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Mobilising for Education for Sustainable Development: Towards a Global Learning Space based on Regional Centres of Expertise

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The cover design is based on the Green Ribbon, the global symbol of Education for Sustainable Development (ESD). ESD envisions a world where everybody has the chance to benefit from quality education and to learn the lifestyles, behaviours and values necessary to build a sustainable future. The United Nations has designated 2005-2014 as the Decade of Education for Sustainable Development (DESD).

**Mobilising for Education for Sustainable Development :
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Regional Centres of Expertise**

Foreword

The importance of Education for Sustainable Development (ESD) was emphasised by many international fora and reflected in key documents. In 1992, the Earth Summit has recognised the critical role of education in achieving a sustainable future. Chapter 36 of Agenda 21 specifically addresses reorienting education towards sustainable development, and encompasses all streams of education, both formal and non-formal, basic education and all the key issues related to education for sustainable development.

In December 2002, the 57th Session of the United Nations General Assembly adopted a resolution to launch the Decade of Education for Sustainable Development (DESD) from January 2005, following the Johannesburg Plan of Implementation. UNESCO became the lead agency for the Decade which, as one of the first steps developed a draft International Implementation Scheme for DESD.

As a response to the challenges of ESD and DESD, the United Nations University-Institute of Advanced Studies (UNU-IAS) initiated a new programme on Education for Sustainable Development (EfSD) in 2003. Through our activities in six programme areas, we aspire to facilitate actions leading to the fulfilment of the objectives of DESD. EfSD programme has a two-step approach—first, to provide intellectual and conceptual reflections on challenges of ESD and second, to assist in actual implementation of the ESD initiatives. Our six programme areas are 1) advocacy and awareness raising about ESD, 2) promotion of Regional Centres of Expertise on Education for Sustainable Development (RCEs), 3) development of ESD curricula and learning materials, 4) support of Resource Project of the Global Higher Education for Sustainability Partnership (GHESP), 5) promotion of distance on-line learning through ICT; and 6) training the trainers.

Among the six areas, promotion and support of RCEs takes a particular importance. An RCE is a group of organizations which deliver ESD to a local community. Our efforts are directed to the development of the concept, assisting the pioneering initiatives as well as critically examining how an RCE translates and articulates a global vision of ESD into the context of the local community in which it operates.

This report introduces the main goals, aspirations and concepts behind ESD and RCEs as a strategy for bringing ESD to the regional/local level. It also presents the first three initiatives of implementing the RCE concept. These three RCEs in Japan, Canada and Europe provide the readers with ideas about a variety of challenges faced by the regional/local actors as well as strategies for achieving desirable goals.

Mobilising for ESD through RCEs is on-going in various parts of the world including different parts of Asia and Pacific, Africa, America and Europe. Collaboration with these up-coming RCEs is our commitment. For example, we are happy to be the centre for RCEs promotion. Lessons from up-coming RCEs and collaboration among them will constitute the content of our future publications. While communicating achievements of RCEs, these envisioned reports have another, very significant function. The process of preparation of such reports serves as an interactive ground for contributing authors working with and inside RCEs. Such process will promote development of networking among RCEs and, thus, will contribute to the development of the Global Learning Space for Sustainable Development.

A H Zakri
Director, UNU-IAS
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List of Abbreviations and Acronyms

CBO	Community-based organisations
DESD	Decade of Education for Sustainable Development
EE	Environmental Education
EFA	Education for ALL
ESD	Education for Sustainable Development
GSCESD	Global Service Centre to promote Education for Sustainable Development
GHESP	Global Higher Education for Sustainability Partnership
GLSSD	Global Learning Space for Sustainable Development
GVU	Global Virtual University
GUNI	Global University Network for Innovation
ICT	Information and Communication Technology
IHE	Institution of Higher Education
K-U	Kindergarten through University
MEXT	Ministry of Education, Culture, Sports, Science and Technology, Japan
NGO	Non-Governmental Organisation
RCE	Regional Centre of Expertise on Education for Sustainable Development
SD	Sustainable Development
SME	Small and Medium Size Enterprise
ULSF	Association of University Leaders for a Sustainable Future
UN	United Nations
UNDP	United Nations Development Programme
UNU	United Nations University
UNU-IAS	United Nations University – Institute for Advanced Studies
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNESCO-ACEID	UNESCO Asia-Pacific Centre of Educational Innovation for Development
UNESCO-APEID	UNESCO Asia-Pacific Programme of Educational Innovation for Development
WSSD	World Summit on Sustainable Development

Preface - Mobilising for Sustainable Development

We are living in a time of profound change in an increasingly interlinked world. The rapid development of improved systems of communication and transport has changed our world from a complex and sometimes chaotic blanket of territories and borders to an organised system of nodes and channels. The frequency and volume of the exchange of goods and the mobility of people, money and ideas have created a situation in which no one can allow him or herself, anymore, to live in isolation. Our world is becoming ever more globalised and knowledge-based. Our society is getting more complex and heterogeneous, consisting of individuals characterized by intriguing sets of multiple identities. Together we are set on an unsustainable course, using so much of our planet's natural resources, that the future of younger generations is jeopardised.

These changes are for both better and worse. When international terrorism can strike from a great distance, good can also be done from far away. Together, we can make the choice to contribute to a better life and a safer world for all now, and for our grandchildren and their children. When we live in an affluent society, we cannot ignore poverty, either in our own or in poverty-stricken countries. We can no longer ignore the inter-linkages between globalisation, trade, poverty, development and the environment. That is what sustainable development is all about: to understand the whole complex reality and to act in adequate, informed ways. That is where education can help. Education for Sustainable Development (ESD) aspires to make people aware of our individual responsibilities to contribute, to make responsible choices, to respect other people, Nature and diversity.

Since the UN Conference on Environment and Development – the "Earth Summit" held in 1992 in Rio de Janeiro, sustainable development has been high on the political agenda. However, the role of education was not well articulated and education was not defined as one of the stakeholder groups. During the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002, various initiatives were launched to strengthen the role of ESD, including the Global Higher Education for Sustainability Partnership (GHESP)¹ and the Global Virtual University (GVU)². GHESP was, in fact, formed in 2000 as a follow up to the thematic debate on "Higher Education and Sustainable Development" at UNESCO's World Conference on Higher Education (Ginkel, 1998). The Japanese and Swedish governments have identified ESD as a spearhead for their contributions to the actions following the WSSD, Johannesburg. Their proposal to the United Nations General Assembly, at its 57th Session, led to the adoption of the resolution to start the Decade of Education for Sustainable Development (DESD) from January 2005, following the Johannesburg Plan of Implementation. UNESCO was appointed to be the lead agency for DESD.

During WSSD in Johannesburg in 2002, eleven of the foremost educational and scientific organisations in the world signed the Ubuntu Declaration³ with a goal to strengthen collaboration between science and technology researchers and educators, to better integrate science and technology into educational programmes for sustainable development, for all subjects and at all levels, and to strengthen cooperation between formal, non-formal and informal education. The signatories of the Ubuntu Declaration⁴ have worked closely with UNESCO to promote DESD, and have contributed to the draft framework of the International Implementation Scheme for DESD.

ESD is seen as not just environmental education nor even sustainable development education, but "education for sustainable development". ESD covers not only environment and natural resources management but much broader topics such as poverty alleviation, gender, peace and dispute settlement, inter-cultural understanding, democracy, etc. It is not a topic that can be taught in a few weeks just at a certain age. Its aim is to teach ESD across all stages of education, integrating it into existing curricula. In this way "education for sustainable development" gives orientation and meaning to "education for all" (EfA). EfA and ESD are two sides of the same coin. While EfA focuses on access to education, ESD refers to a particular quality of it. ESD requires education that will prepare learners to identify issues critical for their lives and lives of their fellow citizens and to act upon these issues.

To develop and regularly update needed curricula and courseware as well as to inform teacher training and re-training in effective ways, the Ubuntu Declaration Group aims at an inclusive and flexible process, mobilising all who have something to contribute in primary, secondary and tertiary (including higher) education. Specific attention will be given to online learning and contributions of the media and, in general, institutions providing non-formal education. The Johannesburg Plan of Implementation will give guidance with regards to the focal issues, such as water, energy, health, agriculture and biodiversity (WEHAB) and of course the Millennium Development Goals⁵. The Earth Charter⁶ provides important perspectives and concepts to build upon while constructing curricula and training teachers. GHESP has been promoting a Resource Project on Reorienting Higher Education toward Sustainability to provide high quality resources and specific tools to individuals seeking to reorient higher education toward sustainable development. This will increasingly provide good teaching materials to introduce core concepts, to sharpen insight and overall improve knowledge with regards to sustainability and development.

The process of the year and decade for ESD must be inclusive and flexible, the framework challenging and enabling, not limiting and harnessing. Regional Centres of Expertise on ESD (RCEs) could mobilise many and serve to give focus to their contributions in creating, jointly, a global learning space for sustainability.

In the context of RCE these regions are seen as parts of countries like Bretagne, Tohoku or Catalonia. RCEs should include institutions of primary, secondary and tertiary, including higher education, research institutions, (science) museums, zoos, botanical gardens and other institutions of non-formal education. As it is important to mobilise many, initially, prizes could be awarded for innovative, joint projects of two or more institutions from different sectors. RCEs might be identified in a comparable way to the monuments on the cultural heritage list. This would have the advantage that local/regional conditions can be fully taken into account. The Decade would in this way have as a visible output a global network of such RCEs. In the process, it would be possible to mobilise many, learn from their creative ideas, build on diversity and promote international co-operation in ESD. RCEs together and their mutual relations would form the Global Learning Space for Sustainable Development—the major outcome of DESD.

The UNU and its partners in the Ubuntu Alliance will work hard to make this dream reality. This publication gives an overview of the concepts and views that form the bases of our contributions to DESD, as well as a birds' eye view of our activities, so far. It would be an honour for us to welcome you to our mobilising programme to develop, around the World, Regional Centres of Expertise on Education for Sustainable Development (RCEs).

Hans van Ginkel
Rector, UNU
May 2005

¹ GHESP is a consortium of four partners - the International Association of Universities, the Association of University Leaders for a Sustainable Future (a North American university network), the Copernicus-Campus (a European university network), and UNESCO. The UNU Centre and the UNU Institute of Advanced Studies are promoting the GHESP Resource Project as special collaborators. GHESP was officially established in 2000 and acknowledged as a Type II Partnership in Johannesburg in 2002. See <http://www.unesco.org/iau/sd/sd_ghesp.html> for further information.

