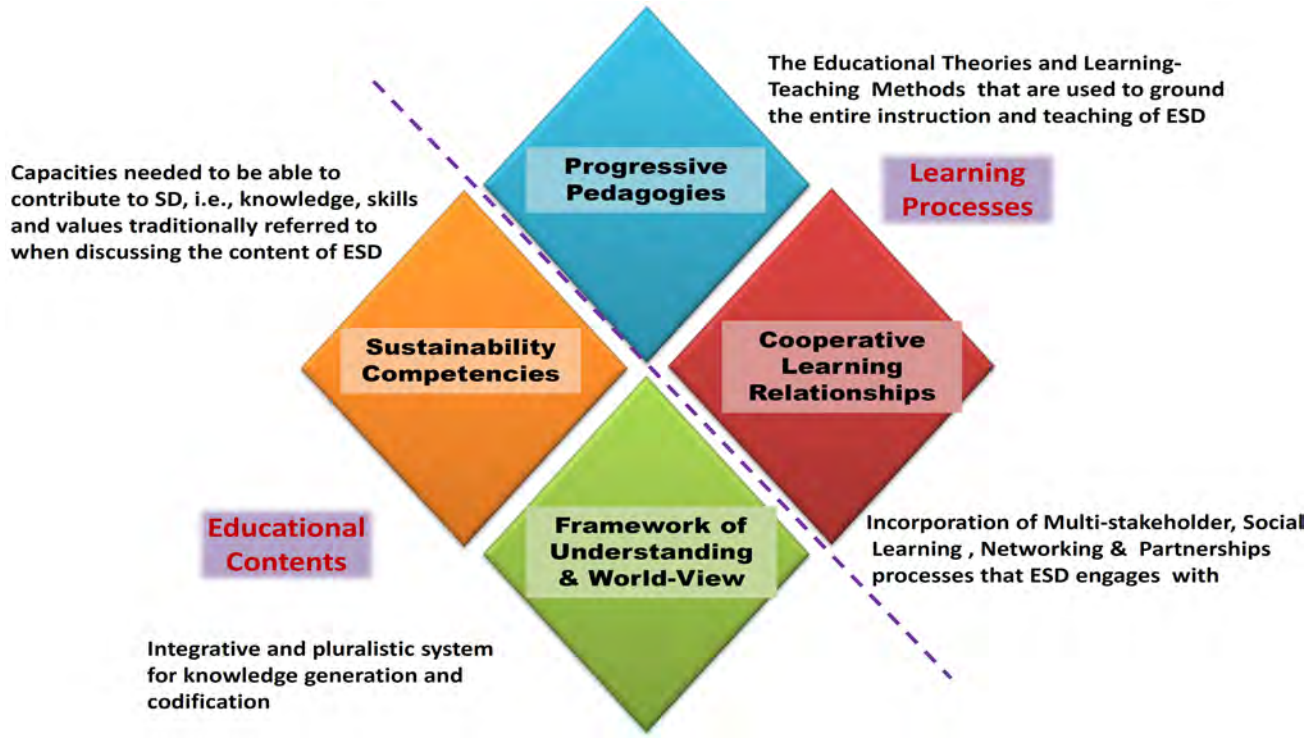
- **Progressive Pedagogies (PP)** which is looking at the educational theories and learning methods that are used to ground the entire instruction and teaching of ESD and
- **Cooperative Learning Relationships (LR)** which involves the incorporation of the multi-stakeholder social learning and networking processes that ESD engages with, especially as seen through the RCEs.

Regarding educational contents, there are two elements as well namely sustainability competencies and framework of understanding and world-view.

- **Sustainability Competencies (SC)** that consists of capacities people need in order to be able to contribute to SD; this includes a variety of different knowledge and skill-sets along with values and certain ethical issues, and
- **Framework of Understanding and World-View (WV)** that looks at the types of contextual frameworks and schemes through which individuals shape meaning from diverse knowledge.

FIGURE 4: The four elements of ESD learning performance

[The figure depicts the 4 elements of ESD learning performance with their corresponding representative components in the rectangles, the sub category to which they belong (process or content)]



The following several pages will describe the theoretical and methodological underpinnings of the learning performance framework's elements and their corresponding characteristics. Examples of existing theories, methods, and approaches in education that complement the elements and characteristics in the LP Framework are presented for further elaboration and understanding. Where appropriate examples of the practices/activities provided in the RCE reports will also be given.

Background – Progressive Pedagogies (PP)

Progressive Pedagogies (PP), a term used in this work to signify the collection of pedagogical approaches brought together under the framing of ESD (while also avoiding a static and prescriptive definition), which transcend the various theories, methods and tools that can assist in creating awareness about the unsustainability of certain ecological, economic and social processes and the role of individual and collective behaviour (Mehlmann et al., 2010). Progressive pedagogies emphasise the psycho-social dimensions of teaching and learning, and they stress the value of "experience that comes from hands-on research and community-based learning experience and from the personal experience of each learner" (Columbia University, 2012). PP encourages critical reflection about teaching among students and teaching is organised with the objective of solving real-world problems. PP also looks at the theoretical and practical aspects of

different issues while also creating learning space for learners to be actively involved in the process including inquiry and problem-solving (Columbia University, 2012). Pedagogy for sustainability should allow learners to delve into the actual processes of learning and knowledge-making in order to analyse and understand their physical, biological, ecological, historical, social, economic, political characteristics, drivers and constraints. PP further helps learners to analyse and comprehend how their own actions and behaviour may be influenced by, may contribute to and/or alter these processes whether positively or negatively.

Progressive pedagogies can be considered as akin to "pedagogy of sustainable development" (Gadotti, 2010) and to the deeper ecopedagogy (sometimes called "Earth Pedagogy"), the kind of pedagogy that promotes learning on the meaning of things. The characteristics of these pedagogies would fully fit within the framing of progressive pedagogies presented in this report and include the following important aspects: they overcome the human-centredness of traditional pedagogies by establishing a symbiotic link between human and nature. Furthermore, PP implies a curriculum orientation that should include materials that are meaningful to the learners and also to the health of the planet (Gadotti, 2010).

The mid-term review on DESD by UNESCO identified two distinct pedagogical interpretations: 1) ESD as a means to transfer sets of knowledge, attitudes, values and behaviours considered as appropriate; and 2) ESD as a means to equip people with the needed capacity to be able to address sustainability issues and independently make conscious pro-sustainability choices in their daily lives using discourses that are likely to transform peoples' mind-sets and lifestyles rather than dialogues linked to behaviour change (UNESCO, 2009; Tilbury 2010). This report gives preference to the understanding of ESD based on the second interpretation and on the premise that ESD provides a stimulus for reform of traditional educational pedagogy or even as a precursor for the possibility of a paradigm shift. The proponents of ESD have outlined a reframed pedagogy of education as a process to give rise to citizens who are capable of understanding the relationships that exist between them and the natural and social environments along with an ethic that supports the realisation of a better society through sustainability (Sterling, 2002).

In progressive pedagogies, rather than viewing the student as a passive receiver of abstract knowledge, ESD engages a teaching/learning approach that situates the learner at the centre of the world he/she is studying in order to undertake an active learning process that involves critical reflection and testing of information in order to contextualise new knowledge in relation to practical, real world application. Progressive pedagogies in the context of this report deals with the educational theories and pedagogical learning approaches/ methods contextualised in ESD. Those briefly discussed in this paper include Kolb's experiential learning theory and education, critical pedagogy and praxis, cooperative learning (theory) and cooperative inquiry.

Experiential Learning (and Kolb's Experiential Learning Theory, ELT):

According to Andresen et al. (1995) the distinguishing characteristic of experience-based learning is the centrality of the learner's experience regarding the teaching and learning process. This may consist of events that occurred earlier in the learner's life, events currently happening and those happening as a result of activities facilitators and teachers have implemented and which the learner participated in. A major component "of experience-based learning is that learners analyse their experience by reflecting, evaluating and reconstructing it" – individually, collectively, or both – so as to make meaning of it in relation an earlier experience (Andresen et al., 1995: 225).

Providing the conceptual model of a "complete" learning cycle that incorporates all preferred learning types, experiential learning theory (ELT) is a model of a holistic learning process originally developed by Kolb and Fry (1975) and later modified by Kolb (1984) that draws on works of Kurt Lewin, Jean Piaget and John Dewey. It posits that knowledge of the individual learner is created through a process of experience transformation and that the individual must go through the stages of: 1) concrete experience – which provides the basis for learning, relying on open mindedness and adaptability, 2) reflective observation – by making sense of the concrete experience as several perspectives are articulated, 3) abstract conceptualisation – where there is use of logic and ideas to understand situations and problems, and 4) active experimentation – during which theories are tested leading to experiences. For learning to be effective, all stages of the cycle have to be experienced although most learners do not use all the stages equally. Furthermore, this cycle can be entered at any point though it is considered that each stage follows the previous in the above order (Didham and Choi, 2010; Dieleman and Huisingh, 2006; Loeber et al., 2007; Lisko and O'Dell, 2010).

The learning process is set in motion by concrete experience and the experiencing individual then observes the effects of their actions and reflects on them (Loeber et al, 2007). According to Lisko and O'Dell (2010), Kolb's theory presents a causal relationship statement that can be identified with the concepts of learning, the leaning cycle, and also an associational relationship statement with the concepts of experience and learning styles.

The two dimensions of learning presented by Kolb are: 1) perception – the way information is grasped from experience, ranging from concrete experience to abstract conceptualisation, and 2) processing – the way in which the information is processed ranging from active experimentation to reflective observation. In this learning cycle, value is placed both on concrete/real world experiences and abstract thinking/reflection about a given situation as important processes through which we gain knowledge about our environment. Observation of action and reinterpretation of knowledge frameworks based on review of previous outcomes are continuous actions throughout the experiential learning cycle. According to Breathnach (2006), the

reflexivity present in this learning cycle is essential for encouraging development that is responsive and proactive rather than a reactive change.

Kolb's ELT further identifies and defines key concepts for the learner: experiences are grasped through apprehension or comprehension and where apprehension is seen as participating in the actual experience while comprehension is seen to occur outside the actual experience through abstract conceptualisation (Lisko and O'Dell, 2010). The four learning styles identified by Kolb are: diverging, assimilating, converging and accommodating. The general typologies of the learners in each category as explained by Lisko and O'Dell (2010), Tennant in Smith (2010), and Dieleman and Huisingh (2006) are: 1) a diverger – learns by apprehension as well as through experience and internalises by reflection, usually has a strong imagination and is good at seeing multiple perspectives, 2) an assimilator – learns by comprehension, prefers to reflect and conceptualise and often uses inductive reasoning and is good at creating theoretical models, 3) a converger – learns by comprehension through conceptualising and then experimenting and is strong at practical application of concepts and hypo-deductive reasoning, and 4) an accommodator – learns by apprehension, prefers active, hand-on experimentation, solves problems intuitively and is able to create practical solutions.

The concept of experiential learning is regularly applied in two contrasting approaches. First in the field of formal education, ELT is used to strengthen discussions about teaching/learning techniques and often leads to a mandate for institutions to provide more holistic and diversified educational experiences especially those that provide for more direct counter experiences. Second, as a model of informal education, ELT is used to explain how people learn from daily life experiences (Smith, 2010).

According to Didham and Choi (2010), ELT provides a unique model for considering the approach of development work, particularly those efforts aimed at SD. In their work on measuring SD and establishing indicators for monitoring and evaluation, Morse and Bell (2003, 2005) also referred to Kolb's learning cycle as a way to ensure systemic learning for sustainability. Loeber et al. (2007) however identify two limitations linked to ELT. First, the theory does not pay attention to the aspect related to context, how learning is influenced by social settings but primarily focuses on learning from and through the individual's experience. Second, it overlooks the role of values that influences human behaviour.

Experiential learning as an approach with the underpinning theory can be exemplified in 1) teachers who received ESD knowledge, then visited schools showing good ESD practices and interacted with their peers and the students. They then related their experience to their profession in the classroom, their own lives and extended it to where they lived. Though not stated (and also not attributing causality), the learning outcome indicates participants/teachers must have gone through the experiential leaning cycle already described.

2) The youth from Tongyeong after taking a personal journey through learning: combining their experiences both at home and abroad as well as the learning acquired cognitively. Also, 3) the Edamitsu programme that involved the entire citizens attempt to revitalise the "deteriorating" community in which they lived by supporting each other also indicate participants going through the experiential learning cycle and gaining a better understanding about how as individuals they could support their community's well-being.

Critical Praxis/Pedagogy:

Different definitions of critical pedagogy exist, however there are several common aspects including 1) the decentralisation of power, in order for the teacher and learner to interact at similar levels of epistemology, 2) there should be a cross-boundary nature to disciplinary knowledge or trans-disciplinarity to promote understandings that are considered both complicated and holistic, and 3) there should be a problematisation of simple concepts in order to adopt an action orientation to problem solving (Welsh and Murray, 2003).

Developing the capacity of students in critical pedagogy requires focusing on creating spaces in the classroom such that students will feel challenged: 1) not to take things for granted, but rather question assumptions, 2) unambiguously recognise the presence of power relationships as they subject situations to analysis, and 3) to critically reflect in collaboration with other students on the network of relationships embedded therein and also to take into consideration use of transformative alternatives for that network. Critical pedagogy is context-based and transformational, hence it can contribute to sustainability in the shaping, producing, diffusion and transformation of sustainability issues (Welsh and Murray, 2003).

In her work in *Community Development: A critical approach (2005),* Margaret Ledwith provides insight for understanding how social change occurs and how the professionals can carry out transformative development work. As an expansion from Paulo Freire's idea the aim of education is either to liberate or domesticate, hence sustainable development can be pursued as an innovative learning process for promoting critical and reflective praxis. By working with communities within their informal educational contexts, ESD/sustainability work can expand beyond ameliorative effects into a transformative nature towards establishing a critical consciousness among the members of a community who can rely on their capability to produce practical knowledge that is grounded in daily experience in the quest for a more sustainable world (Ledwith, 2005).

Providing a model of critical praxis in order to locate both change and power as factors within community development, Ledwith (2005) identifies two major streams of influence in community development which also applies to education. They are *critical consciousness* and *hegemony.* This model's hegemonic circuit distinguishes the factors that replicate ideological consent and reinforces subordination, while the critical

consciousness circuit identifies those factors that aid in establishing alternative worldviews based on equity and justice. As critical consciousness among members of a community is formed through praxis, reflective inquiry creates an experiential learning cycle in the community in a dynamic relationship with the hegemonic influences of wider society. In fact, it is the wider community that is viewed as the place where the forces of these two circuits overlap and are brought into reconciliation. Hence the RCE serving as the ESD learning space for the community/region could facilitate the reconciliation of these two circuits through interaction in the learning process.

The critical praxis model displays the primary function of reflection and action in shaping community and corresponds to the secondary functions of theory and practice which respectively represent the meta- and micro-levels of development including sustainability. As a result it is possible to distinguish the meso-level role community plays as the place where real praxis occurs thereby forming connection between theory and practice in a three-fold cyclical process of "direct experience, analysis of one's beliefs, values or knowledge about that experience and consideration of options for future action based on the analysis" (Davies, 2012: 284).

Regarding ESD, critically reflecting on our individual experiences, how our socio-cultural background and upbringing with its accompanying tensions weave into the common ethos across scales, how we make individual choices albeit small to live our lives such that the planet can accommodate more than seven billion in our quest for the sustainability transition should be an important aspect for thought.

Problem-based Learning

Known to originate in the late 1960s from the medical school at McMaster University in Canada, problem-based learning (PBL) is "an instructional method of hands-on, active learning centered on the investigation and resolution of messy, real-world problems" (LTK, 2012: 34). It is a student-focused pedagogical approach and sometimes curriculum design methodology that is often associated with the kinds of experiences and outcomes identified with ESD. It emphasises learning by doing where students are given problems that are rather challenging, context-specific and open ended with multiple answers similar to those they will face in the real-world (Thomas, 2009). Teachers take up the responsibility as facilitators and guide the learning process as well creating an environment of inquiry which allows students to apply knowledge to new situations, rather than having a teacher merely providing facts and then testing students' memorisation skills. "Students are faced with contextualized, ill-structured problems and are asked to investigate and discover meaningful solutions" (LTK, 2012: 34). In PBL, agreement upon a solution to an identified problem leads to implementation.