² The agreement establishing the Global Virtual University was signed in Johannesburg in 2002. The GVU, however, is not an official Type II Partnership. See <<http://www.gvu.unu.edu> for further information>.

³ Additional information about the Ubuntu declaration can be found in the Appendix A.

⁴ Signatories to the Ubuntu Declaration are:

- United Nations University
- United Nations Educational, Scientific and Cultural Organisation
- International Association of Universities
- Third World Academy of Sciences
- African Academy of Science
- Science Council of Asia
- International Council for Science
- World Federation of Engineering Organisations
- Copernicus-Campus
- Global Higher Education for Sustainability Partnership
- Association of University Leaders for a Sustainable Future

⁵ See <<http://www.un.org/millenniumgoals/>>.

⁶ See <<http://www.earthcharter.org>>.

Introduction

This report is compiled from various materials produced over a period of several months by the United Nations University (UNU) and by representatives of various organizations working closely with the UNU. These materials are concept papers, case studies, conference papers and speeches. These different documents were brought together to:

- a) convey the challenges of education for sustainable development (ESD) and ambitions of the UN Decade of Education for Sustainable Development (DESD),
- b) highlight the roles of various actors, in particular institutions of higher education, in implementing ESD,
- c) present the concept of Regional Centre of Expertise on ESD (RCE) and demonstrate examples of putting this concept into practice in various regions of the world.

Differences in the sources of the materials might explain the difference in style of this report. We hope, however, that it would not prevent understanding of the main messages. The book, that is to follow this report, will provide more comprehensive and substantiated elaborations of some of the key concepts as well as more lessons learnt from unfolding RCE experiences.

This report consists of two parts. Part One brings in concepts relevant for understanding ESD, discusses the role of important actors, higher education institutions in particular, and introduces RCE as an important mechanism of ESD implementation. Part Two presents three cases of RCE-building initiatives in Japan, Europe and Canada.

Education serves as a powerful tool for moving nations, communities, and households toward a more sustainable future; therefore, the General Assembly of the United Nations adopted a resolution, declaring 2005-2014 to be the UN DESD. The first chapter of the Part One reflects on the central position that education occupies in preparing people for their future in a globalised world introducing the history of mobilising for ESD leading to the declaration of DESD. The chapter describes issues and challenges associated with ESD and emphasises the relevance of ESD for all people and organisations, in economically developed and developing countries. ESD is needed around the world to address difficult sustainability issues such as more sustainable production and consumption patterns and under-education of hard-to-serve populations.

The first chapter introduces four major thrusts of ESD: (1) improve access to quality education, (2) reorient existing education to address sustainable development, (3) develop public understanding and awareness, and (4) provide training programmes for all sectors of society.

ESD builds the capacity of nations to create, broaden, and implement, sustainability plans. ESD improves sustainable economic growth by improving the quality and skills of the workforce while addressing the overarching need for environmental integrity and social justice. ESD also aspires to create an informed public that can support enlightened environmental, social, and economic policy and legislation and raises the quality of life for all members of society.

The second chapter of the Part One describes challenges faced by institutions of higher education (IHEs) in a globalised world. Universities, like international businesses, would need to teach skills essential for sustainable development while, in many instances, become larger, stronger, and reach over greater distances. The second chapter builds on the elaborations of needs and challenges for sustainable development introduced in the first chapter. The chapter invites IHEs to think about new ways to respond so that future graduates and other beneficiaries of IHEs can deal with sustainable development issues in their careers and lives. Higher education plays a vital role, not only in shaping the future by educating the professionals of tomorrow, but by creating a research base for sustainability efforts, and providing outreach and service to communities and nations. Emerging challenges such as globalisation call for graduates of higher education to understand and address issues inherent in the quest for a sustainable future. The chapter also reports on the way UNESCO and related IHEs and networks are mobilising to strengthen the role of education for sustainable development.

To promote ESD as a newly emerging strategic initiative, the UNU proposes to create RCEs, to develop innovative ways of collaborating among IHEs, primary and secondary educational systems, local governments, and other regional stakeholders. The third chapter presents the concept of RCEs. RCEs will assist with the vertical alignment of curriculum from primary through university and with linking formal and non-formal sectors of the education community. This alignment and linkage is essential to the success of a coherent and ambitious ESD programme for all citizens in the region. IHEs are seen as one of the central actors to the development of an integrated regional approach to ESD, bringing the best of knowledge from the natural sciences, social sciences, and humanities and integrating the knowledge with the best of educational practice of their community and regional partners. Dependent on the local situation, local governments or NGOs might take a lead in RCE facilitation. An active role of universities, however, is critical for the success of any RCE. To facilitate communication

and to enhance the process of learning from each other by working together, RCEs will be linked with a Global Service Centre to promote Education for Sustainable Development (GSCESD) facilitated by the UNU.

Part II of the report presents local initiatives that work on implementation of RCE concept. Three initiatives from Japan, Canada and Europe illustrate variety of sustainability problems and diversity of approaches for solving these problems. The three initiatives are at different stages of maturity and, thus, face different coordination challenges. Four essential elements of RCE's activities are a) management and sustainability of RCE as an organisation, b) collaboration, c) research and development, and d) transformative education. In order to facilitate the reader's recognition of the forms of concept implementation, all chapters on RCE building have sections providing a specific reflection on how these four elements are considered by each of the RCEs.

Chapter Four of the report presents the case of the Greater Sendai Area RCE in Japan. Since the very beginning in February 2004, the process of developing the RCE in the Greater Sendai Area has been about collaborative recognition and redefinition of existing ESD activities in alignment with the principles of ESD. In addition to enhancing collaboration between different levels of formal education and facilitating partnerships between formal and non-formal education sectors, the RCE initiative provides UN recognition for local contributions to ESD, thereby legitimating and coordinating disjointed grassroots activities into a concerted endeavour to achieve sustainable society. Being the most mature initiative, the case of the Greater Sendai Area RCE shows concrete ways of collaborating to promote ESD in the regional (sub-national) context and highlights challenges associated with this process for the purpose of informing budding efforts to create RCEs elsewhere.

Chapter Five is dedicated to the efforts to establish an RCE in the largest metropolitan area in Canada – Toronto. Toronto has been a recognized leader in sustainable development programme at many levels – from global, e.g. one of first parts of the country to ratify Kyoto Accord, to local. The RCE will work with learning processes for sustainable development in a face of a formidable challenge of rapid population growth in the Greater Toronto Area. The population of this area will grow by more than three million over the next thirty years. The case of Toronto summarises innovative actions in ESD in the area and processes of developing an RCE under the leadership of Toronto Zoo and the city of Toronto.

Based on the concept of RCE, Framework of UN DESD and European policies for sustainable development, an RCE initiative was established in Rhine-Meuse region. The region stretches across several countries, i.e. The Netherlands, Germany and Belgium, and contains more than twenty different universities, several multinationals, a large number of small and medium-size enterprises (SMEs) and regional governments. The Rhine-Meuse+ RCE, with plus added to indicate somewhat larger territory than officially considered, aspires to function as a broker for knowledge transfer and as a meeting point for decision- and policy-makers in the region. Activities of RCE building go hand-in-hand with activities of developing European Learning Space for ESD by encouraging RCE implementation in other European countries.

The concluding Chapter Seven of the report presents initial observations from implementation of RCE initiatives and indicates conceptual and practical challenges that are important for success of ESD at all levels.

Part 1.

**Education for Sustainable Development :
Concepts, Roles and Mechanisms of Implementation**

Chapter 1 Mobilising for Education and Sustainable Development

By Charles Hopkins and Rosalyn McKeown

1.1 The Need for ESD Everywhere

As ESD is implemented in locally relevant and culturally appropriate manners, ESD will take various forms. Some countries see ESD as a strategy combating unsustainable consumption patterns while others see it as addressing issues of illiteracy and rapid population growth, which keeps large segments of the population in poverty. Often, we are more concerned of the issues of "others" and not those of our own societies. As a result, too many institutions of higher education (IHEs) in the North are not reorienting their curricula to address sustainability or involving their campuses in sustainability-related reforms. These institutions, particularly in the United States, see ESD as an issue for developing countries only. These Northern institutions are ignoring a powerful tool—ESD—that could address important national issues and could lead institutions, nations, and communities to a more sustainable future. For example, the rapid consumption of the Earth's resources and energy is a well-known issue of the North—about one-fifth of the world's population consumes approximately two-thirds of the world's energy and raw materials. This inequity can be addressed through ESD. Northern citizens should become knowledgeable consumers. They should become aware that through both their daily and major purchases they can support sustainable products and boycott unsustainable merchandise. They must see beyond the "green wash"—public-relations efforts that highlight the more environmentally responsible corporate activities and ignore or hide the major activities that are not. In much of today's world, people are surrounded by such media as television, radio, newspapers, and magazines as well as advertisements on billboards, banners on World Wide Web sites, and logos on clothing. To combat all the hype, people must become media literate and able to analyse the messages of corporate advertisers. ESD targets this societal need. With the world's advertising and promotion budget set at approximately one-half trillion US dollars, the need for media literacy is immense.

A much lesser known problem is the under-education of both youth and adults. Too many students opt-out as soon as they become legally of age (i.e., 16 or 18 years of age). Others mentally drop out, attending classes but not mentally engaging in their education. For many of these youth, education seems purposeless and irrelevant to the jobs and lives they desire to lead. An appropriately reoriented education will give these undereducated students the knowledge, skills, values, and perspectives they need to enter the workforce, to have sustainable livelihoods, and lead sustainable lives.

Undereducated citizens populate every country. Some 800 million adults in the world cannot read and 100 million children ages 6 through 11 have never attended school—90 per cent of whom live in developing nations (UNESCO, 2003, p.49, 241). International programmes, such as Education for All, the Millennium Development Goals, and the United Nations Literacy Decade, address these large issues. However, under-education strikes even deeper and is not relegated to developing countries. For example, about a third of Montreal's teenage boys drop out of high school before graduating (Ferguson, 2004). They dream of lives as musicians, athletes, and disk jockeys. Most end up unemployed, in criminal activity, or in minimum wage jobs. They do not have the skills to change their livelihoods as the economy changes. The problem of under-education of males also exists in some Caribbean nations where the attrition rate for males is much higher than that of females (Down, 2004; UNESCO, 1998, p. 139). Ironically, this is a reversal of the concerns for gender discrimination in education. For centuries and in most regions of the world, girls lagged behind boys in educational attainment.