Thomas (2009) describes the features of PBL as follows: 1) because it is used to solve real problems, it makes knowledge more accessible and applicable, 2) it is used for developing skills capable of solving real-world problems, 3) since it focuses on real world and current problems, it enhance motivation, and 4) it facilitates active learning by looking for and evaluating information from various sources (Thomas, 2010; LTK, 2012). PBL proponents believe that, strategically, it is used to build the capacity of students in the areas of critical thinking and creativity. As a result, there is an improvement in student's ability to solve problems leading to an increase in motivation which in turn helps students learn to transfer actionable knowledge to new situations with the aim to address them. Two criticisms of PBL however, are first in situations where there is no prior experience, learners cannot know what is important for them to learn. Second, implementing PBL requires considerable planning and hard work, hence it is quite challenging for the teacher to implement. The PBL approach may thus be incapable of covering as much material as a conventional lecture-based course would (LTK, 2012).

Characteristics of the Element PP:

FIGURE 5: The characteristics of the element Progressive Pedagogies

Progressive Pedagogies
• Critical reflection & practice and problem solving • Action/experience–oriented, student-centred learning • Knowledge production through iterative interaction • Life-long learning, and • Cyclical process of collective inquiry.

The characteristics of PP that are grounded by the educational theories and identified as important success factors in the good practice cases include the following:

- Critical reflection & practice and problem solving (Ledwith and Springett, 2010; Tilbury, 2011; Tilbury and Wortman, 2004; UNESCO, 2002);
- Action/experience–oriented, student-centred learning, active, interactive enquiry-based learning where the student engages as a participant with transformative teaching instead of transmissive teaching (Tilbury, 2011);
- Production (jointly) of credible, salient and legitimate knowledge (Cash et al., 2003) through iterative interaction aiming for development of the ability to learn by collaboratively deconstructing, reconstructing, and co-constructing knowledge (Hegger et al., 2012a; Hegger et al., 2012b);
- Life-long learning, and;
- Cyclical process of collective (cooperative) inquiry.

EXAMPLES: RCE Tongyeong students (youth) were able to address sustainability issues using critical praxis. Students used a participative inquiry and action research approach through critical thinking to investigate an issue which they considered as important to themselves. Also, the students used skill-based competence/learning such as field visits to locations that were related to the issues being investigated to envisage alternatives and solutions to unsustainable practices. RCE Phnom Penh conducted basic research and used it as the basis for solving a locally relevant problem. It encouraged farmers to form cooperatives through a cyclical process of cooperative inquiry, iterative interaction and use of other learning tools discussed in this report. Consequently were able to enhance the socio-economic status of the farmers. Teachers of RCE Beijing critically reflected on the ESD training they underwent.

Background – Cooperative Learning Relationships (LR)

Cooperative Learning Relationships (LR) is the inclusion of social learning, networking and partnerships as an important educational component of ESD. Educational methods and approaches to be described in detail are, social learning, communities of practice (CoP) and cooperative learning. Social learning theory was already described briefly in Section 1.

Social Learning:

Social Learning (SL) is a process in which people are stimulated to reflect upon implicit assumptions and common frames of reference in order to accommodate new perspectives (Wals, 2010a). Social learning is about creating a common platform for people of different backgrounds, knowledge, skills, values, perspectives and experiences both from the organisation and outside of it with the common aim of coming together to seek answers to questions that have no ready-made answers (Wals, 2010a). Worldwide there is the emergence of multi-stakeholder partnerships that use social learning to together create their own relevant agendas (Wals, 2012).

The overall social learning process can be described as a multi-scale process. Promotion of public participation strengthens social learning with the factors influencing the participation process including the following:

> "the scope of participation of multi-stakeholder partnerships across sectors as the basis of inclusiveness and thus the possibility of overcoming a participation gap; the space given to boundary and bridging organizations regarding collaboration to incorporate their particular experiences of the creation of collective action for capacity building to adapt to change; effective coordination among team members and the leadership required to steer and coordinate the process and the type of strategies applied in the negotiation process; the laid-down rules established to facilitate interactions among the stakeholders; the involvement of the stakeholder in the process in terms of role and purpose; the structure of the internal

> capacity for interactions and the space given for democratic deliberations among social networks and in building social capital; how the existing culture exerts influence on the way the issues at stake are framed and defined; the processes in establishing managing systems of knowledge and making sense of information; building trust, caring for one another, nurturing shared commitment and providing the guarantee that the well-being of all stakeholders is taken into consideration; and the facilitation and allocation of resources needed to move the process forward" (Ofei-Manu and Shimano, 2012a and references therein: 1636).

Consequently, framing and reframing of the problems and the issues at stake affect the social learning processes.

Wals (2011) posits the following four features of social learning 1) the importance of difference and diversity that energise people, introduces dissonance and unleashes creativity, 2) the value in both reflexivity and reflection, 3) the power of social cohesion and social capital that could create change in complex situations loaded with uncertainty, and 4) the power of collaborative action that strengthens the qualities embedded in individuals. Dyball et al. (2007) also present five important aspects or strands of social learning that they believe could be braided together through interacting and overlapping with each other towards realising sustainable environmental management. They are: a) reflection and reflexivity as a product of a learning cycle like Kolb's, b) systems orientation and systems thinking so as to understand the dynamics of change in complex interactions, c) integration and synthesis, d) negotiation and collaboration and e) participation and engagement.

Social learning has become synonymous with different types of learning processes and consequently, its meaning has become somewhat confused (Wals, 2011; Garmendia and Stagl, 2010; Reed et al., 2010; Armitage et al., 2008) and has several interpretations (Glasser, 2007). Social learning also includes great diversity that employs meanings, concepts and methods of over half a dozen disciplines that cross human scales from individual to societies. Reed et al. define social learning as the "change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks" (2010: 6). Furthermore, Reed et al. (2010) posit that for learning to be considered as social learning: 1) there has to be a change in understanding in the individuals involved and this level of change may be superficial (e.g. a recall of information) or deep (e.g. a change in attitudes, worldviews or epistemological beliefs); 2) it must go beyond the individual and become situated within the wider social units; and 3) it must occur within a social network through social interaction and processes between actors.

Central to social learning are "multi-party processes that are influenced by the context in which they are embedded and produce outcomes that may lead to changes in the context and thus to a cyclic and iterative process of change" (Tabara and Pahl-Wostl, 2007). This context of social learning comprises the governance structure as well as the environment within which the inter-relations and inter-actions take place among

actors (Tabara and Pahl-Wostl, 2007). One can therefore understand and manage environmental/ sustainability issues by using social learning as an approach (Pahl-Wostl, 2006).

According to Glasser (2007), the major difference between individual and social learning is that for some, individual learning occurs in social settings, and for others social learning is affected by social aggregates. In contrast, he tries to relate individual learning to social learning by viewing all learning by individuals (except pure trial and error learning) as some form of social learning so long as learning by individuals or collectives involves some form of input drawn from others. Because social aggregates are made up of individuals who shape it, individual learning processes are known to play a fundamental role. The importance of processes of learning in the domain of social aggregates therefore is worth noting because individuals are embedded and influenced by social systems. Social learners gain adaptive capacity and skills that can lead to sustained processes of attitudinal and behavioural change through interactions (Pahl-Wostl et al., 2007). They can also build up experience needed to cope with uncertainty and change (Folke et al., 2003) in their environment. Lately, the concept of social learning has, "coincided with the thrust for public participation and the growing importance given to sustainable development" (Tabara and Pahl-Wostl, 2007).

Social learning has the ability to engender important and useful learning outcomes with respect to knowledge, understanding, perceptions, skills and values, and also, reinforce the capability and motivation for further/continual learning (Nath, 2003; 15, 16; Cato and Myers, 2011). Furthermore, effective social learning, although not value-neutral (Wildermeersch, 2007) is a reflective and collaborative process that could be extended across communities and generations. Milbrath (2008) posits that in transition towards sustainability, social learning must include the following: 1) appreciation for the complex and interconnectedness of ecosystems and the implications for social action and holistic, systemic thinking; 2) understanding of the important roles values and beliefs play in shaping reality; 3) avoidance of interfering with systems and cycles of nature and recognition of the limits to growth; 4) extension of empathy and compassion to people of other nations, species, and the preservation for the future generations; and 5) holding sacred the ecosphere and the eventual survival of all humanity.

Communities of Practice:

The "communities of practice" concept (CoP), developed by Lave and Wenger (1991) and Wenger (1998) is an important conceptual framework for understanding social learning theory and also for understanding the important learning opportunities that exist at a community-level. Wenger (in LTK) defines communities of practice (CoP) as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (LTK, 2012: 24). CoP involves people who have a common interest

in a subject or area with no immediate solutions, collaborate over an extended period of time, share ideas and strategies, come up with solutions, and build innovations (LTK, 2012).

The concept of CoP is postulated on three common aspects: mutual engagement, joint enterprise, and shared repertoire. CoP concept begins with the coming together of people to complete activities and in so doing they must negotiate the meanings of the actions they engage in with one another. Joint enterprise means this type of mutual engagement must be a negotiated experience in which both purpose and relationship of accountability are developed. The result is the establishment of the community's own form of practice. The mutual engagement and joint enterprise of a community of practice leads to the development of a shared repertoire which is the third aspect.

Learning however happens as an incidental result that is found to accompany social processes. As such there is no requirement for intentionality. The three required components of CoP are: 1) a *domain* of interest that is shared and by which a CoP identity is defined. Membership implies one is committed to the domain, 2) a *community* where members of a specific domain build relationships through interaction and engagement in activities that they commonly share including, information sharing and exchange, helping one another and learning from each other, and 3) members should be *practitioners* who assemble the resources that they share which can include stories, helpful tools, experiences, stories, ways of handling typical problems, etc. (Wenger, 2006; LTK, 2012). Seeing the world as a learning system using the CoP approach "can help increase our societal capacity for inquiry and our ability to continuously create, adapt and develop solutions that are contextualised and thus more likely to be robust and viable over time" (Blackmore and Ison, 2012: 350).

CoP has gained popular support in some academic fields as a valid approach to situated learning since the overall apparatus of situated learning is considered a significant reconsideration of learning theory of value to anyone who wants to take learning beyond the individual and embed it in the community (Barton and Tusting, 2005:3). The dynamism of the learning process in the community of practice is known because renegotiation and change are a continuous part CoP. *Reification* and *participation* are key aspects to this learning process and are the two main ways in which participants can influence the process of practice. In the CoP process, *reification* is the act of bringing concrete meaning to abstract concepts through their regular application and codification. *Participation* on the other hand, is the process through which diverse ideas and concepts can be deliberated over to reach common understanding to structure practice on (Wenger, 1998).

In ESD, the RCE has emerged as a CoP where: a) a range of activities and practices based on current and locally relevant issues are dialogically addressed often collaboratively through its network across scales, and b) the RCE itself is seen as an evolving social learning experiment with the local government, the community, business and the higher education institutions all considered as important players in the learning/teaching

and research to produce salient, legitimate and actionable knowledge that is socio-culturally relevant. It is noteworthy that autonomy in the RCE community is carefully guarded against outside influences power and even internally, the old system where "expert" knowledge and approaches to sustainable community development were distinguished from that of the "non-expert" is dissuaded.

Cooperative Learning (theory and model) and Cooperative Inquiry:

The Theory of Cooperative Learning, including the subsequent learning model, is based on convergence of major sets and subsets of theories including: motivation theory, cognitive theory, social learning theory and behavioural theory, behaviourism, sociocultural theory, humanist and cognitive psychology (Davis, 2006; Jacobs and Hannah, 2004). Often interchanged with collaborative learning (Felder and Brent, 2007) and used as a pedagogical approach during which social skills like leadership, decision-making, trust-building, and communication are developed (Andrew in Baghcheghi et al., 2011), cooperative learning is defined by Baghcheghi et al. (2011) as solving a problem using division of labour and by Panitz as "an instructional strategy that employs a variety of motivational techniques to make instruction more relevant and students more responsible" (in Baghcheghi et al., 2011). Improving interpersonal skills, knowledge of content, and the ability to think at a higher-level are considered the objectives of cooperative learning (Baghcheghi et al., 2011).

The main elements identified in cooperative learning include: 1) positive interdependence – where relying on one another to achieve the goal is an obligation of all members to fulfil their parts and leads to collective responsibility, 2) promoting interaction directly – where each other's learning and accomplishment is promoted by members face to face interaction. Cooperative learning most often involves small groups of students who contribute to each other's learning. It allows learners to bring their own experience to the learning process thus increasing active learning (Felder and Brent, 2007). Cooperative learning further includes: 3) "individual accountability – all students in a group are held accountable for doing their share of the work and for mastery of the material to be learned. …. 4) Appropriate use of collaborative skills. Students are encouraged and helped to develop and practice trust-building, leadership, decision-making, communication, and conflict management skills. ..... 5) Group processing. Team members set group goals, periodically assess what they are doing well as a team, and identify changes they will make to function more effectively in the future" (Felder and Brent, 2007: 2).

Student interactions lead to opportunities for improving communication skills and more importantly to collective problem-solving (Earl, 2009). Although some of the group work may be parcelled out and done individually, some must be done interactively, with group members providing one another with feedback, challenging reasoning and conclusions, and perhaps most importantly, teaching and encouraging one

another (Felder and Brent, 2007). It encourages creativity, stimulates discussion, and has been shown to improve confidence and performance. Furthermore, through interaction students learn to cross-examine issues, share ideas, clarify differences, and construct new understandings (Gillies and Boyle, 2010). In cooperative learning, learners hold each other personally and individually accountable to do their fair share of the work, use appropriately the interpersonal and group skills needed for successful cooperative efforts.

From the methods of cooperative learning, there are many valuable tools that can be applied to how decision making is carried out in communities. Because cooperative learning supports a process of reflective fact finding, it can provide methods that are beneficial for investigating unknown factors that are often part of sustainable development. The action–reflection cycle is useful for moving forward with caution and simultaneously closely evaluating the outcomes of the development activities. The use of reflective learning cycles also encourages individuals to articulate the specific conditions and details that lead to the success of a development at a time.

Cooperative learning in a formal setting could be impeded by lack of competent/confident, bright/mature students capable of giving direction to others or a good gender balance, or due to an excess of power relationships (Ross, 1988). As an important objective of education for SD, capacity building also requires that the focus of ESD expands beyond the standard arena of formal education. UNESCO has therefore identified two of the key characteristics of ESD being part of the UN Decade of Education for Sustainable Development (DESD, 2005-14) as: building ‘’civil capacity for community-based decision-making, social tolerance, environmental stewardship, adaptable work force and quality of life” and “based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences” (2005b: 30-1).

Cooperative (collective) Inquiry:

Cooperative Inquiry is one of the main approaches that can be used when the researcher moves from the first person research to the second person research. Its main premise is that good research must be done with people not on people. Consequently, the researcher needs to work in practice with the group central to the issues of the research to address the matters that are important to them. Six procedures that are essential for improving the quality of knowledge developed in cooperative inquiry are: 1) Research cycling between action and reflection helps to look at experiences from different angles, develop new ideas and try different ways of behaving; 2) Creating a balance of action and reflection is critical, though each research topic and inquiry group will find a different balance; 3) Developing critical attention involves promoting in all participants, a sense of inquiry and curiosity for understanding and can be promoted through research cycling and creating constructive challenges; 4) Authentic collaboration between the members of

cooperative inquiry group can be facilitated through a process that secures equal opportunities for sharing and leadership; 5) Since cooperative inquiry is about examining the groups individual and collective lives, it is necessary to have means for dealing with distress which can be scheduled into the group for sharing emotional feelings of the process; and 6) Both order and chaos need to be equally embraced in the process of discovery that will undergo periods of confusion and uncertainty, but that these may prove the most beneficial parts to pursue (Reason and Heron, 1999).

In summary, learning individually or collectively behoves the learner to see all the dimensions of sustainability as connected so as: a) to maintain the physical integrity of the planet and not endanger its biological diversity, carrying capacity and production systems, b) to maintain the balance of the materials mined from it and returned to it as pollutants, c) preserve the earth for futurity in the context of enhancing social equity and justice, and d) against the backdrop of an economic system that is maintained within the bounds of the environment and social capacity and also where valuation reflects all the other forms of capital inputs.