Unfortunately, millions of people are undereducated in countries around the world in both the North and the South. Myriads of local solutions exist. ESD with appropriate pedagogy, curriculum, and teacher training has much to offer to make curriculum relevant to the daily lives of the students.

Every educational system faces the problem of undereducation. One has to deal with the questions - "How could my institution help with the undereducation issue?", "How can my institution help retain students in the educational system?" and "How can my institution create alternative visions for youth that make college life and the careers it leads to attractive?"

Societal expectation has evolved that public schools must educate all children. A generation ago, many students left formal education before graduating from high school. They entered the economy often taking jobs that did not require in-depth reading, writing, or mathematical skills. However, now there are fewer jobs for people with less than a high school diploma so these students stay in school. Compared to the majority of students, this hard-to-serve group does not reap the benefits of traditional classrooms. Many of these students have preferred learning styles other than reading, which makes learning from textbooks difficult. While vocational programmes give many youth marketable skills, few schools, especially small

schools, can offer a variety of vocational programmes. Also, social issues such as poverty, drug use, alcohol misuse, physical and mental abuse, and divorce encroach on the schools. Teachers take on social work tasks in addition to teaching. Students often are distracted by family problems and cannot concentrate during classes or do homework in after school hours. Having been classroom teachers ourselves, we are convinced that reorienting education to address social ills would be a great step forward rather than ignoring them as is the case with current curriculum.

For example, a second year high school student grades plummeted when her mother started doing drugs. She was preoccupied when she found illegal drugs in her mother's purse and her mother lied to all of the relatives that her daughter was good for nothing to cover her own mistakes. This teenager would have really benefited from a class on illegal drugs and society. She would then know that her mother's dishonest behaviour was typical of people on drugs and that drugs make people lie. With this knowledge, perhaps, the student would have been less preoccupied with worry.

ESD approaches with a community-school tie offer hope for schools that struggle with social issues that spill from the community in the school and curriculum that seems irrelevant to life in the new millennium.

1.2 Goals of ESD

ESD was first described by Chapter 36 of Agenda 21. This chapter identified four major thrusts to begin the work of ESD: (1) improve access to quality basic education, (2) reorient existing education to address sustainable development, (3) develop public understanding and awareness, and (4) provide training programmes for all sectors of private and civil society. These four became major components for DESD (UNESCO, 2004).

As you read the descriptions of four thrusts of ESD as well as challenges of ESD in capacity building for the society including adult and gender education, ask yourself:

- Does this major issue face my community or nation either now or in the foreseeable future?
- Does my institution have the expertise to address one or more aspects of this issue? Is this something my institution could address by reorienting the curriculum?
- Is this something my institution could address with research?
- Is this something my institution could address through service?
- Could my institution partner with another institution or stakeholder to ameliorate the situation or provide part of the solution?
- What strategies could my institution use to address this issue internally or externally?

1.2.1 Quality Basic Education

The first priority of ESD is improving access to quality basic education. Basic education is not only essential for improving the workforce and public participation in civil society, but it is central to a more sustainable future. The meaning of a quality education is being redefined in societies undergoing profound social, economic, and environmental change. A quality basic education must also address environmental stewardship and social knowledge and skills. A quality education also includes local and global perspectives as the world becomes more interconnected through globalisation.

Old notions of quality are no longer enough. . . . there are many common elements in the pursuit of a quality education, which should equip all people, women and men, to be fully participating members of their own communities and also citizens of the world. (Ministerial Round Table on Quality Education, 2003, p.1)

The content and years of basic education differ greatly around the world. In some countries, for instance, primary school is considered basic education. In others eight or 12 years is mandatory. In many countries, basic education focuses on reading, writing, and arithmetic. Pupils learn to read a newspaper, write letters, figure accounts, and develop skills necessary to fulfil household and community obligations. Girls, for example, may learn about nutrition and nursing. Pupils also learn how their governments function and about the world beyond their communities.

In many countries, the current level of basic education is too low and the quality so lacking that it severely hinders national plans for a sustainable future. In Latin America and the Caribbean, many countries have six to eight years of compulsory education with approximately 5 to 15 per cent of students repeating one or more years (UNESCO, 2003, p. 338). In parts of Asia, especially Bangladesh, Pakistan, and India, many children attend school for an average of five years. A complicating factor in this region is that many girls receive fewer years of schooling to create that average (Heyn, Lythgoe,

Myers, 1997). In parts of Africa, where life is disturbed by drought or war, the average attendance in public education is measured in months, not years (UNESCO, 2003, p. 181). Unfortunately, the lowest quality of education is often found in the poorest regions or communities. The impact of little and/or poor-quality education severely limits the options available to nations trying to develop short- and long-term sustainability plans.

Simply increasing basic literacy, as it is currently taught in most countries, will not produce sustainable societies. Indeed, if communities and nations hope to identify and work toward sustainability goals, they must focus on skills, values, and perspectives that encourage and support public participation and community decision making. Basic education must be reoriented to address all three sphere of sustainability—environment, society, and economy—and expanded to include critical-thinking skills, skills to organise and interpret data and information, skills to formulate questions, and the ability to analyse issues that confront communities.

1.2.2 Reorienting Education

The term "reorienting education" has become a powerful descriptor that helps administrators and educators at every level (i.e., nursery school through university) to understand the changes required for ESD. ESD encompasses a vision that integrates environment, economy, and society. Reorienting education requires teaching and learning knowledge, principles, skills, perspectives, and values that will guide and motivate people to pursue sustainable livelihoods, to participate in a democratic society, and to live in a sustainable manner.

In reorienting education to address sustainability, curriculum developers should balance looking forward to a more sustainable society with looking back to traditional ecological knowledge. Indigenous traditions often carry with them the values and practices that embody sustainable resource use. While returning to indigenous lifestyles is not an option for the millions of urban dwellers, the values and major tenets of indigenous traditions can be adapted to life in the 21st century.

One of the great challenges that lay ahead for those who reorient education to address sustainability is to emphasise attitudes and values that support sustainability. Professionals who work in many fields—environmental resource management, secondary education, public health policy—all mention that if the public "had a different attitude" they would act in more responsible ways. One African environmental officer attending a natural resource management class in Germany, described how people left their water taps open, wasting this valuable resource; he was amazed that poor people who had so little could squander a readily available resource. His observation brings us to the issue of a reoriented curriculum placing more emphasis on the behaviour component of education. At one time, educators thought awareness and knowledge alone would lead to appropriate behaviour, but research in environmental education shows this not to be so. Students need a chance to develop skills and attitudes and to have the opportunity to participate in meaningful ways that lead to the well-being of their environment and community (Hungerford and Volk, 1998).

1.2.3 Public Awareness

Sustainability requires a population that is aware of the goals of a sustainable society and has the knowledge and skills to contribute to those goals. The need for an informed voting citizenry becomes ever more important with the increase in the number of democratic governments. Informed voting citizens, who lend support to enlightened policies and government initiatives, can help governments enact sustainable measures.

Years of resource management have shown that a public that is aware of and informed about resource-management decisions and initiatives can help achieve programme goals. In contrast, an uninformed public can undermine resource-management programmes. Education has also been essential in many other types of programmes, such as public-health efforts to stop the spread of specific diseases (e.g., education about immunisation combined with immunisation have reduced the worldwide incidence of polio). Effective public awareness programmes when combined with realistic options for alternative action also change behaviours and lifestyle choices.

1.2.4 Training

Agenda 21 also stressed training. A literate and environmentally aware citizenry and work force will help and guide nations as they implement sustainability plans. All sectors—including business, industry, higher education, governments, nongovernmental organizations, and community organisations—should be encouraged to train their leaders in environmental management, equity policies, etc. and to provide training to their workers in sustainable practices.

Training is distinct from education in that training is often specific to a particular job or class of jobs. Training informs workers how to use equipment safely, be more efficient, and comply with environmental, health, and safety regulations. For instance, a training programme might teach workers to avoid changing the waste stream without notifying their supervisor. Further, if an employee is involved in a non-routine activity, such as cleaning a new piece of equipment, the employee is instructed not to dispose of the cleaning solvent by pouring it down a storm sewer drain that leads to the river.

Training informs people of accepted practices and procedures and gives them skills to perform specific tasks. In contrast, education is a socially transforming process that gives people knowledge, skills, perspectives, and values through which they can participate in and contribute to their own well-being and that of their communities and nations. Training can be instrumental in achieving sustainability goals. For example, qualified water professionals are needed in Africa, Asia, and Latin America to support the Millennium Development Goals efforts in potable water and sanitation. Vast numbers of professionals are needed to deliver water education/training programmes related to new water and sewage systems. Lack of training of the people who receive the new services threatens to undermine the progress in developing the physical infrastructure.

1.3 ESD : Building Capacity in Civil Society

Education directly affects the capacity of a society to create, support, and implement sustainability plans in the following five areas: development and support of national workforce matching development ambitions of a country, environmental stewardship, support of community-based decision making, development of social tolerance, and improving quality of life.

Workforce. A national sustainability plan can be enhanced or limited by the level of education attained by the nation's citizens. Nations with high illiteracy rates and unskilled workforces have fewer development options. For the most part, these nations are forced to buy energy and manufactured goods on the international market with hard currency. To acquire hard currency, these countries need international trade; usually this leads to exploitation of natural resources or conversion of lands from self-sufficient family-based farming to cash-crop agriculture. An educated workforce is key to moving beyond an extractive and agricultural economy.

Workforce supply and demands are often mismatched. In countries like Botswana, although the unemployment rate is high—over 20 per cent—industries import technically skilled labour because the current workforce lacks workers with specific skills (Tema, 2004; UNDP, 2004, pp. 19-20). This story repeats around the world when the workplace demands do not match the skills of the workforce. Unfortunately, this sad situation also hurts national economies. Many immigrant labourers send a portion of their wages home to their families in neighbouring countries, thus taking money out of the local and national economies.

The United Nations Development Programme (UNDP) advises, "The level of education matters, and the skills of employees need to be continually upgraded through on-the-job training to increase the firm's productivity and its ability to absorb new technology" (UNDP, 2004, p.19). Life-long learning opportunities, which allow workers to develop new skills and have life-long employment, is part of the ESD vision.