Characteristics of the Element LR:

FIGURE 6: Characteristics of the element Cooperative Learning Relationships

Cooperative Learning Relationships
• Inclusion and internal network structure for interaction (among social networks) and latitude given for democratic debate on the framing and definition of the issues at stake; • Group processing in establishing and managing systems of knowledge and making sense of information; • Participation and power sharing, shared ownership/commonality • Clear definition and purpose of roles; • Accountability of individual/groups; • Positive interdependence and building of trust; • Opportunities for reflexive moments and discourse; • Situatedness and Social skills.

EXAMPLES: Generally, in addition to student-centred and interactive enquiry-based pedagogy and content that uses the environment, community, or university as learning resources as occurred in many of the RCE cases, there was also a strong emphasis on multi-stakeholder social learning. The social learning activities of the RCEs address many of the attributes of cooperative learning relationships identified from the review of important social learning theories, although no one case clearly addresses all aspects simultaneously. These participatory interactions and collaborative relationships resulted in opportunities for reflexive moments, inclusion, building of trust and many other LR elemental characteristics. RCE Phnom Pehn for example used

basic research on a real problem to engage local farmers in a participatory group for problem identification, knowledge processing and solution modeling as an attempt to solve a ten-year-old local agricultural problem with multi-faceted challenges. This resulted in the formation of farmers' cooperatives in cooperation with an external advisory panel that provided expert input and capacity development at the beginning stages of the cooperatives. This collaborative effort resulted in enhanced inclusion of farmers who did not belong to the cooperatives, trust building, sharing of information and the overall boost of their socio-economic aspect. RCE Kitakyushu and RCE Okayama used the *kominkan* (community centres) as learning spaces to build ESD capacity through multi-stakeholder collaboration. The youth of RCE Tongyeong engaged in a research collaborative partnerships with the youth of other RCEs they visited. Participation of members was strongly observed in most of the RCEs surveyed. Additionally, several of the cases during and after implementation resulted in the formation of new networks and strengthening of old ones.

Background – Sustainability Competencies (SC)

Sustainability competencies (SC) as a concept is referred to as the enabling qualities people need to possess to act when confronted with the challenges of our current unsustainable development paths and the desire to achieve a sustainable society (Wals, 2010b). SC is a concept that helps articulate the qualities and attributes that learners need to develop when engaging in sustainability issues. The basis of competency for SD is the possession of relevant knowledge and the ability to think, act and take responsibility. SC as an element of ESD learning performance comprises the knowledge, skills and values traditionally referred to when discussing the contents of ESD. Therefore, ESD competence is understood as one's capacity to engage with other people, one's community and one's society in meaningful ways on SD matters (Wals, 2010a).

Knowledge is considered as an embodiment "by actors within the system, rather than to be existing independently" and "is regarded as inherently dynamic, where interactions within a knowledge system result in the constant evolution of knowledge-based resources" (van Kerkhoffa and Szlezákb, 2010: 1). Knowledge competencies in the context of SC however, deals more with the discipline-specific content. The list is inexhaustible with the following as a representation: climate change, disaster risk reduction, sustainable consumption and production/education for sustainable consumption, indigenous knowledge, well-being, development, environmental quality, resilience and socio-ecological systems.

Characteristics of the Element SC-knowledge:

FIGURE 7a: Characteristics of the element Sustainability Competencies: Knowledge

Sustainability Competencies: Knowledge
• Climate Change, • Disaster Risk Reduction, • Sustainable Consumption and Production/Education for Sustainable Consumption, • Indigenous Knowledge, • Information and Communication Technologies (ICT) and education/ESD • Well-being, Development & Environmental Quality, • Resilience and Socio-ecological Systems.

Skills that underpin and are associated with ESD, similar to knowledge, are expansive and a general representation is provided. They include collaboration and cooperation, conflict resolution, creativity, imaginative and real-world problem-solving, future-mindedness, meaningful communication and civic engagement, social action, conflict resolution and negotiation, interdisciplinary and transdisciplinary thinking and research skills, adaptive learning, contextualisation of issues, personal introspection, visioning and gaining buy-in the ability to identifying change and adapting to it, systems thinking and thinking that is focused on values (Armstrong, 2011; and the several references therein).

Characteristics of the Element SC-skills:

FIGURE 7b: Characteristics of the element Sustainability Competencies: Skills

Sustainability Competencies: Skills
• Critical thinking and complex thinking, • Conflict resolution, • Seeking alternative solutions, • Real-world problem-solving, • Future-mindedness, • Adapting to change and advocating for change, • Social action, collaboration and cooperation, • Conflict resolution, negotiation, creativity and imagination, • Interdisciplinary and trans-disciplinary, research skills, • Adaptive learning, • Contextualization of issues, • Personal introspection, visioning and gaining buy-in to identifying change and adapting to it, • Systems thinking and thinking that is focused on values.

According to David Orr in Wals and Corcoran (2012) the lack of critical reflection on the ends of education results in humans vandalising the earth. Learning outcomes for ESD skills emphasise learning processes as much as fact-based learning, or the *how* as much as the *what*. Some of the most common strategies for the development of these skills include collaborative activities, systems instruction, reflection, multigenerational analysis, and democratic dialogue (Armstrong, 2011).

Values supportive of ESD provide a basis that are most frequently cited in the literature include care, respect (Jones et a., 2010; UNESCO, 2004), charity, social and economic justice, commitment, cooperation, compassion, self-determination, and self-reliance, self-restraint, and empathy. Others are resilience, optimism, tenacity, commitment, passion, patience, emotional intelligence, assertiveness, persuasiveness, empathy, authenticity, ethical self-awareness, competence, and curiosity (Armstrong, 2011) and interdependency. In fact, Wals and Corcoran (2012) argue that the present crisis of unsustainability is first and foremost a crisis of values in addition to lack of imagination and creativity.

Characteristics of the Element SC-values:

FIGURE 7c: Characteristics of the element Sustainability Competencies: Values

Sustainability Competencies: Values
• Respect, care and empathy, • Charity, social and economic justice, • Citizenship and stewardship, • Empowerment an motivation, • Commitment, cooperation, and compassion, • Self-determination and self-reliance

EXAMPLES:

Knowledge: In RCE Beijing, teachers received ESD knowledge and its concepts as well as topics including climate change, DRR, to become more sustainability conscious. In RCE Chubu, participants in the cyber dialogue increased their knowledge of biodiversity and other minority oriented topics including gender and indigenous knowledge and ethics. Participants of RCE Kitakyushu and RCE Okayama cases increased their knowledge through use of the *kominkans* as learning centres and also the ESD cafes for ESD-related topics. The youth of RCE Tongyeong gained in-depth knowledge through the topics they researched on in addition to the ESD-related knowledge they received through lectures. Members of RCE Bohol increased their knowledge of waste management, health and sanitation, climate change adaptation and mitigation, poverty and environmental preservation while members of RCE Cha-am increased their knowledge of energy savings, the conservation of natural resources and environment and Sufficiency Economy Philosophy. Furthermore,

participants of the RCE Penang initiative increased their knowledge on composting and recycling. Teachers' knowledge of food and sustainable agriculture in RCE Phnom Pehn increased through training and so was the knowledge transfer to farmers regarding environmental health and sustainable agriculture. The RCE Yogyakarta case resulted in an increase in knowledge conservation agriculture including organic farming and renewable energy.

Skills: The newly trained ESD-skilled in-service teachers of RCE Beijing taught their students ESD knowledge, skills and values they had acquired. In RCE Kitakyushu, ESD leaders acquired ESD-related skills through training to be able to lead the *kominkans*. Students from RCE Okayama acquired citizen science-related skills through hands-on research. The youth of RCE Tongyeong obtained several ESD skills – critical thinking, seeking alternative solutions, real-world problem-solving, future-mindedness, adapting to change and advocating for change, collaboration and cooperation, negotiation, creativity and imagination, etc. – to be able to conduct research, make presentations, create environmental awareness through campaigns. RCE Penang equipped community members with skills for making composting and recycling. RCE Phnom Pehn increased skills to support farmers to produce and sell value added organic products with low chemical inputs at higher prices in the market. RCE Yogyakarta provided participants the ability to apply the zero waste method of sustainable agriculture.

Values: Through ESD training, teachers of RCE Beijing used the values acquired to become more sustainability conscious. They became motivated and showed more commitment towards teaching the kids. RCE Tongyeong youth became empowered through the ability to acquire knowledge by themselves. Their self-reliance, self-determination, charity, etc. helped them to achieve some of the goals they set at the beginning of the project. RCE Cha-am members after studying the Sufficiency Economy Philosophy (SEP) were able to express SEP-related values including moderation, integrity, reasonableness and self-immunity**.** RCE Phnom Pehn members showed appreciation for environmental health and motivation to adopt sustainable agricultural practices.

Background – Framework of Understanding and World-View (WV)

How we interpret, learn and take action towards environmental, social and sustainability issues is greatly influenced by the lens through which we observe and make meaning of these issues, including our schematic understanding of reality, hence our worldview and perspective which in turn influence both the what and how of knowledge acquisition. Worldview is the complex, and sometimes disjunctured, set of beliefs, ideologies, and knowledge structures that guide the way we interact with and making meaning of the world around us (Guba, 1990). According to Bateson (in Sterling, 2007), our current worldview is predicated on the perception of and belief in separateness.

The key issue then is the adequacy of the match between the real world and the ways through which our prevailing worldview(s) creates understanding of complex realities. Framework of Understanding and World-view (WV) is the integrative and pluralistic system for knowledge generation and codification promoted in SD and ESD, furthermore it is attached to the idea of paradigm change that is discussed with some ESD topics. WV is also grounded in a couple of theories particularly Critical Theory, Systems Theory and Integrative Theory.

Systems theory:

Systems theory conveys important insights into how systems of all kinds may embody emergent properties and possibilities that are characteristic of systems as wholes – offering us a means of understanding why an entire system is appropriately understood as more than the sum of its parts. "The systems view is a world-view that is based on the discipline of system inquiry"… central to systems inquiry is the concept of 'system' which in most general terms means "a configuration of parts connected and joined together by a web of relationships" (Banathy, 2012). Using a complex systems lens, learning is not just a cognitive endeavour but an existing natural property of all complex systems.

*Critical Theory (CT)***:**

The critical theory approach of sustainability is used to directly analyse modernisation theory and its implication to social development as impacted by its ideological underpinnings (Rist et al, 2007). In other words, a critical perspective on sustainability reveals an ideological struggle that directly confronts 'legitimacy' and conventional theory of management (Springett and Kearins, 2001). Critical theory does not accept things at face value but rather gives consideration to asymmetric power relations and how these relate to the debate at hand, the ways in which power may become legitimised or naturalised and what that represents (Springett, 2010).

One of critical theory's goals is to enhance learners' ability to engage in critical inquiry, reflexivity and self-reflection as they question the world as they know it through the lens of sustainability regarding values and worldviews and employ action methods as a way of extending and strengthening learning (Springett 2010; Springett 2005). Distinguished from Critical Theory (in its capitalised form) which is directly linked to the work of the Frankfurt School and the ideas championed by its members, although there is a close link between the two, critical theory as an analytical approach holds human beings as creators of their own historical form of life and investigates the power of ideologies in shaping this. The dialectical critique of knowledge and ideologies by critical theory challenges the objective rationality of modernity by arguing that praxis which is central to understanding transformative learning, "is the moving back and forth in a critical way between action and reflection on the world" (Brooks, 2004: 216) – and by questioning the attempt of

empiricism to establish factual universal truths. The analytical approach of critical theory can be utilised to investigate many epistemological constructs, while at the same time it is not hindered by the more pejorative connotations of Critical Theory school of thought.

In this work, the focus is on ESD-related learning and practical solutions through which learning processes and content are advocated to support more sustainable forms of development, but it also attempts to underscore the importance of SD employed as a critical theory of social development in relation to two analytical approaches. According to Didham (2007), the earlier dimensions of sustainability applied its concepts as part of a critical theory approach that addresses the obvious unsustainable aspects of contemporary (modernisation) development. Modernity and globalisation are significant ideological drivers of social development. Both provide the basis for extensive advancements in human knowledge and activity, but have also driven us towards unsustainability. If we are to fully understand the reasons behind the "unsustainability" of current development trends, we must examine the ideologies that have framed certain activities as reasonable or acceptable while viewing others as unimportant. The second dimension of SD was a move from critique to solution and discusses means for practical improvement towards sustainability.

These two distinct approaches thus help address the apparent inconsistencies and irregularities that are embedded in SD. Because the critical theory approach has meant that much of the focus by proponents for SD remained on issues that occur across a global context, there continues to be difficulty in translating this critique into means for practical solutions (Didham, 2007). While those who write about practical solutions often focus on issues at a local context, therefore it is difficult to draw linkages from the solutions back to the critique of the global context. The result of these two approaches is that it is often impossible to understand how the solutions being articulated by practitioners in fact relate to the problems being critiqued. Though proposing a stronger role for critical theory may suggest a heavy focus on problem oriented evaluation, the main purpose of employing the analytical methodology of critical theory is its ability to break beyond the bounds of narrow ideologically-defined views of what is possible (Didham, 2007). Critical theorists test knowledge by the effects of its practical application and judge social development by the norms of freedom and happiness that it professes. Critical theory's usage to analyse, "the social interests ideologies serve by exposing their historical roots and assumptions, no less than the distortions and mystifications which they perpetuate" is a powerful tool for understanding the current challenges addressed in sustainable development (Bronner and Kellner, 1989: 6).

The place where social learning, an essential aspect of ESD and the RCE's practices becomes part of both theory and practice is where Habemas's "theory of communication action" brings sustainability in the context of social learning and collective action to the fore (Rist et al., 2007). The goal of combining action methods with a critical theory approach is to enable people to see the world in a new way through active

participation in practical action for achieving sustainable development. Habermas's theory of communicative action explains that what is judged to be normative becomes embedded in everyday behaviour in a way that reproduces the existing social order, or the status quo (Ledwith and Springett, 2010). Normalisation of the sustainability discourse therefore limits the impacts of such discourse from a strong discourse that is considered both political and progressive and views SD as a force for democracy to a weak discourse that maintains business as usual positions that only focus on sustainable growth. This is a dangerous revelation in the realm of problematising sustainability. Hence exploring the 'silences' and 'gaps' in the sustainability discourse as well as the constructed nature of people, institutions and concepts on the premise that things do not happen by chance and are subject to change are some of the key concepts for consideration (Springett, 2010).

Characteristics of the Element WV:

FIGURE 8: Characteristics of the element Framework of Understanding and World-View

Framework of Understanding and World-View
• Holism and Integration, • Systems perspective or whole systems thinking, • Interdisciplinarity and Cross-boundary approaches, • Cultural relativism and Social constructivism, • Pattern recognition, Systems design from patterns to details (synergy).

The characteristics of this element include the following:

Holism and Integration:

A non-reductionist, descriptive and investigative strategy for generating explanatory principles of whole systems, and it involves the generation of experiential understanding. Attention is focused on the emergent properties of the whole rather than on the reductionist behaviour of the isolated parts (ISSS, 2012). According to Weber and Esfeld (2004), holism is described by Smuts as the study of the complex that presents to the whole of an entity, the ontological and epistemological significance which the parts of the system lack. Wissemberg (2010) refers to holism as "the interdependence of and interconnectedness between the elements of an ecosystem", while Goodmand and Richardson (2010) posit it emphasises "interrelationships" and "interconnectedness" based on a "eco-centric paradigm". In some cases, integration is considered "synonymous with processes and concepts … as coordination, collaboration, cooperation, systems, synthesis, holism, unity and consensus" (Dyball et al., 2007: 186). After discussing holism from different angles covering meaning, confirmation, justification of beliefs and methodological holism (Esfeld,

2003) points out that holism in the context of ESD is rooted mainly in ontological holism and to a degree methodological holism as it relates to transdisciplinarity in the environmental sciences.

Systems thinking:

Williams and Hummelbrunner (in Hargreaves and Podems, 2012) define a system as a set of "embedded and interrelated parts that make up a whole, with links between the parts, and a boundary that determines what is inside and outside the system" (2012: 4). Systems thinking is a process of making sense of the world by seeing it in the context of wholes and relationships, not as component parts in isolation (Ramage and Shipp, 2009). It is "interdisciplinary, encompassing multiple schools of systems theory, including general systems theory, cybernetics, systems dynamics, complexity theory, soft and critical systems, network theory, and learning systems" (Hargreaves and Podems, 2012: 1). Systems thinking is considered to be at the core of integration as it opens a window to look at the entire problem and how it relates to its parts (HirschHardon et al., 2010). Systems thinking makes sense of situations by using interrelationships, perspectives and boundaries and additionally draws on complexity theory which consists of the " concepts of emergence, coevolution, and self-organization; complex adaptive systems; tipping points; and phase change" (Hargreaves and Podems, 2012: 4). Being systemic on the other hand is "an orientation toward the world that involves being self-reflective, consciously letting go of control in complex situations, and trusting in the situations' self-organizing processes that lead to systems change and development" (Hargreaves and Podems, 2012: 4).

Interdisciplinarity and Cross-Boundary:

Interdisciplinarity is academic approach to investigation and knowledge creation that attempts to move beyond disciplinary boundaries and the limiting constructs of any single discipline (Schmidt, 2011). As an approach to knowledge and inquiry, it has both epistemological and methodological dimensions and may be seen as a response to the perceived shortcomings of disciplinarity (Jones et al., 2010). It provides an integration instrument with basic goal of obtaining a synthesis as a means to achieve a presupposed unity from a plurality of disciplines. Interdisciplinarity (with epistemological and methodological dimensions) and sustainability which has normative and ontological dimensions are increasingly being seen in a necessary interrelationship based on the fact that the complexity of sustainability issues can only be addressed in that manner (Jones et al., 2010). Interdisciplinarity also demonstrates transformational properties as there is consensus on theory, problem formulation and shared methodology developed from the various disciplines through integration and coordination (Gaziulusoy and Boyle, 2012). According to Armstrong (2011), many authors associate ESD with interdisciplinary approaches to education.

In ESD, systems thinking, cross-boundary thinking and other concepts that act as potential world-view "shapers" provide an opportunity for its adherents to critically reflect and question their present ideas and

concepts about nature and the environment and their individual contribution to its deterioration or otherwise. Against the backdrop of constructs and the corresponding implicit assumptions and cognitive frameworks that shape them in sometimes uncertain contexts, the thinker is able to see the world in terms of one of its major purpose: a socio-ecological system composing of relationships and interactions between nature and social units, their inherent or imposed boundaries, the dynamics of change processes continuously occurring and the underlying demand to help preserve the planet for its intrinsic value even if not for futurity.

Other characteristics of WV that are not described here in detail include:

- Cultural relativism and social constructivism, and
- Pattern recognition, system design from patterns to details (synergy).

Transformative Learning:

According to Brooks (2004), in Freire's emancipatory theory of transformative learning, learners make their own knowledge of the world "through the process of participant critical reflection on themselves and organizational or social communities, aims to make them more equitable places to work and live" (Brooks, 2004: 216). Freire's development of this approach came out of wanting to see "people with limited literacy skills to become 'subjects' rather than 'objects' of their worlds through learning to engage in ongoing reflection and practice in a dynamic process of transformation" (Brooks, 2004: 216). Viewing education as politically sensitive as it "either teaches the values of the dominant group, or it helps learners to reflect critically and then to take action to make society more just and equitable" (Brooks, 2004: 216), Freire's emphasised the centrality of praxis to understanding transformative learning.

Cranton defines transformative learning (TL) as occurring "when people critically examine their habitual expectations, revise them and act on the revised point of view" (as quoted by Thomas, 2009: 253). TL is considered as having direct relevance to the skill set of ESD which allows one to modify one's skills to different situations across the social frameworks and cognitive domains. The skills needed for this transformation to occur include the following:

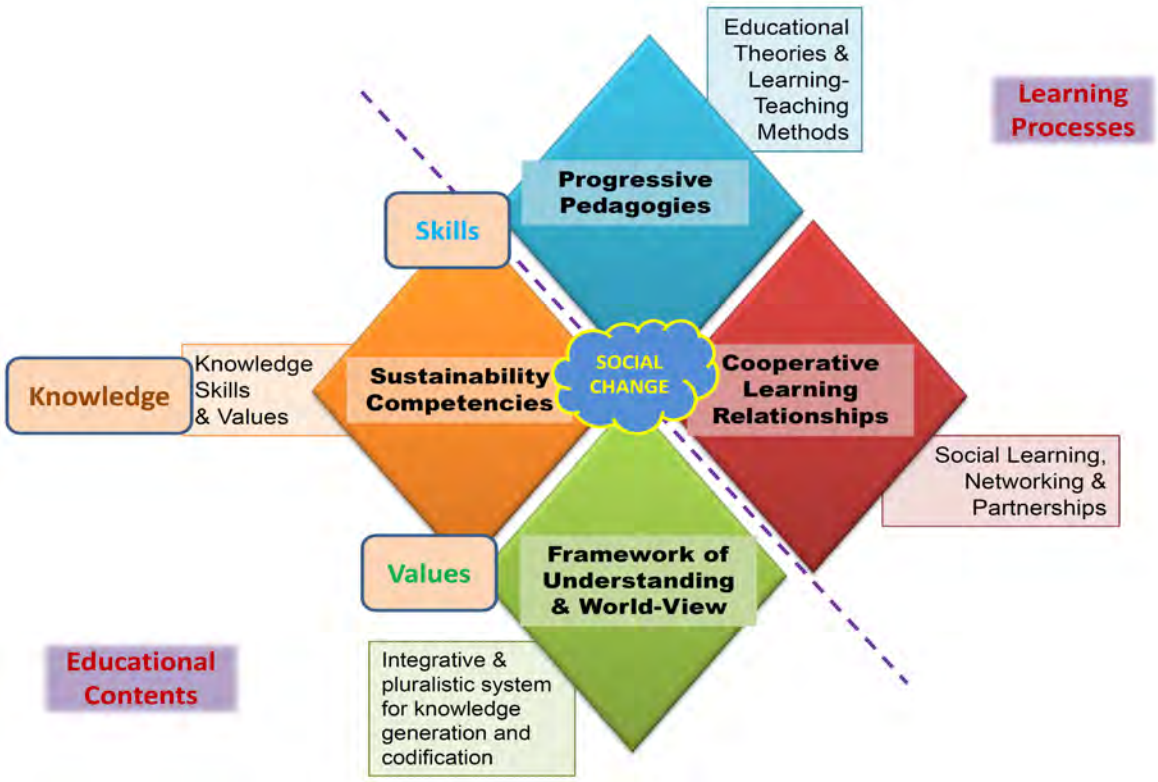
- Appreciation of the sustainability bottom lines of economic, socio-cultural, environmental, political etc. for each discipline, a significant knowledge competency in SD, problem-solving skills with systems approach, creative, holistic thinking with critical judgment;
- Ability to bridge theory and practice with transformational action;
- Ability to develop a level of reflexivity (self-reflection);
- Ability to be an interdisciplinary team player and creative ability to initiate and manage change;

- Ability to apply sustainability-related values to day-to-day learning and decision-making (Thomas, 2009: 253-254).

In transformative learning, attempts are made to use the three domains of learning, namely cognitive (head), psychomotor (hands), and affective (heart) to engage learners in transformative educational experience (Sipos et al., 2008). Transformation-based learning stresses innovativeness and the importance of interaction, dialogue, reflection and moving beyond the cognitive (Wals 2010b). Wals and Blewitt posit that 'Gestaltswitching' – "the switching between different mindsets" (2010: 66) is crucial in the context of sustainability and that "we need to be able to switch back and forth between disciplinary perspectives, time perspectives, cultural perspectives and perhaps even between human and other or more-than-human perspectives" (2010: 66). It is also necessary to constantly reexamine our deep beliefs and values mostly shaped by the form of education and training we are put through, and consequently make adjustment in our living system(s) which is inherently dynamic.

EXAMPLES: RCE Cha-am used Sirindhorn International Environmental Park as a resource learning centre for ESD-based learning and to promote the dissemination of change in world-view concept of Sufficiency Economy Philosophy (SEP) which combines moderation, reasonableness and self-immunity with knowledge and integrity. SEP also promotes holism and integration. In RCE Beijing, in-service teachers were taught (or learned) ESD concepts and other thematic topics which enriched their knowledge and appealed to their values as they critically reflected upon their current way of living as against the expected new way of sustainable living. Their change of mindset motivated them to disseminate the knowledge to their communities. Students of RCE Tongyeong, after embarking on sustainability study trip abroad and having built their capacity and competence in that regard, returned to share their experiences with the local community members.

FIGURE 9: Elements of ESD Learning Performance: Diffusion of elemental boundaries



It is noteworthy that the boundaries between these elements are not clearly defined, thus there are crossovers and overlapping of the elemental characteristics (Figure 9). Hence taking SC as an example, while knowledge competency lies at the core of this element, regarding skills – there are skills that emphasise process and are related to the type of pedagogy and the overall learning skills gained from ESD. Similarly, with respect to values – there are values grounded in one's world-view, that supports societal change through transformative action and values acquired through learning.

Linking the identified ELPC (educational/learning process and content) types from the RCEs cases with the characteristics of four elements of the proposed ESD learning performance framework

This section attempts to link the elemental characteristics of learning performance that are found in the literature with the actual ELPC-based methods and approaches, activities and practices as well as the outcomes of the RCE cases. It should be noted that previous examples were cited regarding actual pedagogical/learning activity that occurred in the RCEs that were found to clearly relate to the various aspect of the educational/learning theory or methodology. Tables 16 and 17 show an approximation of linkage between the ELPC summaries of the learning methods/approaches parameter and

activities/practices parameter of the RCE cases respectively, and the elemental characteristics of the learning performance framework represented by the four colours of the elements.

Generally, ranking of the elements based on the strength of the link between the ELPC and the LP framework represented by the colours orange (education/learning content), blue (education/learning process), pink (multi-stakeholder interaction), and green (new vision for the future), and corresponding to sustainability competencies (SC), progressive pedagogies (PP), cooperative learning relationships (LR) and framework of understanding and world-view elements (WV), respectively decrease from left to right of the table. However, in some cases, the strengths of two or even three successive elemental characteristics may be equal. The following discussion is largely based on the ELPC of the practices/activities parameter (Table 17) due to the closeness of the two parameters, i.e., the ESD practices/activities were effected/implemented using certain methods, approaches or strategies.

TABLE 16: SUMMARY OF ELPC OF METHODS, APPROACHES AND STRATEGIES PARAMETER OF THE RCE CASES LINKED TO THE ELEMENTAL CHARACTERISTICS OF THE LEARNING PERFORMANCE FRAMEWORK
REPRESENTED BY THE FOUR COLOURS OF THE ELEMENTS: BLUE-PP; PINK- LR; ORANGE-SC; GREEN-WV

	The four colours representing the learning performance framework				Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Education and Knowledge transfer	PP	SC	LR	WV	●	●*	●	●	●	●	●	●	●	●
Knowledge acquisition, research and training	PP	SC	LR	WV	●		●	●	●	●	●	●	●	●
Conferences, workshops, meetings, etc.	LR	SC	PP	WV							●	●	●	
Good practices and practical experience	SC	PP	LR	WV	●		●	●	●	●	●	●		●
Information sharing and awareness raising	SC	PP	LR					●	●				●	●
Platform for dialogue and community engagement	LR	SC	PP	WV	●	●*	●	●	●*		●	●	●	
Multi-stakeholder partnership and networking	LR	SC	PP	WV		●	●	●	●*			●	●	●
Role play & games	PP	SC	LR	WV	●									

* Not stated in the report but was inferred/implied in =found in the unexpected part of the report

TABLE 17: SUMMARY OF ELPC OF ACTIVITIES/PRACTICES PARAMETER OF THE RCE CASES LINKED TO THE ELEMENTAL CHARACTERISTICS OF THE LEARNING PERFORMANCE FRAMEWORK

REPRESENTED BY **THE** *FOUR COLOURS OF THE ELEMENTS: BLUE-PP; PINK- LR; ORANGE-SC; GREEN-WV*

	The four colours representing the learning performance framework				Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom	Yogyakarta
Education and knowledge transfer	PP	SC	WV	LR	●	●	●	●	●	●	●	●	●	●
Knowledge acquisition, research and training	PP	SC	LR	WV	●		●	●	●	●	●	●	●	●
Workshops/Meetings etc.	LR	SC	PP	WV	●		●	●	●	●	●	●	●	
Good practices and practical experience	SC	PP	LR	WV	●		●	●	●	●	●	●	●	●
Platform for dialogue and community engagement	LR	SC	PP	WV	●	●	●	●	●		●	●		
Information sharing and awareness raising	SC	PP	LR				●	●	●		●	●	●	●
Multi-stakeholder Partnership & networking	LR	SC	PP	WV	●	●	●	●	●		●	●	●	●
Other					●		●	●			●			

Education and knowledge transfer: Eight out of ten RCEs used education and knowledge transfer to provide knowledge to the learners in different contexts. In providing ESD as an educational subject for the learners' personal capacity development or as a teaching tool to transfer to students or to other members in their community, the pedagogical approach/activity of progressive teaching or knowledge transfer was the main objective. Hence progressive pedagogies (PP) was considered the strongest in this category followed by sustainability competencies (SC). Cooperative learning relationships (LR) was next and was followed finally by world-view (WV). It is noteworthy that world-view mostly appears last in the ranking shown in the tables because a change in one's world-view only occurs after one has gone through some form of experience and consequently a learning cycle (as already described) or faced an issue that led to a desire/motivation to change one's mind-set.

Although generally the teaching process (and also the learning process) was not described in detail, as a typical ESD-related class, teachers would critically reflect upon content and pedagogy as the focus of their teaching plans set around solving problems (problem-based learning). Students would be active participants and not spectators (student-centered active learning), disagreements would be encouraged in the classroom,

and differences would be articulated, analysed and resolved. Critical reflection, practice and problem solving of the students, individually or collectively, also would occur with the teacher's facilitation.

Research and knowledge acquisition and training Research: Nine out of ten RCEs used research, receiving lectures and training as a method for knowledge production. Progressive pedagogies (PP) and sustainability competencies (SC) come first as equally strongest on impact, although in some contexts cooperative learning relationships (LR) can be of equal strength as the first two. It is followed finally by world-view (WV). Knowledge acquisition places the student at the centre of the learning process in a normal ESD-related learning environment. Teachers with good teacher-student relationships and acting as facilitators make available the necessary pedagogical tools and encourage the students to be active participants, to be critically reflective upon both content and pedagogy, and to question assumptions. Individual and/or collective problem-solving was encouraged. Action research, experiential learning, problem-based learning and cooperative learning, along with use of praxis through active inquiry and investigation are some of the appropriate tools available.

Examples include: a group of students undertook a self-planned research with limited guidance by choosing their own sustainability theme/topic after receiving background information through lectures. They went through the research process resulting in collective inquiry in connection with members (learner) of their chosen RCE in a cyclical process of action and reflection leading to continuous improvement (RCE Tongyeong). Other approaches identified include action/experience–oriented, student-centred learning, and knowledge production through iterative interaction to supports learners in becoming citizen scientists and receiving mentorship from seniors (RCE Okayama); teachers and students honing their cognitive and practical knowledge, skills and values to develop organic gardens (RCE GPP); practical approaches to environmental management and conservation (RCE Cha-am); and learning to conduct composting (RCE Penang).

Conferences, workshops, meetings, seminars, and discussions: This set of activities was observed in eight RCEs. Except in situations where the activities were slated for educational/learning pedagogy (PP), the interaction (LR) and content (SC) normally took precedence. Also, the type approach of knowledge transfer through the different presentations in this category will significantly determine the effectiveness of these activities. Coming together through workshops, meetings, seminars, conferences and discussions resulted in individual and collective reflexivity on the issues or topics presented or deliberated on during the learning collaboration.