Sidebar—Brain Drain

"Technological innovations and the shift towards knowledge-based economies make human capital investment a prerequisite for sustained economic growth and central to the start-up, growth and productivity of firms. Many developing countries suffer from low levels of human capital investment, aggravated by the outward migration of highly skilled professionals. The cumulative "brain drain" since 1990 has been estimated at 15% for Central America, 6% for Africa, 5% for Asia and 3% for South America. The International Organisation for Migration estimates that some 300,000 professionals from the African continent live and work in Europe and North America." (UNDP, 2004, p.19)

The outward migration of educated and skilled professionals illustrates that education alone will not solve economic problems or sustainability problems. All sectors must work together in concert to achieve sustainability goals.

Environmental Stewardship. Although ESD focuses upon the interaction and interdependence of environment, society, and economy, the primary need for a healthy environment requires special attention. A healthy society and a sustainable economy depend upon environmental stewardship of water, air, and land that support the community. Developing the knowledge, skills, and the willingness to act as stewards of the environment is an essential element of ESD. Using resources in quantities and ways that leave sufficient for neighbours and the next generation is at the heart of sustainability. Using safe substitutes for toxic chemicals in the house, garden, or farm puts the individual, the family, and the neighbours at

lesser risk. Reducing and managing the waste stream from homes or businesses and reducing the impact of personal transportation are things that will protect, preserve, and conserve the natural environment for this and future generations. Stewardship also addresses the role that sustainable production and consumption plays in the lives of individuals. A special responsibility comes with having disposable income, which is used to purchase items beyond those that meet the core necessities of life. This responsibility is to reduce our ecological footprints through the choices we make in spending disposable income. Learning that even small actions will lessen human impacts on the environment and improve our surroundings and quality of life are central to ESD. Small daily acts of conservation may seem unimportant, but they are like drops in the proverbial bucket—over time they will make a huge difference. All sectors of the education community can contribute greatly to environmental stewardship.

Community-Based Decision Making. Good community-based decisions—which affect social, economic, and environmental well-being—also depend on educated citizens. Development options, especially "greener" development options, expand as education increases. For example, a community with an abundance of skilled labour and technically trained people can persuade a "cleaner" corporation with higher paying jobs to locate a new development nearby. Citizens can also act to protect their communities by analysing reports and data that address community issues thereby preparing themselves to shape a community response.

Social Tolerance. Modern sustainable societies are based on human rights and characterized by social equity and tolerance of people whose ethnicity, language, culture, religion, race or traditions are different than one's own. Unfortunately, throughout history such differences led to suspicion and separation, which often led to hatred and violence. In a culture of peace, using violence in times of domestic, civil, national, or international conflict is untenable. War is the antithesis of sustainability. Education has a huge role in developing tolerant and peaceful societies in which democratic citizenship, values, and solidarity are important outcomes.

Ministers of Education at a meeting in Paris emphasised the importance of "Equipping all children with universally shared ethical and moral values in order to enable them to learn and practice these values of empathy, compassion, honesty, integrity, non-violence, respect for diversities thus learning to live together in peace and harmony" (Ministerial Round Table on Quality Education, 2003, p.3). Respect for diversity and learning to live together peacefully is of growing importance as global mobility increases and people of different nations and cultures interact more frequently and live in closer proximity.

Quality of Life. Education can contribute so much more to the individual than preparing them for the workforce. Education is central to improving quality of life. Education raises the economic status of families; improves life conditions, lowers infant mortality, and improves the educational attainment of the next generation, thereby raising the next generation's chances for economic and social well-being. Beyond preparation for the world of work and community life, education also addresses what it is to be human, to question the assumptions behind the predominant world view, and to pursue artistic, philosophical, and other activities for their own intrinsic merit and reward.

1.4 Adult Education

The World Conference on Education for All set the goal of reducing adult illiteracy to half the 1990 level by 2000. Great strides have been made toward this goal in many countries. For example, in Syria, illiteracy (Globalis, 2003) rates for females dropped from about 65 per cent in 1980 to 39 per cent by 2000 according to the UN Common Database. However, in many areas of the world, adult literacy has not increased (International Literacy Institute, 2000). Overall, the literacy problem remains one of the major challenges of this century, especially for women, who compose 60 per cent of the illiterate population (UNESCO, 1998).

For the 800 million illiterate adults in the world, adult education is the one great hope for a better life. For example, literacy and numeracy allow farmers to adapt to new agricultural methods, cope with risk, and respond to market signals. Literacy also helps farmers mix and apply chemicals (e.g., fertilisers and pesticides) according to manufacturers' directions, thereby reducing risks to the environment and human health. A basic education also helps farmers gain title to their land and apply for credit at banks and other lending institutions. For these farmers, education allows a more secure foothold in the economy, greater family security, and more efficacy as members of society. Education enhances the quality of life while improving economic conditions.

Beyond individuals, illiteracy hurts nations in many ways. Illiterate youth and adults have limited employment options. Low wages, partial employment, and unemployment can be disheartening and can lead to social discontent. Large unemployment rates are sometimes associated with discontent and civil and political unrest, threatening social cohesion. Hence, one of the great challenges of governments of rapidly growing populations is to provide jobs for youth as they come of age (Hertsgaard, 1999). Providing jobs for thousands of illiterates is difficult at best. Governments compete to

bring in industries that will employ the populace. Attracting industry with highly paid jobs (e.g., software, electronics assembly, and aircraft industries) requires a highly educated workforce, not illiterate and unskilled workers. The magnitude of the illiteracy problem led the United Nations to declare 2003 to 2012 to be the UN Literacy Decade.

1.5 Gender and Education with Implications for Sustainable Development

One educational effort that can boost the economic potential of entire nations is educating females. During the past decade, some national leaders have recognised that educating the entire workforce, both males and females, is important for economic viability. Accordingly, some nations are removing barriers to girls attending school and have campaigns to actively enrol girls in school.

In the past, educating the boy child was a priority for many societies; however, today's leaders realise that educating girls strengthens our families, communities, societies, economies, and governments. The roots of male-female disparity in education are complex, and the causes vary from society to society. Governmental policies, cultural traditions, familial expectations, and immediate economic pressures thwart the education of girls and women at every level of education. Fortunately, gender inequity in education is amenable to change through public policy. Changes in governmental policy can dramatically increase educational opportunities for females of all ages.

Investment in education, especially for females, yields positive short- and long-term benefits for economies and societies. The connection between increased education of females and declining population growth has been well-documented. Lawrence Summer of the World Bank says, "Once all the benefits are recognised, investments in the education of girls may well be the highest-return investment available in the developing world" (King & Hill, 1993, p.vii).

Education benefits a woman in life-altering ways. An educated woman gains higher status and an enhanced sense of efficacy. She tends to marry later and have more options when approaching marriage. She also has greater bargaining power in the household after marriage. An educated woman tends to desire a smaller family size and seeks the health care necessary to do so. Therefore, she has fewer and healthier children. An educated woman has high educational and career expectations of her children, both boys and girls. Higher education, more protected by academic freedom than most levels of education, has a leadership role to play in this key area singled out by both the Millennium Development Goals and The Johannesburg Plan of Implementation.

Rapidly increasing population concerns many national governments because it reinforces social and economic disparities, which in turn pressure social cohesion. Much of the world's population increase occurs in less-developed countries that are least prepared to meet people's needs. The challenges associated with increasing population include, but are not limited to, caring for the poorest social groups, constructing and staffing more schools, providing health care for growing numbers of people, providing potable water, coping with sewerage and waste disposal, and growing sufficient amounts of food. Education is one of the most effective as well as acceptable means of intervention available to decision-makers with regard to the population problem, which is perceived as a major threat to sustainability.

One of the roots of sustainability is social equity. In many parts of the world, this means elevating the status of women and supporting their full participation in society. Access to quality education at all levels is one of the foundational steps of this process.

Educating women also makes economic sense. As nations enter into global competition, it is imprudent to eliminate half of the nation's economic potential and workforce by not educating females. It is a strategic economic measure to educate the entire potential workforce and thereby be poised to use the human resource potential of both men and women.

1.6 Concluding Remarks

In this chapter we describe the major components of ESD and ESD's potential role in building the capacity of civil society to create more sustainable societies. We cannot imagine how the people of all nations will move toward a more sustainable world without the contribution of educators and trainers from around the globe. Although education is a powerful tool for moving communities and nations toward sustainability, the education community alone cannot achieve this goal. Education must be accompanied by good government, enlightened policy, civic participation, and commitment. Furthermore, every sector of society including government, business and industry, non-profit organizations, religious groups, etc. must share the responsibility.

Chapter 2 Challenges and Roles for Higher Education in Promoting Sustainable Development

By Charles Hopkins and Rosalyn McKeown with Hans van Ginkel

2.1 Effects of Globalisation on Universities

Some thought has been given over the last decade to the question of how to ensure that globalisation will benefit all humankind and help sustain the future. What has become clear in this process is that the line between the beneficiaries of globalisation and those who are currently on the losing end is not easily drawn. Of course, 'big' business (often headquartered in industrialised countries) that thrives on the globalisation of trade and labour markets, is readily identified as occupying the driver's seat in the globalisation process. At the other end, there are the farmers and labourers in developing countries who, due to a lack of access to education, information and technology and to the imbalances of international markets, are severely limited in their bargaining power for the prices of their labour and produce. However, is it all North versus South, industrialised versus developing countries? Certainly not. The developing country-based NGO could, through the Internet, become able to link up with like-minded groups around the world and, by broadening its basis of information and building on the experiences of others, obtain a much better position to further its cause than before. On the other hand, there are people in industrialised countries, sometimes out of work as rationalisation has made their specific skills obsolete, to whom the global circles of communication and collaboration are the most remote of realities.

Without attempting to downplay the differences that continue to exist between the opportunities of developing and industrialised countries to participate in the global economy and information networks, one point becomes clear when contemplating the complex realities of globalisation in its current form: whether or not one can benefit from globalisation depends on the skills one possesses—skills to obtain and analyse information, to make independent judgements, and to communicate across social and cultural boundaries—rather than just being a function of location. This is where education is of use.

Education, understood broadly as an ongoing process including both formal and informal modes of teaching and learning, plays a crucial role in preparing people for their future in a highly connected, interlinked, globalised world. Higher education, in particular, occupies a central position in shaping the way in which future generations learn to cope with the complexities of globalisation, trade, poverty, development and environment. Higher education prepares an important portion of the population for their entry into the labour market including, in most cases, the teachers that are responsible for education at primary and secondary levels. Universities are called on to teach not only the skills required to advance successfully in a globalised world, but also to nourish in their students, faculty and staff a positive attitude towards environmental issues and cultural diversity; to help them understand how a richness of both nature and cultures can contribute to a better life in a safer world for all; to instil in young people the desire to contribute to their society and its environment; in short to the sustainability of their way of life and quality of living. Academic freedom and university autonomy, after all, do not only create opportunities and capabilities, but also a moral obligation. It is only through internationalisation, and the 'internationalism' that follows, that universities will be able to meet this challenge.

2.2 A Copernican Revolution

Apart from the fact that increasingly global labour markets require universities to adjust the way in which they approach education, globalisation affects universities in yet another way. The frames of reference for the quality and position of each university have broadened considerably; it is no longer just to their neighbouring cities or countries that universities look for institutions with which to co-operate or to compare themselves. Rather, the global network the university belongs to will become increasingly important. It will contribute directly to the identity and awareness of the university and its international position. It is, indeed, possible that international networks may form the basis of the university of the future, or at least will help it function properly. It might not be long before the stronger universities will establish new branches abroad. The university will become, under the influence of this process, bigger, stronger, more competitive. It will behave increasingly like an international business, with shrinking distances, larger institutions, competition, selection and hierarchies.

In spite of this, globalisation could lead to greater unity in the long run. This unity will not, however, be the unity envisaged by Napoleon two centuries ago, with the same laws and the same straight roads stretching right across Europe. It might,

and should be a unity in diversity, based on the principle of subsidiarity.⁷ This applies, in particular, to universities. They have a tradition of diversity stretching back to their origins in China, the Arab World and Europe. Universities will become increasingly interlinked and bound to one another, while also identifying themselves as distinct from each other, each within their own region and country, their own tradition, with their specific sets of disciplines, programmes and people. Here again, suggestion for the universities is to have as the guiding principle in their processes of internationalisation, the acceptance and appreciation of diversity.

A Copernican Revolution is taking place with regard to the position of universities in their own country and worldwide. In the interlinked, globalised world, universities can no longer regard themselves only as a part of a national system, protected by national laws and regulations. Striving for excellence in a competitive world in which they face a challenge of maintaining constructive and supportive relationships with all their stakeholders, universities would do well to take more care of themselves individually. As a consequence, they could rethink their modes of governance, their financing, their internal structures and external relations. They should rely on the considerable capabilities and creativity of their own people, not just to teach and do research, but also to run and develop the university as an organisation; as an enterprise; as a public good, though managed in energetic, entrepreneurial ways. They must network, develop relations with all kinds of institutions and show that they are taking their social responsibilities seriously.

It is for this reason that the UNU with UNESCO and the Polytechnic University of Catalonia have started the Global University Network for Innovation (GUNI). The real innovation in universities must come from within, created and supported by everyone working and learning in institutions of higher learning, rather than by top-down regulation, changes in governance structure or financial regulations. For universities to learn from each other by working together, it is important that the global network is based on regional networks, as the conditions under which universities must work are very different from country to country, from region to region. Only strong, responsible and responsive universities can properly fulfil their crucial role in developing ESD, in providing guidance and leadership in all education with regard to curriculum-development and teacher training, in introducing and disseminating state-of-the-art knowledge.

2.3 Challenges of ESD and Higher Education

Education is one, albeit large, ray of hope for the global sustainability vision. Agenda 21, the world's first action plan for sustainable development, made it clear that many paths to sustainable development exist. The document stated that work on multiple fronts (e.g., environmental protection, good legislation and governance, economic incentives, overcoming corruption, human rights and security, and creating infrastructure—from transportation to financial pillars) was necessary. While there was much discussion and negotiation on these various key approaches, one path was adopted unanimously—the need for education, public awareness, and training.

Higher education had a reach history of promoting ESD. Some key events from this history are presented in the Table 2.1 (For more information on these events please refer to Appendix B). Now, thirteen years after the Earth Summit and the adoption of Agenda 21, education still remains a powerful tool brimming with possibilities for implementing sustainability; therefore, the United Nations has declared 2005-2014 to be the UN Decade of Education for Sustainable Development (DESD). Each sector of the government, society, and economy must work synergistically toward a goal of sustainability to make brighter tomorrows possible. Higher education can play a vital leadership role in shaping the future by educating the next generation of professionals, creating a research base for sustainability efforts, and providing outreach and service to communities and nations. Institutions of higher education (IHEs) need to be reorienting curriculum to address sustainability. Higher education faces great challenges, but by addressing sustainability, IHEs could greatly benefit their surrounding communities and the world.

Governments see education as a powerful means of implementing not only local sustainability goals but also the Millennium Development Goals and the Johannesburg Plan of Implementation. The reality of the new millennium is that globalisation—and its many ramifications on the environment, the economy, and societies—is forcing education systems at all levels to address new issues of purpose, content, and pedagogy. Each country asks: What should our students know, be able to do, and value when they graduate? In answering these questions, the linkage between education and sustainability becomes more defined because education helps nations build capacity, widen development options, protect the natural environment, and create more flexible and effective sustainability plans.

⁷ Subsidiarity is a principle which intends to ensure that decisions are taken as closely as possible to the citizens and practiced by the smallest group that has the capacity to implement the action and oversee its consequences.

Table 2.1. Milestones in the Field of Education for Sustainable Development

Date	Event
1972/6/6-16	UN Conference on the Human Environment (Stockholm Conference)
1975/10/13-22	UNESCO/UNEP International Workshop on Environmental Education (Belgrade Charter)
1977/10/14-26	Intergovernmental Conference on EE (Tbilisi Declaration)
1987	Publication of "Our Common Future"
1988	CRE-COPERNICUS ⁸
1990/3/5-9	World Conference on Education for All
1990/10	Talloires Declaration
1991/12/11	Halifax Declaration
1992/6/3-14	United Nations Conference on Environment and Development (UNCED)
1993/11/19	Kyoto Declaration
1994/5	CRE Copernicus Charter
1997/12	Thessaloniki Declaration
1998/10/5-9	World Conference on Higher Education (WCHE)
2000/4	Dakar Framework for Action
2000/9/6-8	UN Millennium Summit
2002/8/26-9/4	World Summit on Sustainable Development
2002/9	Ubuntu Declaration
2002/12	Designation of 2005-2014 as DESD at the 57th UN General Assembly
2003/6/23-25	World Conference on Higher Education + 5 (WCHE + 5)
2004/10	DESD Draft International Implementation Scheme
2005/3	Launch of DESD

Education and sustainability are inextricably linked, but the distinction between education as we know it and ESD is enigmatic for many. ESD carries with it the inherent idea of implementing sustainability-fostering programmes that are locally relevant and culturally appropriate. All sustainable development programmes including ESD must consider the local environmental, societal, and economic conditions. As a result, ESD and ESD in higher education will take many forms around the world.

Although ESD will challenge IHEs to move in new directions, the core missions of IHEs remain the same. "The core missions of higher education [are] to educate, to train, to undertake research and to provide services to the community" (UNESCO, 1998, paragraph 3). The role of universities in educating for social justice and a culture of peace is well documented in the publications of the World Conference on Higher Education in the Twenty-first Century: Vision and Action (UNESCO, 1998).

The current and potential contributions of IHEs to sustainability through research are well documented also (UNESCO, 1998). UNESCO held a series of regional conferences and convened the World Conference on Science—Science for the Twenty-First Century: A new commitment. Universities serve as sources of research that can support sustainability. In fact, universities often produce the science underlying technological advances in energy efficiency, medicine, and electronics. Such research is vital to create a new generation of products that are manufactured, used, and disposed of in more sustainable ways. Universities also research the social and economic spheres of societies, uncovering inequities and trends that run counter to sustainability ideals. Equally important, universities stimulate creativity and innovation, skills that will play an important role in a more sustainable world.

⁸ See <http://www.copernicus-campus.org/sites/conferences_index.html>.

This chapter takes a different approach to the discussion of the role of higher education and sustainability. The authors posit that large issues associated with education and sustainable development are rooted in the communities and nations that surround IHEs. Faculty, administration, staff and students should have an ongoing thoughtful discussion of the role of their IHE in wider society (Readings, 1996). Because IHEs educate and train future professionals and leaders in many sectors of society, graduates of our institutions will have to grapple with environmental, social, and economic issues inherent in the quest for a sustainable future. IHEs should challenge themselves by asking some critical questions on *what their IHEs are doing to prepare these future professionals to work with, provide services for, and write policy that will promote equity for the poor and excluded members of society; what IHEs are doing to promote a just and equitable life for all, both now and for generations to come; and what IHEs are doing to protect preserve and restore the environment so that people of all economic conditions can lead healthy lives.*

An important discussion about the changing nature of IHEs to be both places of merit and places of egalitarian access and opportunity currently happens on campuses in many countries. For decades, if not generations, universities were places of merit and privilege. One of the underlying principles of sustainability and ESD is equity. Now, universities are faced with being places of egalitarian access and opportunity for populations not traditionally served by IHEs (Kerr, 1994). IHEs have to change not only their admissions policies, but also they have to provide services to populations that they have not traditionally served. They also have an obligation to assure that the primary and secondary education of a more diverse student body really prepares the pupils to be admitted to an IHE.

This chapter returns to some major issues and challenges related to sustainability and education highlighted in Chapter One. These issues and challenges are often not just part of higher education; however, they are highly relevant to the students' future careers as many will become leaders and decision-makers in their lifetimes. These complex issues demand interdisciplinary solutions. They call for new ways of thinking about the role of a higher education in providing experiences for students that will be relevant to their professional and private lives. The proceedings of the World Conference on Higher Education in the Twenty-First Century: Vision and Action stated, "higher education systems should enhance their capacity to live with uncertainty, to change and bring about change, and to address social needs and to promote solidarity and equity" (UNESCO, 1998, paragraph 14).

Agenda 21 called for communities to create Local Agenda 21 plans. Some IHEs are creating sustainability plans to allocate their already over-extended resources to arenas where they will have the greatest impact. Using this model each IHE could create an institutional Agenda 21 plan that sets directions and priorities for the campus, insuring that each institution creates a relevant and appropriate plan that maximizes its institutional expertise and addresses its unique environmental, social, and economic context. By examining programmes, practices, and policies, institutions can find ways to reshape their many facets—for example, curriculum, teaching, research, service, business practices, and physical plant construction and maintenance. IHEs can do more than the traditional roles of education, research, and service; they can be models of sustainable institutions with fairness in their social policies (e.g., gender and racial equity in hiring), economic interactions (e.g., purchasing safe substitutes for toxic chemicals and recycled paper), and environmental practices (e.g., reducing CO₂ emissions and improving water quality management).