Good practices and practical experience: All things being equal, both content (SC) and process (PP) have equal impact in this ELPC type. Observed in nine RCEs, good practices and practical experience brings together all the ESD activities that are considered practical and hands-on: 1) knowledge (a) promoting field activities to help build a sustainable community including experiencing nature, managing the forest and coastal vegetation, waste water treatment and composting, organic gardening and making materials for organic farming; (b) visitation to schools with good ESD practices; (c) visitation to green buildings; (d) visitation of youth to other countries/places of sustainability significance; (e) eco-farm/eco-tourism; (f) sale of products with low chemical input; and (g) home visitation. All can be linked to an action/practical experience-oriented learning which might involve Kolb's experiential learning cycle, however this might not happen automatically if it is not strategically employed. PBL, cooperative inquiry and situated learning are all favourable approaches and likely to be employed. These activities also support acquisition of competencies like knowledge (including Indigenous knowledge), 2) skills (systems thinking/complex thinking, imagination, creativity, seeking alternate solutions and adapting to change), and 3) values (respect, care-empathy, motivation, stewardship, self-reliance, etc.).

Platform for dialogue and community engagement: Identified in seven RCEs, symposiums for teacher training and interactions; cyber-dialogue development among RCEs; ESD week and interaction with the general public come under platform for dialogue and community engagement. Participation, interaction, cooperation and collaboration, linked to LR, was the most essential elements followed by the content of knowledge, skills and values (SC) and then pedagogical approaches (PP) that is needed to share or transfer the information at hand or even to create new knowledge.

Information sharing and awareness raising: Observed in seven RCE cases, the content (SC) was the strongest element in information sharing and awareness raising. Although in some situations, the type of pedagogy used to transmit or share the information was equally important. The participation and interaction and the networking (LR) was crucial as well.

Multi-stakeholder partnership and networking: This ELPC type was identified in seven countries. As the name goes, LR was the strongest element and followed equally by SC and PP. The learning tools namely concepts, methodologies, and approaches that fall under this ELPC include: social learning, collaborative inquiry/learning and community of practice, communicative action, and participation. Intra- and inter-RCE collaborative partnerships established among universities, schools, NPOs, local community and government was featured prominently in this ELPC type. Examples include: 1) advisory panel and facilitators collaboration with RCE Phnom Penh to implement technical training on sustainable agriculture, 2) exchanges with other members in the RCE and also between RCEs (RCE Kitakyushu, RCE Okayama, RCE Tongyeong), 3) capacity

building through collaboration, networking and other multi-stakeholder cooperative relationships (RCE Kitakyushu, RCE Phnom Pehn, and RCE Yogyakarta).

In summary, linking the ELPC of the activities to the LP framework's elemental characteristics is not clear cut as the strength of impact of one element more than the other could be affected by a number of factors including level of capacity, logistics, local culture, and existing power relations. To avoid repetition and also due to lack of space, for details of examples of specific activities (of the RCE cases) described under each identified ELPC and linked to the specific elemental characteristics of the LP framework, one should consult the Appendix.

Linking the LP framework to summary of overall main outcomes:

Table 18 indicates the summary of the overall main outcomes and achievements of the RCE cases and their linkage with the elemental characteristics of the LP framework. Relating this table to the LP framework, the four colours shown in the table correspond directly to the four colours of the LP framework, which means the education/learning outcomes that fall in the orange (education/learning content), blue (education/learning process), pink (multi-stakeholder interaction), and green (new vision for the future), correspond to the sustainability competencies, progressive pedagogies , cooperative learning relationships and framework of understanding and world-view elements, respectively. The outcomes underpinned by education/learning content (SC), education/learning process (PP) and multi-stakeholder interaction (LR) characteristics were generally high for most RCE cases. SC, PP, and LR in five, four and four RCEs cases respectively obtained maximum outcomes while only three cases (RCE Beijing, RCE Tongyeong and RCE Yogyakarta) categorically stated the realization of the outcome underpinned by the WV characteristics. Regarding the LP framework-related outcomes versus the total learning outcomes for each RCE case as shown in Figure 10, LP framework-related learning outcomes of cases of RCE Tongyeong, RCE Beijing, RCE Cha-am and RCE Phnom Penh were highest, while those of RCE Bohol and RCE Chubu were the lowest.

Linking the elemental characteristics of the LP framework to actual practices of the RCE cases:

Table 19 indicates linkage between the elemental characteristics of the learning performance framework (in their respective elemental colours) and the actual activities/practices that occurred in the individual RCE cases. Several elemental characteristics could be linked to the activities/practices of the individual RCE cases even though the theoretical and methodological underpinnings of education/learning were not necessarily taken into consideration during implementation. Additionally, it will be rare for an initiative to cover all the elemental characteristics identified in the LP framework more so when only one initiative per RCE was presented as good practice case. In any case, future initiatives should particularly take the following

characteristics into consideration: Life-long learning, and cyclical process of collective inquiry (PP); power sharing, shared ownership/commonality, accountability of individual/groups, positive interdependence and building of trust (LR); culture (indigenous knowledge/understanding) (SC-knowledge); critical thinking/systems thinking/complex thinking, seeking alternative solutions, future mindedness, adapting to change and advocating for change (SC-skills); respect, care/empathy, charity, compassion, social and economic justice, commitment, self-determination and self-reliance (SC-values); and, holism and integration, systems perspective or whole systems thinking, cultural relativism and social constructivism, pattern recognition, systems design from patterns to details (synergy) (WV) (see Table 19).

Although the results shown are based on the survey report, workshop and personal communication there is some level of subjectivity suggesting the absence of a particular characteristic could be inherently present in the activity or vice versa for a characteristic which is currently present but somewhat based on assumption. To minimise subjectivity on the part of the researcher(s) and provide the respondent(s) with a clearer means of reporting, it will be good that future investigations include a framework/ an item close in resemblance to Table 19 for higher measurability.

TABLE 18: SUMMARY OF THE MAIN OUTCOMES AND ACHIEVEMENTS OF THE RCE CASES AND THEIR LINKAGES WITH THE LEARNING PERFORMANCE FRAMEWORK

	Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
LEARNING/EDUCATIONAL CONTENT - Increased awareness [1] - Increased Knowledge [2] - Increased Skills [3] - Increased Values [4]	1, 2, 3, 4	1, 2 3	1, 2	1,2, 3	1, 2, 3, 4	2, 4	1, 2, 3, 4	1, 2, 3	1, 2, 3, 4	1,2 , 3 ,4
LEARNING/EDUCATIONAL PROCESS - Improved ESD Learning [5] - Improved ESD Teaching [6] - ESD integration into curriculum [7]	5, 6, 7	5	5 , 6, 7	5, 7	5, 6	5	5, 6	5, 6, 7	5, 6, 7	5, 6
MULTI-STAKEHOLDER INTERACTION - Increased participation [8] - Increased collaboration, [9] - Increased networking, [10] - wider community of practice etc. [11]	8, 11	8,10	8, 9, 10, 11	8, 9, 10,	8, 9, 10, 11		8, 9 10,	8, 9, 10, 11	8, 9, 10, 11	8, 9, 11
New vision for the future/ Changes in perceptions [12]	12	12			12		12		12	
Increased/Further Support [13]			13	13	13					
Capacity building [14]	14	14	14	14	14	14	14	14	14	14
Improved practices [15]			15	15		15	15	15	15	15

FIGURE 10: Individual RCEs and total outcomes versus outcomes related to LP framework's characteristics

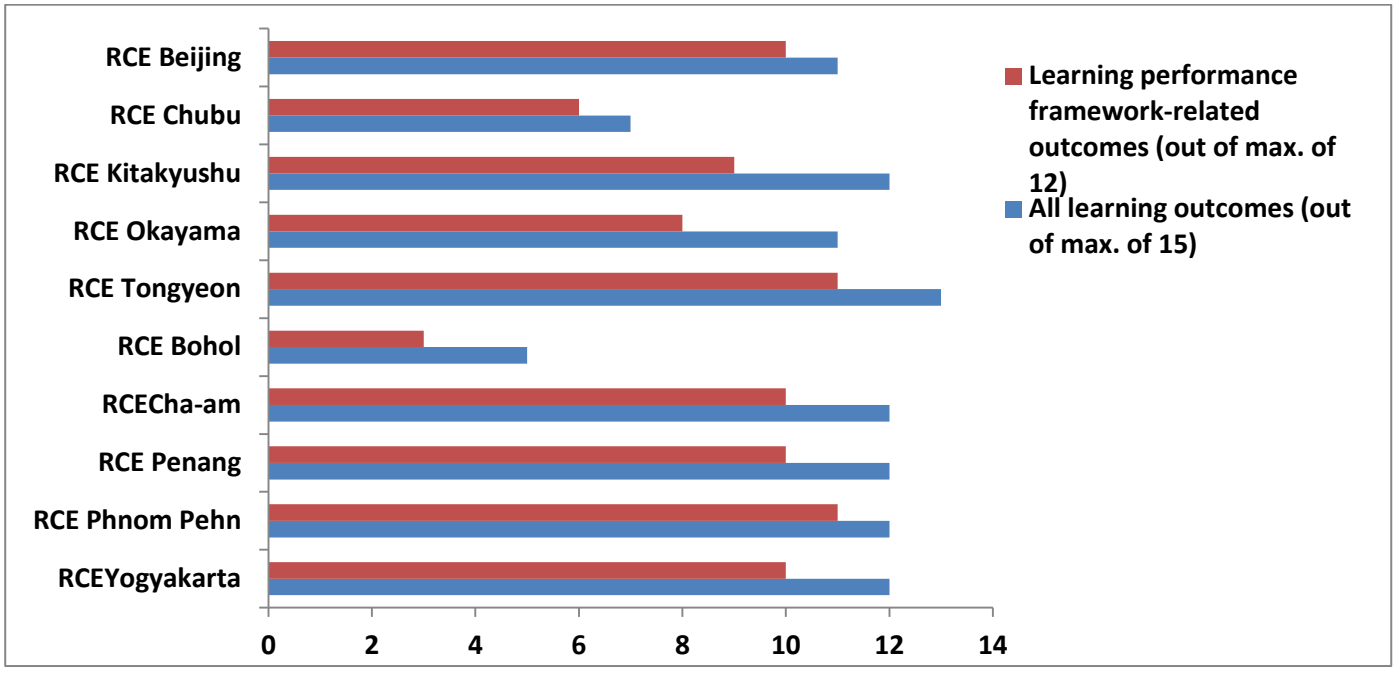


TABLE 19: MAPPING OUT/LINKING THE ELEMENTAL CHARACTERISTICS OF THE LEARNING PERFORMANCE FRAMEWORK AND THE ACTIVITIES/PRACTICES OF THE RCE CASES (SC: SUSTAINABILITY COMPETENCIES)

			Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
LEARNING PROCESSES	Progressive pedagogies	Critical reflection & practice and problem solving	●	●	●	●	●		●	●	●	●
		Action/experience oriented student-centred learning	●		●	●	●	●	●	●	●	●
		Knowledge production through iterative interaction		●	●		●		●	●	●	
		Cyclical process of collective inquiry					●	●				
		Life-long learning			●	●	●					
	Cooperative Learning Relationships	Inclusion and internal network structure for interaction	●		●	●	●		●	●		
		Group processing			●	●	●		●	●	●	●
		Participation	●	●	●	●	●	●	●	●	●	●
		Power sharing, shared ownership/commonality										
		Clear definition and purpose of roles			●	●	●			●	●	
		Accountability of individuals /groups			●		●					
		Positive interdependence			●	●	●					
		Opportunities for reflexive moments	●		●	●	●					
		Situatedness	●	●	●	●	●	●	●	●	●	●
		Social skills	●		●	●	●		●	●	●	●
EDUCATIONAL CONTENT	SC - Knowledge	**ENVIRONMENT:** Climate change, biodiversity, Socio-ecosystems	●	●	●	●	●	●	●		●	●
		SOCIETY: DRE, ESC, ESD	●	●	●	●	●	●	●	●	●	
		ECONOMY: SCP, Green growth/economy, SEP	●		●	●	●			●	●	●
		CULTURE: Indigenous knowledge, Understanding		●			●					
	SC- Skills	Critical thinking, systems thinking, complex thinking	●				●					
		Conflict resolution; Real-world problem solving	●	●	●	●	●	●	●	●	●	●
		Seeking alternative solutions // Future mindedness					●				●	
		Adapting to change and advocating for change	●				●				●	
		Social action, Collaboration and Cooperation	●	●	●	●	●		●	●	●	●
	SC- Values	Respect; Care/empathy; Charity; Compassion					●	●				
		Social and economic justice										
		Citizenship; Empowerment; Stewardship; Motivation	●		●	●	●	●		●	●	●
		Commitment; Cooperation	●					●				
		Self-determination; Self-reliance					●					
	World-View	Holism and Integration					●					●
		Systems perspective			●	●						
		Interdisciplinarity and Cross-boundary	●	●	●	●	●		●	●	●	●
		Cultural relativism and Social constructivism					●					
		Pattern recognition and Systems Design (synergy)										

SUMMARY, RECOMMENDATIONS AND CONCLUSION

Summary

To transition to a more sustainable world requires a new frame of mind (Huckle, 2012) and a new form of learning at the very core of ESD that has been discussed in this report, the type of active and action oriented learning in which information/knowledge is co-produced, co-owned and rooted in innovation and creative solutions. Furthermore, learning that presents a new model spearheaded by citizens with critical, holistic, systemic and systematic thinking skills and who aspire to live in a society that is more reflexive and resilient.

This study began on the premise that to halt exposing the future of humanity to uncertainty and peril by the steady destruction of the planet through our unsustainable ways of living, there is the need for a fundamental change or paradigm shift of our worldview, from a flawed system of education that contributed largely to the present and reproduce unsustainability – to creating social spaces modelling how and what we learn and live. ESD-based learning as a fundamental solution to the current sustainability problems should therefore be a daily, continuous and lifelong attempt to deeply reflect on the social and cognitive issues and in a continuous attempt "to decode, differentiate and internalize ethical principles" (Rist et al., 2007: 241). And not only just learning but *effective* learning that goes through the learning processes to become more critical, self-reflective and transformative (Bawden et al., 2007) to provide affective outcomes like knowledge, understanding, skills, social action which reinforce one's motivation and capacity for continuous learning.

Considered as a major player capable of contributing to the creation of a new learning system for SD at the regional and global levels and whose initiatives have been at the forefront of local implementation of the DESD, flagship projects from RCEs in East Asia and Southeast Asia were qualitatively evaluated. They serve as part of a larger project aimed at developing regional indicators for monitoring and evaluation of ESD implementation on the basis of how effective the learning processes and content of those practices would be and consequently, the learning outcomes in relation to monitoring and evaluation of ESD implementation. Related to this was the goal to develop an ESD Learning Performance (LP) framework for future referencing regarding the implementation of ESD initiatives towards effective performance outcomes. It was also a way to tell a story of good practices that are shaping the communities in the RCEs and more importantly, identify the characteristics that underpin effective learning performance as is found in the literature through an action-reflection cycle.

Evaluation of the RCE background information showed some differences and to some extent similarities. Evaluation of the background of the RCE cases including the major partners and supporters, target learners, the educational sectors addressed and the main sustainability themes covered also showed some

differences. Regarding how the RCE cases address the three pillars of sustainable development, although several of the cases addressed the three pillars, the economic pillar in some cases was not clearly or adequately addressed. The RCEs were hence seen as capable of delivering identifiable improvements in the socio-economic and environmental areas of people's lives.

Generally, all the ELPC-related activities identified occurred in not less than 7 out of 10 RCE cases. Overall, the number of learning outcomes at the end of the implementation of the RCE initiatives was high even though lower numbers were recorded in a couple of RCEs. Among the learning outcomes, increased awareness, increased knowledge and improved ESD learning were the highest while new vision for the future, ESD integration into the curriculum, values, participation and engagement with community of practice were among the lowest. The major strengths and advantages of the RCE cases include: networking, multi-stakeholder participation, engagement and collaborative partnership, self-efficacy, the spirit of voluntarism, and a high sense of motivation. The major weaknesses and constraints include: lack of funding in different forms, lack of capacity with regard to ESD experts, lack of time and lack of continuity.