2.4 IHE and Issues of ESD

IHEs could be central to the development of ESD in each country and region. IHEs could provide research, analysis, and conceptual guidance to create relevant and appropriate education systems for all students, including those who currently are underserved by existing educational systems. They could prioritize the leading sustainability issues in their country and region and address those. They could research other avenues for schools to cope with the social problems that prevent students from learning. Dealing with ESD makes IHE wrestle with a number of critical concerns identifying the most pressing sustainability issues of the country and the region as well as with the questions of available institutional capacity to address these issues.

2.4.1 Goals of Education for Sustainable Development and Higher Education

As it was described in Chapter One, there are four major thrusts to begin the work of ESD by a) improving access to quality basic education, b) reorienting existing education to address sustainable development, c) developing public understanding and awareness, and d) training representatives of all sectors of private and civil society. Let us consider the role that IHEs could play in each of the thrusts.

Quality Basic Education and IHE

When it comes to the first priority of ESD - **improving access to quality basic education**, one should ask a question: *what is the connection between basic education and IHEs?*

One connection between basic education and IHEs is that in many countries teachers are trained through higher education. Other connections might be that faculty members sit on national primary curriculum writing committees, or publishers turn to universities for assistance in writing textbooks. All of these examples are excellent leverage points for turning university expertise into promoting ESD. The principal concern for IHEs would be if they are *addressing the need for teachers, administrators, and policy makers, all of whom graduate from IHEs, to seek out and educate the vast number of excluded and undereducated children in our societies.*

As stated previously, more education is not the solution to an unsustainable world; simply educating the illiterate and undereducated will not lead the world toward sustainability. Unfortunately, the most educated nations leave the deepest ecological footprints. Education must be relevant to life in a sustainable world. IHE should make sure that *the curriculum educates children and youth to lead sustainable lives and weave sustainability into their occupations.*

Reorienting Education and IHE

The need to reorient basic and secondary education to address sustainability has garnered international attention. The need in higher education is just as great; however, it has not received as much attention. IHEs are educating society's future leaders and decision makers. If these young people are expected to lead all sectors of society (e.g., government, health care, agriculture, forestry, law, business, industry, engineering, education, communications, architecture, and the arts) in a world striving toward sustainability, then current administration and faculty members must reorient university curricula to include the many complex facets of sustainability.

To date, few IHEs have a good track record in educating indigenous peoples or showing respect for traditional knowledge and wisdom. Thus, whether indigenous knowledge an issue for IHE should be on the discussion and action agenda.

Reorienting education to address sustainability is something that should occur throughout the formal education system including colleges, universities, professional schools (e.g., law and medicine), and technical schools as well as primary and secondary education. Hans van Ginkel, Rector of UNU, says, "Education for sustainable development . . . is not a topic that can be taught in a few weeks just at a certain age, but should rather be given attention in all sectors and at all levels in relation to relevant, already existing subjects in an integrated manner" (Ginkel, 2004a).

In fact, higher education is accused of indirectly limiting ESD. Too often, the reason secondary schools give for not reorienting their curriculum is that they need to prepare students for entrance to university. This fact gives IHEs an opportunity to show leadership in coordinating this reorientation process. The World Conference on Higher Education "insisted on the reordering of [higher education's] links with all levels of education, in particular with secondary education as a priority" (UNESCO, 1998, Paragraph 5). IHEs are supposed to take the initiative to align education from pre-school through university. This mandate gives IHEs the opportunity to assist with reorienting education in primary and secondary schools as well as align it.

Although many administrators and faculty agree that reorienting curriculum should occur, the main question is how to reorient education. Specifically, IHE should consider what should be added to or removed from the institution's curriculum so that it contributes sufficiently to a more sustainable society and what strategies could be used to foster interest in reorienting education at this particular institution. As an early step, every course syllabus should be examined to determine if knowledge, issues, skills, perspectives, and values related to sustainability are woven into each course. Because every discipline can contribute to sustainability, each course should be examined, not only those that are traditionally associated with sustainability (e.g., ecology). As part of syllabus review, a curriculum coordinator needs to look at the coursework as a whole to determine if the courses in each major or career present a broad and cohesive vision of sustainability or one that is characterized by gaps or redundancies.

The Education for Sustainable Development Toolkit offers several activities for analyzing the sustainability components in a curriculum and for weaving additional knowledge, issues, skills, values and perspectives related to sustainability into existing curriculum (McKeown, et al., 2002).

Public Awareness and IHE

Within the context of each institution of higher education, many opportunities can arise for improving public awareness. For example, many citizens look to IHEs as sources of less biased information than that which arrives from governments and corporations. As a result, IHEs have opportunities to impact public information campaigns. IHEs can work with media (i.e., newspapers, radio, television, and magazines) to raise public awareness of sustainability issues and sustainable lifestyles. Public service campaigns, which are provided on a pro bono basis, often create good will for the providers.

To assist with this goal of ESD IHE should ask *if their institution currently assist with any public information or awareness campaigns and in which way it could contribute*. To answer this question a careful assessment of available expertise, particularly in the areas of communication and journalism, is needed. This expertise should be relevant to major sustainability issues facing local community.

Training and IHE

The questions that IHE should pose in relation to the training component of ESD are the questions about *ways that IHEs could contribute to training and what degree programme or specialisation of this particular IHE has expertise in training*.

For example, adult education is a specialisation within some faculties of education and pedagogy that deals with training and training-the-trainer programmes. In order to progress further IHEs should identify additional pockets of expertise in the institution in communications, business, agriculture, or forestry that disseminate information to the public. It is also essential to map what expertise that these faculties possess could be lent to businesses, industries, corporations, and government agencies for training workers and citizens. Knowledge of other national institutions specialising in adult education or education of the trainers could assist in formulation of co-operative alliances or in understanding of what certificate or non-credit workshops, rather than a degree, could be offered to help with challenges of sustainable development.

2.4.2 Role of IHE as Capacity Builders in Civil Society

Chapter One emphasised the capacity of education to contribute to sustainability plans through 1) creating skilled workforce matching development aspirations of a country, 2) educating stewards of the environment, 3) assisting good decision-making for the communities, 4) cultivating social tolerance and 5) contributing to the improving quality of life.

These five areas challenge IHEs to provide leadership by working in new realms and to be of greater service to society. Ask yourself:

- How can my institution help raise the capacity of civil society?
- What can we do in higher education to develop a skilled workforce?
- Do our undergraduate and graduate students enter the university with citizenship and community membership skills?
- If not, how could my institution foster development of citizenship skills after the students arrive on campus?
- Does anyone hold conversations with students about lifestyle choices?
- Does my institution contribute to students and graduates leading more environmentally sustainable lifestyles?

2.4.3 Adult Education

Eradicating adult illiteracy is a goal for ESD and a challenge for DESD (see Chapter One). For IHEs with high entrance requirements, illiteracy appears to be a distant challenge that should not take resources allocated to campus needs; however, you should ask how many of your institution's graduates will have careers that deal directly with illiterate adults and how many of the graduates' careers will be made more difficult by the social needs of the numerous illiterate population.

In the realm of adult literacy, there are obvious links to faculties of education and pedagogy. For example, research on literacy for children, with which many of these faculties are familiar, could assist with the adult issue. These faculties could also advise on how adult curriculum can be revised so it is relevant to the daily lives of adults and motivates them to learn even when it is difficult.

Adult literacy is a difficult issue; however, in places where literacy has improved, especially for women, the quality of life in the family and community has improved greatly. By working in these realms, IHEs contribute greatly to social equity and a culture of peace.

2.4.4 IHE and Questions of Gender

IHEs can play an important role in accepting and retaining females in all faculties and majors. Often females are admitted to traditional careers (e.g., nursing and teaching), but are not considered serious candidates for technical fields and physical science fields (e.g., engineering and chemistry). IHEs concerned with such issues should assess its enrolment policies and actions to support females entering and studying traditionally male fields throughout their courses of study. Research activities dealing with equity issues for female children and women should be given an importance and the results of this research disseminated and put into practice.

Educating females is mentioned in both the Millennium Development Goals and the Johannesburg Plan of Implementation. It is also central to the UN efforts in Education for All and the UN Literacy Decade. The issue of providing basic education to the populous is often not something that IHEs address. The challenge is to use the expertise and resources of universities to address gender equity in education at all levels.

2.5 ESD Partnership Success Stories

Collaboration among IHEs and IHEs and other stakeholders might create important synergy for ESD. One should consider a possibility of partnering with another institution or stakeholder to share expertise or joining a network to leverage own efforts and learn from the experiences of others. Some IHEs are already taking action on many levels regarding ESD. One such action is through an association of IHEs. The International Association of Universities (IAU), Copernicus Campus, and the Association of University Leaders for a Sustainable Future, together with UNESCO, have formed the Global Higher Education for Sustainability Partnership (GHESP), which was launched as an official Type 2 partnership at the World Summit on Sustainable Development (WSSD) in Johannesburg.

In addition, at the WSSD, eleven of the world's foremost educational and scientific organisations signed an agreement (the Ubuntu Declaration, see appendix B) in which the members pledged to promote sustainable development through education at all levels – from primary to university. Signatories also committed their organisations to strengthening the use of science and technology for sustainable development in education. The Ubuntu Declaration strives to ensure that educators and learners from primary to the highest levels of education and training will become aware of the imperatives of sustainable development (United Nations University, 2004).

IHEs are also working collectively, such as the Baltic University Programme that links 170 IHEs from all 14 Baltic Sea Countries in research and education for regional sustainable development. Coordinated by Uppsala University, courses are produced with the expertise of IHEs throughout the Baltic Region. At the managerial level, the rectors of these IHEs meet yearly (Ministry of Science and Education of Sweden, 2002, p.15). Within Europe, IHEs have joined together forming Copernicus. The Association of University Leaders for a Sustainable Future (ULSF) is an international network of IHEs working together to further ESD at the university level. ULSF is also the secretariat for signatories of the Talloires Declaration (1990), a ten-point campus sustainability action plan that has been signed by over 300 university presidents and chancellors worldwide. IAU, Copernicus, and ULSF are working internationally as well to develop a major online Web site for IHEs to use in developing their own ESD strategies.

Another group of IHEs working to promote ESD is the International Network of Teacher Education Institutions associated with the UNITWIN/UNESCO Chair on Reorienting Teacher Education to Address Sustainability. About 30 IHEs from 28 countries have been working together since 2000. Each institution has experimented with changes in programmes, practices, and policies in locally relevant and culturally appropriate ways. The array of activities they have undertaken is impressive. For example, they have reoriented courses to address sustainability, begun new degree programmes, created and published a journal, carried out research projects, exchanged faculty members, and held conferences. Currently, members of the international network are forming regional and local networks to share experiences and expertise with other teacher-education institutions and government ministries. At the request of UNESCO, in response to a directive from the UN Commission on Sustainable Development, this International Network is writing guidelines for reorienting teacher education to address sustainability. The guidelines will be published as part of DESD.

Individual IHEs are making great efforts as well to address ESD. Many are modelling sustainable practices and redesigning their campus policies. They are constructing far more energy efficient buildings and retrofitting existing buildings. Likewise, they are reorienting their coursework and research to address sustainability. For example, in the European transition economies, the private sector is placing new demands on IHEs.

[C]ertain sector companies, which produce the so-called 'large systems,' such as aircrafts, have to coordinate their efforts with thousands of subcontractors. All of this calls for new technical skills and managerial schemes.

In particular, modern firms require substantial in-house capacity to recognize, evaluate, negotiate, and finally adapt technologies available from different sources. (United Nations Economic Commission for Europe, 2003)

The challenge to universities to reorient their management and business administration courses is vital to regional sustainable development outcomes. The IAU, the UNU, and UNESCO have been working as lead agencies on ESD for several years with networks of IHE, such as Copernicus in Europe, and they accomplished much prior to DESD.

2.6 Next Steps: Regional Centres of Expertise

DESD and other global initiatives on education such as Education for All, and the UN Literacy Decade and UN Decade of Water are bringing unprecedented interest, activity, and growth to the roles of education, public awareness, and training in sustainable development. DESD will broaden ESD to take new forms in communities around the globe and engage more people in the endeavour. Bold experiments and accompanying successes and failures will occur. All of these global initiatives call for communication, collaboration, and synergy. A role for IHEs exists to act as clearinghouses and disseminators of current knowledge and research and best educational practices.

IHEs are important parts of Regional Centres of Expertise on ESD (RCE) (see Chapter Three for elaborations of the RCE concept). Each RCE would create an enabling environment for collaboration among various partners engaged in ESD at the local, municipal, or metropolitan regional level. RCEs and partners will mobilise innovative collaboration among communities, educational institutions, non-profit organisations, businesses, media, municipal officials, and other stakeholders of the region. The RCE will coordinate efforts of the formal, non-formal, and informal sectors of the education, public awareness, and training communities, linking primary, secondary, technical, and higher education with other educational endeavours (e.g., nature centres, museums, public health education, adult literacy programmes, and corporate training) and with the mass media. This linkage will help divide and share the responsibility of education for all members of the community regardless of age, gender, ethnicity, or means.

IHEs will play an important role in RCEs. IHEs will ensure that the best of knowledge from the natural sciences, social sciences, and humanities are woven into ESD programmes. IHEs will also ensure that the newest and best research findings from the scientific and educational communities will be used in ESD programmes. IHEs will need to be vigilant partners in RCEs to assure that current, not outdated, knowledge and research form the basis for ESD programmes and practices. This vigilance will assure the best of education at all levels for all sectors of society.

As part of RCE activities, IHEs should also take responsibility for aligning education from pre-school through university as recommended in the World Conference on Higher Education (UNESCO, 1998, Paragraph 5). While examining and adjusting curricula at different levels of education, IHEs should use the opportunity to work with school systems and ministries of education to reorient curriculum to address sustainability so that the sustainability component of education is also aligned. Providing professional development for ministry officials, school administrators, and teachers—both pre-service and in-service—related to ESD is currently a large unmet need. Professional development needs vary from basic awareness of ESD to advanced pedagogical and curriculum development skills related to ESD and reorienting education in general. For ESD to be successful, senior ministry officials and school administrators must receive professional development in order to comprehend the scope of ESD, its value to students and benefits to society. IHEs as members of RCEs could play a lead role in constructing professional development for the formal sector of the education community.

Together, RCEs from around the world will constitute a Global Learning Space for Sustainable Development (GLSSD). RCEs will share their strategies, techniques, project descriptions, and other efforts amongst themselves and with organisations involved in ESD. RCEs will also promote international co-operation in ESD. The GLSSD will be home to the international network of RCEs. The GLSSD will be coordinated from the Global Service Centre to promote Education for Sustainable Development (GSCESD). The Centre will house a variety of tools to help RCEs accomplish their goals. One such tool could be GHESP Resource Project. The Resource Project is an online resource that will assist RCEs and IHEs with attaining their sustainability goals. This online resource contains a variety of topics related to reorienting curriculum, pedagogy, green maintenance of campuses, etc. The GSCESD will also be home to the Earth Charter. The GSCESD will also offer teams of expert consultants to visit ministries of education, IHEs, and local governments to promote ESD and help organise stakeholder and public participation sessions related to ESD. The GSCESD will provide other services on request.

2.7 Concluding Remarks

Education, public awareness, and training give the promise of a brighter, more prosperous world, in which people of all ages can contribute to the sustainability of their societies. A more sustainable world depends on civic participation, environmental protection, and a more skilled workforce, for which education is essential. It is with this realization that many governments and members of the educational community are working to change educational policy and practices to provide educational opportunities for all citizens. IHEs could step forward to play a crucial role in coordinating ESD efforts. IHEs could link the formal, non-formal, and informal sectors of the education community and assist with reorienting education to address sustainability at all levels. IHEs could also become models of sustainability through their social, economic, and environmental practices and policies.

Although education is a vital component of a more sustainable future, education alone cannot provide it. More sustainable tomorrows will be accomplished through many sectors of society working together. However, without education, public awareness, and training many doubt sustainability will be possible. IHEs have much to contribute through their traditional roles of teaching, research, and service. The times, however, require that IHEs look at new ways of implementing these traditional roles. IHEs not only need to rise to the challenges that issues of sustainability present, but to provide leadership, and widen their service activities to benefit the surrounding regions to address society's needs and aspirations for a more sustainable future.

Chapter 3 Regional Centres of Expertise on Education for Sustainable Development : Concepts and Issues

By Zinaida Fadeeva, Hans van Ginkel and Katsunori Suzuki

3.1 The Need for Regional Centres of Expertise

As emphasised in the first chapter, "ESD ... should be given attention in all sectors and at all levels of education in relation to relevant, already existing subjects in an integrated manner". In spite of multiple efforts in the past to strengthen ESD, many challenges remain. In particular, there is a need

- to integrate adequately science, technology and other sustainability components, such as traditional knowledge, ethics and values etc., into educational curricula;
- to strengthen communication, coordination and collaboration among different stakeholders who have been conducting their activities on ESD separately without good communication with each other; and
- to mitigate gaps in accessibility to latest information and knowledge in different parts of the world.

In order to attain these objectives, there is a necessity to create an enabling environment for strengthened collaboration among various partners working for ESD at the regional and local levels. Regional Centres of Expertise on Education for Sustainable Development (RCEs) would serve, through close co-operation between different institutions, as the major engines for exchange of knowledge and information as well as joint development of innovative programmes towards ESD. They would also facilitate integration of knowledge and information as well as serve as links between sectors that could jointly contribute to the promotion of ESD.

Creation of the RCEs would fulfil two needs: a) it would give a further stimulus to those actors that are already developing RCE-type activities and b) it would provide models of co-operation and joint projects to those who are looking for these.

3.2 What is a Regional Centre of Expertise?

In contrast to the concept of formal organisation, an RCE is thought as a network that is designed to strengthen the collaboration for ESD among regional and local actors. The localised network is voluntary, flexible and inclusive. It is a network of existing organisations that brings them together and optimizes their activities as well as encourages generation of new actions. "Regions" are seen as the scale of a part of a country, like Bretagne, Tohoku or Catalonia. An RCE may be created in an area where people have solidarity in economic, social, cultural and environmental terms, and can get together in a relatively easy manner. A local focus is considered essential for addressing relevant sustainability issues for a particular region through educational activities. Although the RCEs are based on co-operation of institutions, it is the people working in these institutions who are crucial for the quality of the work.

School teachers at elementary and secondary schools, university professors, researchers, experts in museums, local government officials, NGOs, community-based organisations (CBOs) working for ESD, representatives of local enterprises, media people, etc. through their expertise and enthusiasm will be decisive for the work and success of RCEs.

Experts in museums, botanical gardens, science parks, zoos, etc. would be encouraged to contribute.

RCEs could vary in size, affiliations and functions dependent on regional conditions and experiences, in particular the kind and number of the institutions present and ready to cooperate for this high cause. An RCE should be able to identify local concerns and address them in an integrated manner. In this context, however, it must be understood that no region stands alone. In our highly interconnected and dynamic world we must always relate the different levels of geographical scale to each other and thus must local concerns be related to the national, continental and global levels.

ESD seeks to empower people of all ages to assume responsibility for creating a sustainable future. While activities of RCEs will be defined by the regional (local) conditions, RCEs could serve to fulfil several general functions.

RCEs Promote Partnerships for Sustainable Development: RCEs work to build linkages (1) between science and technology and education; (2) between formal, non-formal and informal education; and (3) between different levels of education, i.e., primary, secondary, and higher education and lifelong learning. Through collaboration and partnership the

RCEs will facilitate development and exchange of information and experience among organisations providing different levels of education and with other organisations relevant to ESD, with a view to develop challenging, state-of-the-art, innovative learning programmes. Through sharing of information and experiences, actors will improve their own activities and coordinate with each other to avoid unnecessary duplication.

An illustration of such activities could be environmental education programmes in schools carried out in collaboration with local civil society, community-based waste reduce, reuse, recycling (3R) activities, or NGOs nature observation activities at tourism sites. For example, in Japan, there is an emerging programme in which secondary school students receive advanced-level education on the function of rivers based on river observation activities they experienced at elementary school. Experts in universities and research institutions as well as community leaders who have been actually engaged in on-site environmental activities may contribute not only to developing new learning materials and curricula on the functions of the river but also to implementing the programme by serving as guest lecturers and working directly with the students in the classroom.

RCEs Reorient Education Towards Sustainable Development, covering existing programmes and subjects from the point of ESD and designing an integrated sustainability curriculum. ESD programmes are tailored to address issues and local context of the community in which they operate. For example, RCEs develop and implement innovative sustainability curricula for schools, universities and professional training.