Several of the learning process and content (practices) of the initiatives could be linked to the LP framework developed by integrating the educational/learning process and content domains that embody mainly the affective factors of knowledge, skills, values, perceptions as a way to resonate with the practical core competencies for sustainability (in an action-reflection process with an equal interplay). The LP framework thus helped bring the progress of the learning outcomes of the initiatives into focus (as demonstrated previously in Table 18) and hence gave a better understanding of the ESD practices in the RCEs with regard to future initiatives. To our knowledge, this is the first comprehensive LP framework that is grounded in the literature and covers both the process and content elements of the education and learning for ESD in such clearly distinct yet overlapping manner.

The study has opened a window to the dynamics of implementation of representative ESD-based initiatives in some RCEs across East and Southeast Asia at the time the RCEs are emerging as regional global networks to serve as learning spaces for ESD and platforms for the integration of the principles and practices including collaborative sustainability research and as platforms for transformative education (Fadeeva 2007; Wals, 2012) to encourage change in mind-set and behaviour as we transition towards sustainability. Furthermore, the RCEs are being promoted as communities – regional level platforms where critical reflection, problem posing, and dialogue are central to allowing learners to transform society and thus their own reality to occur where the dynamics of powers at play will be addressed through the learning process (Brooks, 2004).

Recommendations

To strategically facilitate translation of the ESD agenda at the local level into a larger and new global educational/learning framework, particularly as we near the end of the DESD and as we begin to consider what lies beyond 2014, the following recommendations are made:

Aspects for consideration in future implementation of RCE cases:

The results indicated most of the ongoing initiatives in the RCEs particularly in Southeast Asia are tilted towards the environment. Implementation of future initiatives should take into consideration the balance regarding the thematic topics in the context of the sustainability pillars and of course with local and cultural relevance in mind. In relation to a recommendation made during the expert consultation workshop and also covered in recent literature on the topic, it is appropriate, in fact imperative, for the RCEs to start incorporating the dimensions of time and especially culture of sustainability into their programmes. To have a fair grasp of the orientations of the projects in the area, it will be good to put in place a mechanism for inventorying all the ongoing and potential projects in the region – those both under and not under the jurisdiction of the RCE – in order to avoid resource and capacity waste through duplication of projects. Also the insufficient coverage of the primary education sector, higher education sector and business and private sectors suggests that future implementation of initiatives should take that into consideration.

Identifying model approaches for RCE projects:

All the cases in this report can be considered as significantly innovative, in their own ways, based on the learning outcomes, although sole causality cannot be established at this stage of research development.
However, across all the cases it was also possible to identify several models as ways good practices could be formulated and structured: 1) "Teacher training" model as represented by RCE Beijing. Given the important role teachers are to play in the ESD implementation, developing ESD capacity and competence of teachers using pedagogical approaches of learning that combine the aspects of affective, cognitive and practical experience and are in agreement with ESD and thus a new world-view discourse is crucial to the eventual success of ESD. 2) "Youth Lead" model as represented by RCE Tongyeong. The youth are considered probably the most important target group in our quest towards sustainability, i.e., the inter/intra RCE collaborative learning relationships they foster, the leadership skills they acquire through the learning activity mostly by themselves and networking with their peers internationally could serve as a model for the RCEs that can afford to take care of the international travels involved. 3) "HEI-Com" model represented by RCE Penang which showcases a university (higher education or research institution)-community partnership. The activity was set to solve a locally relevant problem by providing capacity building through knowledge transfer,

learning and acting on the knowledge. It also fostered relationships between the two different but intertwined communities, served as a research issue for the university and as a pedagogical resource. 4) In cooperation with an external advisory panel, RCE Phnom Pehn in a multi-stakeholder partnership with the local farmers and local students focused on improving the existing form of agriculture to address the prevailing environment, economic and health problems, aspects that threatened their very livelihood. This depicts the "Multistake" model. The outcomes of the initiative include improvement in the problematic areas described in addition to fostering social ties in the farming community. RCE Okayama and RCE Kitakyushu showed characteristics of both "HEI-Com" and "Multistake" models. 5) Dubbed as "Web-based" model and represented by RCE Chubu to some extent, considering the current era of the internet and computers, significant use of ICT in the not-so-distant future for ESD-based learning cannot be overemphasised and hence is one potentially important area that needs further investigation.

Engaging with decision makers and informing policy:

As the goals of the RCE are defined within the larger context of the DESD and hence needs mainstreaming into the global development agenda that significantly involves policy decision making, the engagement of the RCEs with policy makers can help shape the educational vision in the area/region with respect to ESD integration. To this end, identifying the model approaches to best practices, sharing them while engaging with policy makers to sustain these programmes in the larger context of the educational policy framework of the area/region will be good. Additionally, this engagement will ensure greater "legitimacy" to the RCEs' ESD programmes while still maintaining their autonomy. In seeking to embed the work of RCEs in official regional and national strategies therefore, this report could serve as basic information to inform policy with respect to educational/learning processes and content of practices occurring in the RCEs. Consequently, it can serve as a leverage point for ESD-based learning "infusion" into particularly the formal education sector which is highly regulated in most of the countries surveyed. Added to fostering stronger linkages with policy makers, these findings could also be used to gain additional support for ESD based RCEs programmes from the local government and business sector in the region. At the international level, the time is ripe for the RCEs to fully engage with the several international sustainability processes available for greater impact.

RCE as social learning experiment:

Research, development and knowledge generation is one of the four core elements of the RCE and is capable of serving as a lever for capacity building. It has been proposed that the RCE should also be seen through the lens of research as a social learning experiment with a broader research agenda. Strengthening research capacity in general and especially use of a) research methodologies that reflect the practical

interests of end users and policy makers and 2) research output models that are decision-driven and problem solving should be promoted. Considered as the main identifier of local best practices and success stories with regard to the impact of ESD while also having deep local roots and a global reach, if given the proper tools like the LP framework (a product of research) described in this report for identification and assessment, the RCEs can identify those best practices and bring them to centre stage at the international level through its global network (UNU-IAS, 2011).

Application of ESD Learning Performance Framework:

The study is all the more relevant as the third and final of the UNESCO-mandated DESD implementation reports focusing on impacts and outcomes of the DESD is expected to be out in 2015 (Wals, 2012, Tilbury 2010). Specific objectives described by Phase II of the DESD M&E process include: a determination of "what constitutes processes and learning for ESD, … whether ESD processes aim to achieve normative aims like including ESD in curricula or achieve learning aims like increasing and enhancing stakeholders' awareness of ESD and capacity-building, …. examine what has started to change, what has been learned in the process of implementing ESD and to what extent it corresponds to the principles of SD, … identify what learning processes should be promoted to facilitate learning in ESD" (Wals: 2012: 12). It is hoped the information in this report, particularly the LP framework will be able to contribute to clarifying a direction for identifying the relationships between educational processes (based on the methods and activities) with learning performance outcomes.

Currently, the RCEs are evaluated through the RCE reporting portal based on self-evaluation and also use of the Graz model's five criteria. Due to its comprehensiveness on educational content and learning processes, the LP framework can significantly complement this evaluation process by serving as guidance for planning and implementing future projects. The effectiveness of the learning performance and outcomes of these projects would be assured if attention is paid to both the learning processes and educational content of the initiative as outlined in the framework. Concerning an initiative that is on-going, its status regarding effectiveness can be gauged using the LP framework and consequently modified. The LP framework can therefore help increase the measurability of the affective aspects of ESD as has been demonstrated in the report. As a result, it can contribute to the monitoring and evaluation of ESD. The LP framework is therefore expected to further strengthen the regional indicator framework which is the overall goal of this research and will be presented in detail in the third report in this series. It is hoped in connection with the quantitative part of the project, that these results will help bridge the two aspects of the research.

Future research direction:

Part of the future research regarding this project is to develop a tiered monitoring and evaluation system with the aim of providing/developing indicators that include variable target including national implementation, local level, and classroom or project based performance. In the formal education sector, the quality and the quantity of ESD LP can be evaluated and hence transformative learning can take place. In the end, an improvement is expected in the areas of: reform of teachers' competencies, educational pedagogies and curriculum content, and improvement of sustainable learning environment due to the contributing role of RCE in shaping the new education in the region.

Conclusion

This report presents good practices that are contributing to improving RCE communities across East and Southeast Asia. Furthermore, it describes the characteristics of elements that underpin effective learning performance as found in the literature through an action-reflection cycle in relation to the good practices. The overall goal of bringing together these elements into an actionable framework is to effect social change, which means the educational content and learning processes that seek to advance sustainability should exhibit these and other related characteristics. The LP framework is therefore not limited to the RCEs alone, but any learning sphere across all education settings where there is a desire to engage in the praxis of learning, especially for ESD, can utilise the framework in the context of their situation both in regards to planning and formulating learning activities and also for assessing the quality of learning outcomes (though through future research, the aim is to develop more clear procedures for both of these purposes).

APPENDIX

TABLE 6 (B). DISTRIBUTION OF THE RCE PROJECTS/INITIATIVES WITHIN THE THREE PILLARS AND THEIR COMBINATIONS

	Beijing	Chubu	Kitakyushu	Okayama	Tongyeong	Bohol	Cha-am	Penang	Phnom Pehn	Yogyakarta
Environment	Disaster Education for Primary and Middle School Students	1. Biodiversity Cyber Dialogue 2. Monitoring of the Ise-Mikawa Watershed			1.Lifelong Learning Group Activities 2. RCE EcoPark & Sejathra Centre	1. Climate Change Orientation 2. Organic Farming Education	1. Energy for Environment 2. Mangrove Ecosystem and Rehabilitation 3. Wastewater Treatment System (constructed wetland) 4. Coastal Erosion Protection 5. Inland Ecosystem and Tree Planting 6. Biodiversity 7. Sirindhorn International Environmental Park (SIEP)	1.Vulnerability and Adaptation to Flood in Kuala Nerang, Kedah, Malaysia 2.Eco-Institute Program (with World Wildlife Fund- Malaysia)	1.Project on enhancing education on food, agriculture and environment in elementary schools 2.Project on facilitating sustainable agriculture for local farmers 3.Project on promoting seri-culture for deepening environmental awareness and income generation	1. Training on "Zero Waste Integrated Farming" by University Agricultural Field Laboratory 2. Community based Reforestation Development at Jambi, East and Central Kalimantan, Central Java 3. ESD implementation on community forest development at Gunung Kidul District
Social –[Cultural]			1. Public relations: Networking with national and international RCEs		1. Pe+cademy: Traditional Arts Training Course for Youth 2. Teach for Island: i) Literacy program for the elderly; ii) English class for the under-privileged youth 3. Sumshimsarm Recharging Programme for Activists 4. TongTong Humanities Lecture Series					
Economic				1. Subsidy for citizens groups and communities	1. Atti-School Project Scholarship 2. Tongyeong Young Leader Scholarship for Artists & Athletes 3. Mentoring Programme for Scholarship Awardees R&D					

Social-Environ	1. Geography Textbook s Evaluation Programme		1. Develop educational tools for outreach and conduct monitoring. 2. Youth: initiatives by the youth (Ai no Shima (Ai Island)) Project	1. ESD Café	1. School ESD Model Schools: Kindergarten-University* 2. Extra-curricular ESD Program* 3. ESD Teacher Training* 4. ESD Project Class* 5. Dongpiran EduCentre & Suryukteo EduCentre					1. ESD-based community development at Kemadang village, Gunung Kidul District, Yogyakarta, Indonesia 2. ESD implementation through herbal medicine development at Yogyakarta 3. ESD on Disaster Adaptation and Mitigation
Socio-economic					1. Saengsaeng Informal ESD Program Grants					
Envir-Economic										
All three	1. In-service teacher training on ESD		1. ESD Outreach Project: Strengthen capacity & network of communities	1. ESD Week 2. Collaboration Project with universities, NPOs, schools and municipalities 3. Okayama ESD Project –Realising a sustainable society through a flexible network starting with Okayama	1. Youth Programme Bridge to the World 2. Our Village School: Local Community Centre ESD Program* 3. Local ESD Index Evaluation	1. Bohol Socio-economic and Environmental Awareness Education Programme		1.Enhancing Sustainable Lifestyle within Universiti Sains Malaysia and its Surrounding Neighbourhood 2. Showcasing Balik Pulau as Sustainable Village 3.SD Training for SMEs		
Other					1. Traditional knowledge booklet series 2. RCE Tongyeong 5-year White paper 3. Programme and Site Development					

** The categorizations were made based solely on the title

TABLE 7 (C): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTOR "OBJECTIVES AND FOCUS": RESEARCH AND KNOWLEDGE ACQUISITION AND TRAINING (OBJECTIVE [○]; FOCI [●])

RCE Beijing	○ Better understanding of SD and ESD
RCE Tongyeong	• Selecting one's own topic, researching it in collaboration with other RCEs through visits to those RCEs abroad
RCE Penang	○ Reduction of solid waste that goes to the landfill

TABLE 7 (D): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTOR "OBJECTIVES AND FOCUS": GOOD PRACTICE AND PRACTICAL EXPERIENCE

RCE Beijing	• Learning about good ESD practices in schools through experience
RCE Penang	• Reduction of solid waste that goes to the landfill
RCE Phnom Penh	• Promotion of sustainable agriculture based on natural resource circulation
RCE Yogyakarta	• Practicing sustainable integrated farming

TABLE 7 (E): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTOR "OBJECTIVES AND FOCUS": PLATFORM FOR DIALOGUE AND COMMUNITY ENGAGEMENT

RCE Chubu	• The cyberspace as platform for dialogue

TABLE 7 (F): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTOR "OBJECTIVES AND FOCUS": GOOD PRACTICE AND PRACTICAL EXPERIENCE: INFORMATION SHARING AND AWARENESS RAISING.

RCE Beijing	○ Better communication with students and their parents
RCE Okayama	• Engaging in exchange and information sharing with other RCEs through UNU
RCE Cha-am	• To share Sufficiency Economy Philosophy

TABLE 7 (G): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTOR "OBJECTIVES AND FOCUS": MULTI-STAKEHOLDER PARTNERSHIP AND NETWORKING

RCE Chubu	• Cross boundary, multi-sectoral learning and Increase multi-stakeholder engagement
RCE Kitakyushu	• Strengthening networking
RCE Okayama	• Creating network for information exchange

TABLE 7 (H): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTOR "OBJECTIVES AND FOCUS": CAPACITY BUILDING AND TRAINING

RCE Kitakyushu	• To strengthen capacity
RCE Okayama	• Strengthen capacity through information provision and educational activity for residents

TABLE 7 (H): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTOR "OBJECTIVES AND FOCUS": "OTHER"

RCE Chubu	• Building social relations among people who share similar interests and activities

TABLE 9 (B): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE "LEARNING METHODS, APPROACHES AND STRATEGIES APPLIED TO THE INITIATIVES" FACTOR: EDUCATION AND KNOWLEDGE TRANSFER

RCE Beijing	• Giving lectures to in-service teachers
RCE Chubu	• Expert input from university teachers, NGO members and people from the private sector
RCE Kitakyushu	• Teaching (giving lectures) • Development of ESD teaching materials
RCE Okayama	• Teaching
RCE Tongyeong	• Lectures provided to youth prior to selecting topic
RCE Bohol	• Lecture by a health personnel
RCE Cha-am	• Training courses offered on energy and natural resources conservation
RCE Penang	• Provision of non-formal and informal education methodologies including learning by doing activities
RCE Phnom Penh	• Use of teaching materials • Training of teachers
RCE Yogyakarta	• Knowledge transfer through training in "zero waste" farming

TABLE 9 (C): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE "LEARNING METHODS, APPROACHES AND STRATEGIES APPLIED TO THE INITIATIVES" FACTOR: RESEARCH AND KNOWLEDGE ACQUISITION AND TRAINING

RCE Beijing	• Research
RCE Kitakyushu	• Receiving lectures from experts
RCE Okayama	• Citizen's research led by junior high school students • Receiving lectures from experts
RCE Tongyeong	• Self-planned research with limited guidance
RCE Bohol	• Research: one on one interview • Documentary analyses
RCE Cha-am	• Research (into mangrove management, water treatment, soil quality improvement, etc.)
RCE Penang	• Action research
RCE Phnom Penh	• Baseline survey and evaluation
RCE Yogyakarta	• Research

TABLE 9 (D): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: CONFERENCES AND MEETINGS, ETC.

RCE Cha-am	• Conferences • Meetings • Seminars
RCE Penang	• Talks
RCE Phnom Penh	• Meetings to equip conductors of surveys • Workshops

TABLE 9 (E): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: GOOD PRACTICES AND PRACTICAL EXPERIENCE

RCE Beijing	• Field trips (learning through experience) • Visitation by teachers and dialogue with peers and school management on ESD
RCE Kitakyushu	• Field (study) visits • Participation of members in several activities
RCE Okayama	• Field trip: learning through experience
RCE Tongyeong	• Action-based problem solving programs, activities and processes contributing to a sustainable future
RCE Bohol	• Home visitation to experience the actual situation on the ground • Immersion in the community
RCE Cha-am	• Field study of natural resources in SIEP
RCE Penang	• Learning by doing; composting, recycling, and group work activity
RCE Yogyakarta	• Hands on training in producing organic materials for zero waste farming

TABLE 9 (F): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: INFORMATION SHARING AND AWARENESS RAISING

RCE Okayama	• Use of ESD Café • Information dissemination through UNU networks
RCE Tongyeong	• Partnering groups sharing expertise and knowledge with participating youth (study visits, consultation meetings/lectures
RCE Phnom Penh	• Use of newsletters
RCE Yogyakarta	• Information on zero waste agriculture has been shared internationally with countries and groups

TABLE 9 (G): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: PLATFORM FOR DIALOGUE AND COMMUNITY ENGAGEMENT

RCE Beijing	• Knowledge exchange through discussions
RCE Kitakyushu	• Study meetings
RCE Okayama	• Festivals to present the work done within the year
RCE Cha-am	• Exhibition and demonstration (energy & environment)
RCE Penang	• Campaign towards sustainable lifestyle • Exhibition at GIANT hypermarket, Penang;

TABLE 9 (H): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: MULTI-STAKEHOLDER PARTNERSHIP AND NETWORKING

RCE Chubu	• Multi-stakeholder, cross country learning • Social networking
RCE Kitakyushu	• Collaboration with RCE Tongyeong
RCE Okayama	• Community-school-university collaborative partnership • Networking with other RCEs
RCE Penang	• Collaboration to clean community surroundings
RCE Phnom Penh	• Networking to promote sustainable agriculture in Cambodia
RCE Yogyakarta	• Networking through transfer of methods to other countries

TABLE 9 (I): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: OTHERS

RCE Beijing	• Use of games and role plays
RCE Tongyeong	• Personal career development on global/local issues

TABLE 10 (B): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: EDUCATION AND KNOWLEDGE TRANSFER

RCE Beijing	• Providing ESD knowledge to teachers for them to and apply it in classroom teaching
RCE Chubu	• Input of expert knowledge on biodiversity and ESD-related minority issues using the internet
RCE Kitakyushu	• Giving lectures (at the university consortium)
RCE Okayama	• Lectures provided by university professors and also from the local university students
RCE Tongyeong	• Attending lectures in the community and abroad
RCE Bohol	• Giving a lecture on hygiene
RCE Cha-am	• Learning centre on Sufficiency Economy Philosophy (SEP)
RCE Penang	• Knowledge transfer programs (on composting and recycling)
RCE Phnom Pehn	• Producing teaching materials: Food, agriculture and environment education
RCE Yogyakarta	• Slide presentations before practical training on the university farm

TABLE 10 (C): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: RESEARCH AND KNOWLEDGE ACQUISITION (& TRAINING)

RCE Beijing	• Teacher training exchange programmes with other countries
RCE Kitakyushu	• Receiving lectures from faculty • Training of ESD facilitators to lead in ESD activity implementation
RCE Okayama	• Students leading in conducting research survey and later reporting the results • Knowledge acquisition by fishermen cooperative association from the university faculty • School children learned from university students
RCE Tongyeong	• Exposure of youth to sustainability through research and dissemination of research reports
RCE Bohol	• Conduction of interviews on health and sanitation issues
RCE Cha-am	• Training camps on energy and environmental conservation
RCE Penang	• Situational analysis using SWOT
RCE Phnom Pehn	• Conduction of baseline survey • Conduction of market survey to promote products with low chemical input • Training of teachers on food, agricultural and environmental education
RCE Yogyakarta	• Collaborative research on conservation of animals and vegetation • Training of participants on sustainable, (zero waste) integrated farming

TABLE 10 (D): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: WORKSHOPS, CONFERENCES AND MEETINGS, PARTICIPATION, ETC.

RCE Beijing	• ESD workshops and meetings that featured officials from government, the education and environmental protection ministries, NGOs, etc. • Participation in ESD-related symposiums for teacher training interactions
RCE Kitakyushu	• Method of learning streamlined through seminars, study meetings, etc.
RCE Okayama	• Students learned environmental issues in the fishing industry through workshops
RCE Tongyeong	• Workshops
RCE Bohol	• Organising seminars, workshops, forums for the local people
RCE Cha-am	• Organising meetings, seminars, conferences, etc.
RCE Penang	• Holding meetings and discussions with stakeholders in a university-community engagement
RCE Phnom Pehn	• Holding meetings for survey team and eco-friendly products salespersons • Organising workshops on sustainable agriculture for teachers and students

TABLE 10 (E): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: GOOD PRACTICES AND PRACTICAL EXPERIENCE

RCE Beijing	• Visiting schools with good ESD practices • Visiting green buildings, etc.
RCE Kitakyushu	• Promoting field activities to help build a sustainable community • Use of the community centre as the nucleus to promote ESD • Exchanges with members within RCE Kitakyushu
RCE Okayama	• Use of the community centre as the nucleus to promote ESD • ESD Café
RCE Tongyeong	• Exposure of youth to sustainability through research
RCE Bohol	• Home visitation to see the real situation in peoples' lives
RCE Cha-am	• Sufficiency Economy Philosophy learning and application • Waste water treatment • Prevention of coastal erosion, • Management of the mangrove forest • Tree planting activities
RCE Penang	• Hands-on composting demonstration
RCE Phnom Pehn	• Formation of farmers' groups to promote SD • Sale of product with low chemical input • Teachers managing organic gardens
RCE Yogyakarta	• Eco-farm • Eco-tourism • Production of materials for organic farming: different types of compost, fertilizers, manure, viticulture, biogas, low energy water pump, etc.

TABLE 10 (F): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: PLATFORM FOR DIALOGUE AND COMMUNITY ENGAGEMENT

RCE Beijing	• Explaining ESD to peers, parents and the community
RCE Chubu	• Development of cyber-dialogue among RCEs, etc.
RCE Kitakyushu	• Use of ESD Café; implementation of the field activities involving the community
RCE Okayama	• ESD Week
RCE Tongyeong	• Interaction with the general public
RCE Cha-am	• SIEP served as a platform for engagement of several organisations
RCE Penang	• The university-community engagement served as platform for dialogue

TABLE 10 (G): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: INFORMATION SHARING AND AWARENESS RAISING

RCE Kitakyushu	• Exchanges of information by members within the RCE and also with other RCE members
RCE Okayama	• Conduction of environmental awareness campaigns on ESD and biodiversity during the Autumn Festival
RCE Tongyeong	• The youth organised campaigns to raise awareness on environmental problems
RCE Cha-am	• Conduction of exhibitions on energy and sufficiency economy
RCE Penang	• Lifestyle awareness campaigns • Sharing of information (knowledge) by multi-disciplinary experts within the university, municipal council, solid waste authority, CBOs and NGOs
RCE Phnom Pehn	• Publishing and distributing newsletters • Promoting distribution and sales of eco-products • Promoting education of food, agriculture and environment
RCE Yogyakarta	• Sharing of information on zero waste agriculture with participating countries and groups from abroad

TABLE 10 (H): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: MULTI-STAKEHOLDER PARTNERSHIP AND NETWORKING

RCE Beijing	• Implementation of ESD training programme • Facilitation of links on ESD practices between teachers and students of different schools • Strengthening of knowledge exchange between experts and participants on topics also covering DRR, SCP renewable resources and climate change
RCE Chubu	• Expansion of network of RCE Chubu with Japan Civil Network of Convention on Biological Diversity (JCN-CBD)
RCE Kitakyushu	• Exchanges with other members/RCEs outside RCE Kitakyushu
RCE Okayama	• Collaborative projects among universities, schools, NPOs, the local government, etc.
RCE Tongyeong	• Visiting other RCEs to conduct research through collaboration and networking with members of the RCEs visited
RCE Cha-am	• Networking and collaboration among members/organisations that meet in SIEP
RCE Penang	• Accessibility to conduct ESD activities in partner schools and residential neighbourhoods • Expansion of network with other organizations and initiatives
RCE Phnom Pehn	• Strengthening the network for promoting sustainable agriculture in Cambodia • Cooperation with advisory panel and facilitators to implement technical training on sustainable agriculture

TABLE 10 (I): THE EDUCATION/LEARNING PROCESSES AND CONTENT IDENTIFIED WITHIN THE FACTORS: OTHER

RCE Beijing	• Use of games and role playing by teachers to study SD
RCE Kitakyushu	• Subsidy for citizen groups and community
RCE Okayama	• Subsidies given to citizen groups and communities promoting ESD
RCE Penang	• Monitoring and evaluation of the research project

TABLE 11 (B): THE MAIN OUTCOMES AND ACHIEVEMENTS: INCREASED AWARENESS

RCE Beijing	• Stronger awareness of SD and environmental protection
RCE Chubu	• Increased awareness among participants of particularly biodiversity due to expert input
RCE Kitakyushu	• Increase in level of recognition of ESD by the public
RCE Okayama	• Promotion of ESD using various events and involving all levels of education and several forms of learning
RCE Tongyeong	• Achievement of some of goals set by the students at the beginning of the project: Students were involved in awareness raising campaigns on several environmental issues
RCE Cha-am	• Increased public awareness and knowledge on energy savings, the conservation of natural resources and environment and Sufficiency Economy Philosophy
RCE Penang	• Increased awareness on sustainable lifestyle that led to healthier life of the community
RCE Phnom Pehn	• Increased awareness among farmers of the risks in "inorganic" farming and the benefits of sustainable agriculture with low inputs of chemicals
RCE Yogyakarta	• Awareness of the three pillars of sustainability by members of society

TABLE 11 (C): THE MAIN OUTCOMES AND ACHIEVEMENTS: INCREASED KNOWLEDGE

RCE Beijing	• Use of acquired knowledge to become more sustainability conscious
RCE Chubu	• Increased knowledge among participants of particularly biodiversity due to expert input
RCE Kitakyushu	• Increase in knowledge through [collaborative learning] direct
RCE Okayama	• Increased in knowledge through learning using the *kominkans*, ESD cafes several formal educational programs
RCE Tongyeong	• Achievement of some of goals set by the students at the beginning of the project including increased knowledge
RCE Bohol	• Increased knowledge on waste management, health and sanitation
RCE Cha-am	• Increased knowledge on energy savings, the conservation of natural resources and environment and Sufficiency Economy Philosophy
RCE Penang	• Increased in knowledge of students and the community on composting and recycling
RCE Phnom Pehn	• Teachers knowledge of sustainable agriculture increased through training • Knowledge transfer to farmers who do not belong to the farmers' groups
RCE Yogyakarta	• Increased knowledge through practical preparation of materials for organic farming, etc. and through demonstration of applying the 7 Rs in the process.

TABLE 11 (D): THE MAIN OUTCOMES AND ACHIEVEMENTS: INCREASED SKILLS

RCE Beijing	• Use of acquired knowledge to improve the skill ESD teaching to students
RCE Kitakyushu	• Training of ESD leaders with skills to lead the kominkans
RCE Okayama	• Making of citizen scientists through hands-on research
RCE Tongyeong	• Achievement of some of goals set by the students at the beginning of the project, e.g., conducting research, presentations, creating environmental awareness through campaigns
RCE Cha-am	• Several hands-on practical activities led to increase in skills
RCE Penang	• Equip community members with skills for making composting and recycling
RCE Phnom Pehn	• Increased skills to support farmers to produce and sell value added organic products with low chemical inputs at higher prices in the market
RCE Yogyakarta	• Ability to apply the Zero waste method of sustainable agriculture

TABLE 11 (E): THE MAIN OUTCOMES AND ACHIEVEMENTS: INCREASED VALUES

RCE Beijing	• Use of acquired values to become more sustainability conscious
RCE Tongyeong	• Achievement of some of goals set by the students at the beginning of the project
RCE Bohol	• Valuing the environment and internalizing the importance of sanitation, waste management and good health
RCE Cha-am	• Sufficiency Economy Philosophy
RCE Phnom Pehn	• Appreciation of the health/environmental benefits of sustainable agricultural practices • Increase in motivation to adopt sustainable agriculture based on low chemical input and natural resource circulation
RCE Yogyakarta	• Applying the concept in their actions due to change in the mind-set of the participants and hence act as agents of change in their communities

TABLE 11 (F): THE MAIN OUTCOMES AND ACHIEVEMENTS: IMPROVED ESD LEARNING

RCE Beijing	• Better understanding of ESD by teachers resulted in improved teaching, and hence learning
RCE Chubu	• Realization of ESD across boundaries
RCE Kitakyushu	• Learning from each other through farm visits/experience activities and also use of the community centre for several learning activities resulted in improved learning
RCE Okayama	• Use of the *kominkan* (community centre) as a learning centre led to improved learning due to several learning activities taking place there
RCE Tongyeong	• Students ability to conduct research abroad in collaboration with other RCEs, return home and present feedback to the local society
RCE Bohol	• Improvement in learning about relevant local issues and resultant contribution to SD
RCE Cha-am	• Report stated that all ESD learning activities are expected to lead to SD hence implying improved learning
RCE Penang	• University-community engagement enhanced learning based on practical experience in composting and recycling
RCE Phnom Pehn	• Improved learning resulted in stronger linkage between sustainable agriculture and sustainable livelihoods
RCE Yogyakarta	• Increased in participants cognitive and practical knowledge through learning

TABLE 11 (G): THE MAIN OUTCOMES AND ACHIEVEMENTS: IMPROVED TEACHING

RCE Beijing	• Improved teaching methods
RCE Kitakyushu	• Members as lecturers of ESD at a university consortium
RCE Tongyeong	• Youth eventually turning into teachers after acquisition of knowledge, skills and values
RCE Cha-am	• Several teaching activities using SIEP as a major environmental resource occurred and might have led to improved teaching
RCE Penang	• Adoption of composting and recycling methods as part of teaching pedagogy
RCE Phnom Pehn	• Teachers learning how to set up school organic gardens/compost boxes • Teachers teaching students "Education for agricultural successors" using workshops
RCE Yogyakarta	• Improved teaching using both cognitive and hands on approaches

TABLE 11 (H): THE MAIN OUTCOMES AND ACHIEVEMENTS: ESD INTEGRATION INTO THE CURRICULUM

RCE Beijing	• ESD integrated into the curriculum
RCE Kitakyushu	• Development of educational aids in the form of ESD materials [although not stated as integrated into the formal curriculum]
RCE Okayama	• Promotion of ESD integration into the curriculum
RCE Penang	• Adoption of the initiative's composting and recycling content by university lecturers as part of the teaching pedagogy
RCE Phnom Pehn	• Production of teaching materials on food agriculture and environmental education [although not stated as integrated into the formal curriculum]

TABLE 11 (I): THE MAIN OUTCOMES AND ACHIEVEMENTS: IMPROVED PARTICIPATION

RCE Beijing	• Participation of especially teachers in several events including visitations, symposiums, lectures, workshops, meetings and lectures
RCE Chubu	• Multi-stakeholder cyber-dialogue
RCE Kitakyushu	• RCE members participated in several ESD-related activities
RCE Okayama	• Stakeholder participation using the *kominkan* as the learning centre
RCE Tongyeong	• Youth participated in several activities during their trips abroad
RCE Cha-am	• Numerous groups and organisations participated in the ESD activities in SIEP
RCE Penang	• Strong participation of stakeholders in the university-community engagement
RCE Phnom Pehn	• Farmers participation in the research process and also formation of farmers' cooperatives
RCE Yogyakarta	• Improved participation of both local and international due to the increasing popularity of the zero waste agricultural technique

TABLE 11 (J): THE MAIN OUTCOMES AND ACHIEVEMENTS: IMPROVED COLLABORATION

RCE Kitakyushu	• Increase in collaborative learning leading to enhanced capacity building: collaboration between the community and university faculty, among the member organisations and between the RCEs
RCE Okayama	• Collaboration between universities and municipality to solve local problems
RCE Tongyeong	• Youth were involved in several collaborative activities during their visits abroad
RCE Cha-am	• Probable collaborations among the participating organisations and groups
RCE Penang	• Enhanced university- community collaboration particularly on clean-up efforts
RCE Phnom Pehn	• Formation of farmers' groups and further linking up with non-member farmers
RCE Yogyakarta	• Successful promotion of the zero waste method by researchers to other parts of the region through collaboration

TABLE 11 (K): THE MAIN OUTCOMES AND ACHIEVEMENTS: INCREASED NETWORKING

RCE Chubu	• Increased networking with Japan Civil Network on CBD (JCN-CBD)
RCE Kitakyushu	• Expansion and 'intensification' of RCE Kitakyushu through networking with other RCEs, both local and international
RCE Okayama	• Increased networking through the RCE Service Centre in UNU-IAS
RCE Tongyeong	• Youth formed networks with the youth of other RCEs
RCE Cha-am	• Networking of the various organisations/groups coming to SIEP • Establishing good governance
RCE Penang	• Expansion of networking with other organisations and initiatives in the region
RCE Phnom Pehn	• Networking existed in the Sro Nge cluster of schools

TABLE 11 (L): THE MAIN OUTCOMES AND ACHIEVEMENTS: WIDER COMMUNITY OF PRACTICE

RCE Beijing	• Teachers acting as agents of social learning by embedding knowledge, skills and values in the larger community through students/parents
RCE Kitakyushu	• Development of capacity of members through exchanges within and beyond the RCE community
RCE Tongyeong	• Students/youth reported back their work to the local society and furthermore, work served as basis for training teachers and parents
RCE Phnom Pehn	• Teachers extended their acquired skills on food, agriculture and environmental education to the Sro Nge cluster of schools
RCE Penang	• Increased popularity of the project due to reception of invitations to other parts of the region
RCE Yogyakarta	• Trainees acting as agents of change in the communities/regions regarding sustainable agriculture

TABLE 11 (M): THE MAIN OUTCOMES AND ACHIEVEMENTS: NEW VISIONS FOR THE FUTURE

RCE Beijing	• Readiness to change lifestyle, e.g. energy use
RCE Chubu	• Input of pluralistic views on biodiversity leading to broadening of perspectives of the participants
RCE Tongyeong	• Fusion of culture by introduction of exotic dishes to school canteens and community • Change of world-view of students after such overseas visits including appreciation of cultural relativism
RCE Cha-am	• The Sufficiency Economy Philosophy help change one's world -view
RCE Yogyakarta	• Change of mind set of participants who go on to serve as change agents in their respective communities

TABLE 11 (N): THE MAIN OUTCOMES AND ACHIEVEMENTS: INCREASED SUPPORT

RCE Kitakyushu	• Increased budget to promote ESD by the city government
RCE Okayama	• Expert/university staff support • Support from city government
RCE Tongyeong	• Financial and policy support from the local government • Support from the RCE partner organisations and global RCE network
RCE Bohol	• Availability of experts and other human and material resources
RCE Penang	• The financial and management support received from USM Centre for Global Sustainability Studies ensured the availability of materials and human resources to implement the activities.

TABLE 11 (O). THE MAIN OUTCOMES AND ACHIEVEMENTS: CAPACITY BUILDING

RCE Beijing	• ESD training for teachers to be able to improve their teaching methods and for themselves
RCE Chubu	• Increase capacity building through input of expert knowledge in cyber dialogue
RCE Kitakyushu	• Development of capacity of RCE members by starting new groups or initiatives
RCE Okayama	• Sustaining the farmer capacity for future agriculture through farm visits • Mentoring of primary and secondary school students by university students
RCE Tongyeong	• Independence through self-management and self-responsibility of youth
RCE Bohol	• "Preparation" of human resources to effect societal change through seminars, workshops, training, forums, etc.
RCE Cha-am	• High potential for building capacity of large personnel who visit using SIEP as a resource learning centre
RCE Penang	• Use of different non-formal educational methods to capacity build primary, secondary and university students, residents, SME workers and the public
RCE Phnom Pehn	• Activity promoted sustainable agriculture based on natural resource circulation
RCE Yogyakarta	• Promotion of methods in other regions in Indonesia and abroad

TABLE 11 (P): THE MAIN OUTCOMES AND ACHIEVEMENTS: OTHER (IMPROVED PRACTICES)

RCE Kitakyushu	• Acceleration in stakeholder activities
RCE Okayama	• Establishing a full-time position for ESD coodination
RCE Bohol	• Creating a healthy community and improving the well-being of the people through the activities
RCE Cha-am	• Good governance • Increased biodiversity in SIEP • Green energy use in SIEP • Dissemination of sustainability knowledge • Significant general improvement of the Park
RCE Penang	• Use of multi-disciplinary approach in ESD focused on composting and recycling
RCE Phnom Pehn	• Putting in place mechanisms through meetings for sales of products with low chemical inputs among the stakeholders/partners of the RCE
RCE Yogyakarta	• The method of zero waste agriculture recognized and adopted internationally

TABLE 14 (B): MAJOR STRENGTHS AND ADVANTAGES

	Networking Multi-stakeholder participation and engagement Collaborative partnership	-Self-efficacy -Self-motivation -Promotional activities - Voluntary spirit	Support from -University & Experts -Local government - Business	Other
RCE Beijing	-Teachers networking with fellow teachers in other schools through visits	-Newly trained teachers motivated to integrate ESD in their teaching		-Teachers acting as agents of change
RCE Chubu	-Provision of platform for a cross-sectoral, cross-cultural multi-thematic			-The unveiling of the Appeal of the Citizens of Aichi-Nagoya Document
RCE Kitakyushu	-Networking (strengthening of relationships with other RCEs -Existence of active multi-stakeholders and leaders in the communities	-Spirit of voluntarism -High motivation of RCE members -Support from local government to promote ESD		-Use of the community centre as the nucleus for learning
RCE Okayama	-Multi-stakeholder involvement -Sense of communality -Provision of place for praxis	-Grassroots based ESD promotion	-Support from local government -ESD Coordinator's support for groups and persons -Expert/ University support	-Full-time position of ESD Coordinator -Provision of place for praxis
RCE Tongyeong	-RCE network and dedication of teachers	-Ability of students to self-manage their	-Financial & policy support from the local government -Support from RCE partner orgs and global RCE network	-Understanding from kids' parents and teachers
RCE Bohol	-A strong sense of collaboration and enthusiasm of the members and partner agencies.		-Availability of experts and other human and material resources	
RCE Cha-am		-Sufficiency Economy Philosophy (SEP) -Conservation of energy, natural resources and the environment, several promotional activities and the application of the SEP.		
RCE Penang	-Team work and cooperation given by the multi-stakeholders involved throughout this initiative has enabled the planned activities to be carried out successfully; -Contribution and collaboration from the multi-disciplinary experts; also assisted to improve the pedagogy used in the initiative -Continued interest and participation of all partners throughout the research period and hopefully beyond		-The financial and management support received from USM Centre for Global Sustainability Studies ensured the availability of materials and human resources to implement the activities.	-Construction of a functional four chambers composting system (for garden waste) and a functional two chambers composting system (for food waste from café
RCE Phnom Pehn	-Relatively stronger linkages between sustainable farming and sustainable livelihood through learning.	-High motivation of local farmers to adopt and practice sustainable agriculture based on natural resource circulation-Farmers have benefitted from the activity through learning and are planning to continue the program/system even after the term of the initiative expires due to satisfaction with the experience they gained		- Teachers and students have learned about ESD through sustainable agriculture - Teachers, in particular, and students integrate sustainable agriculture in school curriculum;
RCE Yogyakarta		-The researchers in KP4 also have promoted the success of this program to other regions in Indonesia and overseas.		-International adoption of zero method of agriculture

TABLE 15 (B): PRIMARY WEAKNESS AND CONSTRAINTS

	Financial: -Lack of funding, -Uncertainty of future funding etc.	Lack of capacity -ESD personnel -Technical expertise	Time: -Lack of continuity -Lack of commitment -Narrowness of theme/ focus	Limited networking/collaboration	Other
RCE Beijing	-Financial burden on students	-Inadequate (faculty) trainers to train trainees	-Inflexibility of training period		- ESD seen as an abstract concept
RCE Chubu		-Lack of IT literacy skills -Language barrier		-Limited consensus	
RCE Kitakyushu		-Need to develop theory to support practice in community	-Difficulty in continuity regarding especially the youth -Lack of commitment of faculty	-Limited linkage with the formal education sector	
RCE Okayama		-Low capacity development (in spite of support) -No evaluation process currently	-Scope of ESD core theme too narrow: mainly environmental issues		
RCE Tongyeong	-Lack of long term funding security	- No guarantee for continual availability of experts -Low ESD capacity of personnel	- Time constraint of youth -Lack of understanding from parents & teachers who try to discourage participation		-Possibilities of travel accidents/injuries -Issue of encouraging self-managed activities which are new to most of the young Korean participation
RCE Bohol	-Uncertainty of constant flow of funds.		-Strengthening the coordination of constituent member organizations -Need to instil consistency as some members have not internalized it yet		
RCE Cha-am	-Securing funding and maintaining the collaboration and networking among the member organizations	-Low level of capacity of the personnel and unavailability of manpower			
RCE Penang		-The high level of contamination of the recycling bins on the school premises and university campus during the recycling activities	-Time constraint due to strict time regulation in the formal education sector and hence limited time given and number of students allowed to participate in the activities; -Lukewarm response towards the activities by some community members - The need to reduce dependency of the partners on the research team in the maintenance of the recycling bins and composting systems set up on their premise		
RCE Phnom Pehn		-Further education of consumers who tend to choose low priced inorganic products over organic ones	-The marketing system of the value-added products with organic or low chemical input is not yet established well in Cambodia		
RCE Yogyakarta		-Primary weaknesses include the limited number of resource persons to upscale the method;			The need to upgrade the tools and facilities for training. 1) The language barrier, particularly use of English to targeted people from overseas 2) The need to certify more varieties of paddy

UNITED NATIONS UNIVERSITY
UNU-IAS
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MONITORING AND EVALUATION OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN ASIA-PACIFIC

COLLABORATIVE RESEARCH TO ASSESS THE IMPLEMENTATION OF THE UN DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN ASIA-PACIFIC THROUGH THE DEVELOPMENT OF REGIONAL INDICATORS OF ESD

Reporting Framework for Regional Centres of Expertise on

Good Practice Case Analysis in ESD Implementation & Partnership Collaboration

Dear Colleague,

On behalf of the research team members from the Education for Sustainable Development programme at United Nations University Institute of Advanced Studies (UNU-IAS) and the Governance and Capacity group at the Institute for Global Environmental Strategies (IGES), I would kindly like to express my gratitude for your willingness to cooperate with and participate in the reporting of good practice initiatives in Education for Sustainable Development (ESD). Such good practices as initiated by the RCEs are one of the important features of individual countries' ESD implementation across the region. Your contribution will provide significant input into the development of indicators for ESD to be utilised in the monitoring and evaluation of the implementation of the Decade of Education for Sustainable Development (DESD) in Asia-Pacific, and thus also contribute to formulating what should be the new efforts and initiatives on ESD following the end of the decade and the concluding meeting in Japan in 2014.

Please allow me this opportunity to provide some additional instructions regarding the completion of this reporting framework on good practice initiatives in ESD *(below).* If you have any further questions regarding the completion of the survey, please feel free to contact me directly.

Kind regards,
Dr. Robert J. Didham
Education Policy Specialist
Institute for Global Environmental Strategies

Instructions for Completion of Reporting Framework

The research process on developing ESD indicators is currently in a scoping phase where we are trying to identify the important context, factors and leverage points that commonly lead to successful ESD implementation. The good practice cases by the RCEs will provide one component of this research that will help to identify the strengths and barriers in achieving effective ESD implementation while also bringing an element of real-life story to the reporting of individual countries' status in ESD implementation.

We would like to ask that you ensure that the ESD initiative selected for good practice reporting is one that is being conducted in collaboration between multiple members of the RCE partnership rather than as an initiative of just one RCE member. This is because the benefits that the partnership established by the RCE has brought to the ESD initiative is one of the important aspects that we would like reflected in this report.

The diversity of this survey may require responses from multiple partners involved in this ESD initiative. If possible, the coordination of such a cooperative response would be greatly appreciated. Please provide as much relevant information as available for each question where appropriate.

The following page of this framework asks for general information both on the RCE and the specific ESD initiative selected for reporting. For these questions, please fill in appropriate information in the corresponding boxes. At the bottom of page three, there are two questions regarding the sectors and themes covered by the ESD initiative. Check boxes are provided for your convenience – to fill these boxes in, please double (left) click on them; this will activate a pop up window, change the default value to *checked* and press *OK*. Following this, pages 4-7 ask for written descriptions about different aspects of the good practice initiative. Please provide around half a page (250-300 words) per question.

The reporting framework has been provided to you as both a Word 97 (DOC) in an unlocked format, so please select the appropriate boxes where to add your text. Please save the completed report in the same file type with the name of the RCE and the date in the file name. If you have any questions or problems, please feel free to contact me.

I would like to remind you again to please kindly submit your case study by Friday, 30 March 2012.

Thank you again for your valuable cooperation!

Background Information on the Regional Center of Expertise

Name of RCE:	
Name of main reporter/author:	

RCE's Date of Establishment:	

RCE Member Organisations/Members:	
RCE Partners and Supporters:	

What are the current on-going Educational/ESD projects of the RCE? *(please identify all current projects)*

Background Information on the selected Exemplar Case Study

Title of selected ESD Initiative for case study:	

Starting Year & Duration of Initiative:	

Major Members/ Partners of initiative:	

Amount of Budget and Funding Sources:	

Who are the target learners in this initiative?	

Which sectors are the initiative active in?

(check all that apply – to check box, double (left) click on box and change default value to checked, then press ok)

Formal Education:

☐ Early childhood
☐ Primary education
☐ Secondary education
☐ Teacher education
☐ Higher / Further education
☐ Non-Formal education
☐ Civil Society & Community engagement
☐ Business & Private Sector

☐ Other *(please specify)*

Which of the ESD themes are addressed by the initiative? *(check all that apply – see above for instructions)*

☐ Overcoming poverty
☐ Gender equality
☐ Health promotion
☐ HIV and AIDS
☐ Ethics
☐ Intercultural understanding
☐ Cultural diversity
☐ Citizenship
☐ Peace, human rights and security
☐ Environment
☐ Climate change education
☐ Water
☐ Biodiversity
☐ Natural resource management
☐ Disaster reduction education
☐ Democracy
☐ Governance
☐ Justice
☐ Corporate responsibility
☐ Economy
☐ Sustainable production and consumption
☐ Sustainable urbanization
☐ Sustainable tourism
☐ Rural development
☐ Responsibility in local and global contexts

☐ Other *(please specify)*

Written Description of ESD Initiative (one-half page per question):

What are the major objectives, focus and activities of this ESD initiative?

What are the main benefits that the multi-stakeholder partnership established by the RCE have provided to the implementation of this initiative?

What are the learning methodologies, approaches, and strategies that have been applied to this ESD initiative?

Regarding the three pillars of sustainable development (environmental, social and economic), please describe how this ESD initiative has worked to address each of these pillars.

Please describe the main learning objectives of this initiative, based on the division of: 1) knowledge-based learning, 2) skill-based learning, and 3) value-based learning?

What are the main outcomes and achievements of this initiative? Specifically, what have been the major impacts in regards to 1) achieving ESD learning, and 2) the promotion of sustainable development?

What are the major strengths and advantages of this ESD initiative? **What have been the primary success factors in its implementation?**

What are the primary weaknesses and constraints experienced during this ESD initiative? Also, what were the primary challenges and barriers that had to be overcome to achieve success in this initiative?

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