RCEs Increase Access to 'Quality' Education that is Most Needed in the Regional Context, by various means including through Information and Communication Technology (ICT) or distance learning. RCEs could create ideal conditions to introduce the best of available knowledge in a "natural" way into the learning programmes and contribute to creative sustainability curricular design.

RCEs Deliver "Trainer's Training" Programmes: RCEs train ESD trainers for all segments of society and develop methodology and learning materials for trainer's training.

RCEs Lead Advocacy and Awareness Raising Efforts: RCEs raise public awareness about the importance of educators and the essential role of ESD in achieving a sustainable future among public at large and decision-makers in particular. They promote the long-term ambitions of ESD, such as environmental stewardship, social justice, and improvement of quality of life.

In order to make education a critical component for the future, ESD should be developed, implemented, monitored and reviewed at international as well as national, regional and local levels in a way that meets local conditions and needs. These challenges place a special challenge to the educators as designers and promoters of future reforms in ESD. Responsibilities should be accompanied by the conditions that permit complex undertakings of the educators. For example, educators should have a channel through which they could contribute to political processes. The crucial role of educators in carrying out the educational reform through DESD should be emphasised.

RCEs Facilitate Efficient and Effective Use of Limited Resources through, among other activities, coordinated use of resources by various organisations in the area of ESD. Effectiveness of resource use might permit a bigger scale of ESD actions or longer duration of ESD projects.

3.3 The Range of RCE Activities

Activities of RCE are based on the set of guiding principles. While nobody disputes an argument that RCE could be initiated around activities that potential RCE partners already carry on, the assessment and target group of these activities should be considered differently. For example, implications of educational activities should be assessed from environmental, social and economic perspectives simultaneously. Some of the simplest ways to bring across this point is to ask a question about how a particular learning activity initiated by RCE addresses challenges of sustainable development faced by a region in which this RCE operates. To give it even more specific illustration let us put forward a question about how a particular discipline (e.g. mathematics, economics, literature) should be taught in a region with particular environmental, socio-cultural and economic characteristics.

Box 3.1. Range of Activities of RCEs

- Addressing environmental, socio-cultural and economic challenges simultaneously
- Promoting the long-term ambitions of ESD, such as environmental stewardship, social justice, improvement of the quality of life, and all-life learning
- Improving access to quality basic education, reorienting education, public awareness, and training

It is also important that RCE eventually addresses all three categories of sustainability issues irrespectively of the type of expertise that initial consortium of actors bring together. Such expansion of initial focus might require strategic planning from the very beginning by developing knowledge about relevant regional sustainability issue or by bringing in actors that possess expertise in these areas.

Formation of RCEs expands not only the consortium of contributing experts programme but a target group for ESD. Promoting the long-term ambitions of ESD, such as environmental stewardship, social justice, improvement of the quality of life, and life-long learning, RCEs must educate many social groups that are not necessarily a conventional target group of educational activities.

3.4 RCEs as a Means to Promote the Global Learning Space for Sustainable Development

Through their activities, RCEs would develop innovative ways of collaboration among scientists, educators and other stakeholders of the region. Together, internationally co-operating RCEs would constitute the Global Learning Space for Sustainable Development (GLSSD) that would be an important contribution to the successful implementation of DESD. RCEs all over the world will exchange their experiences, ways of organising and innovations for ESD.

Among other facilitating means, the GLSSD would be assisted through international portals, developed to share ideas and experience. The Resource Project to be developed by the Global Higher Education for Sustainability Partnership (GHESP) could be an example of such a portal.⁹ In turn, the Portals will inform RCEs about good practices in other RCEs or elsewhere. The GLSSD enables locally-based RCEs to tap into various experiences and types of knowledge assembled beyond their region or network. The GLSSD would further enable ESD through provision of resources at the local, regional, national and international levels. Most importantly, it will enable individual learners, making use of modern information and communication technology (ICT), to profit from all relevant knowledge available in the GLSSD (network), by entering it through any convenient RCE they may choose.

3.5 Core Elements of RCEs

For a network of organisations to be recognised as RCEs, several key elements should be addressed through the network activities. The network should address organisational and governance issues of RCE, manage collaborative relations between the network members and other organisations and deal with questions of education and research for ESD.

Box 3.2. Core Elements of RCEs

1. Governance and sustainability of RCE
2. Collaboration
3. Research and development
4. Transformative education

3.5.1 Governance and Sustainability of RCE

It is essential that RCE activities are not undertaken as one time project but built as a long-term programme contributing to the sustainable development of the region. While the organisational structure of each particular RCE would be defined by the individual situation in the region, several issues could be considered to create continuity and effectiveness of RCE's activities (see Figure 3.1).

⁹ See <<http://www.ulsf.org/toolkit>> for more information on the project and to view a draft homepage.

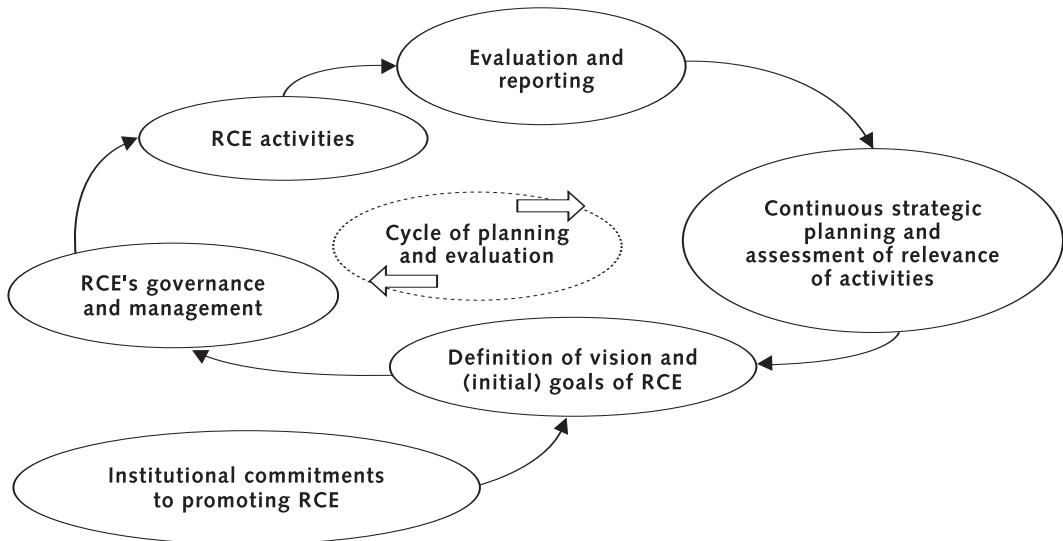


Figure 3.1. Potential Management Components of an RCE

The organisations that belong to the RCE should be connected to it through institutional commitments. Such commitment should be documented, e.g. in a form of letters or official statements, and should include reference to the principles of ESD and the vision of RCE.

If the RCE is to keep long-term commitment and perspective towards ESD, it should build its own vision¹⁰ and goals¹¹. The vision and goals of RCE need to be relevant for the immediate challenges and long-term sustainability vision of the region. Considering that RCEs could become important instruments for achieving goals of DESD, it is recommended that the vision will be built for the period of ten years and beyond. The priorities should be aligned with the goals of DESD and national/international implementation schemes of DESD.

The vision and goals of RCE could be implemented using a management structure. RCE should establish a decision making and communication structure that is appropriate for the region, engages relevant actors and is suitable for achieving stated goals of the RCE. Even if engagement of all relevant actors might not be possible at the very beginning, there is a need to have a clear plan for their involvement. In addition, resources necessary for achieving RCE's short and long-term goals need to be allocated. RCE will achieve its goals by undertaking activities in the area of education, research and networking for ESD. It is important to specify how each of the activities helps to achieve objectives of RCE. Specifically, RCE actors might need to demonstrate engagement of various groups of actors (formal, non-formal and informal education, various levels of educational institutions, representatives of institutions working with "problem areas" in the community). Finally, in order to secure its legitimacy and demonstrate its contribution to ESD, RCEs should be able to assess their activities and report results of its actions to the members of the RCE and to the public.

In the course of RCE work, some goals will be achieved and new requirements emerge. In order to secure continuous process of re-formulation of goals and revision of activities, RCE needs to continuously plan and assess its actions in relation to the priorities of the region and own ambitions.

¹⁰ Vision is a short statement of what RCE needs to become in order to address challenges of sustainable development. It is inspiring and future-oriented. It does not specify means of achieving the aspirations.

¹¹ Goals are specific priorities related to the particular period of time.

3.5.2 Collaboration

1. between different levels of educational institutions (refers to the Vertical Links in Figure 3.2);
2. between educational organisations of the same level, for example, schools in a community (refers to the Horizontal Links in Figure 3.2);
3. between educational organisations and organisations that, while not being part of the formal education, contribute to the promotion of ESD (refers to the Lateral Links in Figure 3.2).

It is important to differentiate conceptually between the vertical, horizontal, and lateral links. Each of the categories emphasises importance of a particular kind of collaboration and, therefore, guides the collaborative actions. For example, the concept of horizontal links draw attention to the importance of experiences of similar organisations in the same locality while lateral links stress significance of experience exchange between different types of organisations. Building relations between similar and different organisations might require different kinds of efforts.

Box 3.3. Collaboration

- Involvement and leadership of institutions of higher education
- Engagement of actors from formal, non-formal and informal sectors of education
- Engagement of actors from all levels of formal education
- Ensuring that ESD addresses people regardless of their gender, age or social status

The mission of RCEs is to bring into positive contacts, in various ways, the scientists and educators in both institutions of formal, non-formal and informal education. In this capacity, the scientists, including experts in research institutions and museums, would become providers of the state-of-the-art knowledge to inform innovative study programmes and help to address local concerns. Educators, in a broad sense, will become main actors in a process to develop and disseminate the state-of-the-art knowledge relevant to sustainable development. They will work with other actors in the society, e.g. representatives of local governments, NGOs, etc. While it might be easier to start collaborative processes between partners that already have experience of working together, RCE should envision future strategy of gradual engagement of actors that could play significant role in ESD. Similar considerations might be applied to the selection of the target group of the RCE activities. ESD activities should not be focused only on the groups that customarily become parts of ESD activities but address all people regardless of their gender, age or social status.

Universities and other higher education institutions should become the leaders in RCE collaboration. Universities combine a double quality of generators/disseminators of knowledge. They prepare future decision-makers including future teachers and professionals responsible for education at the primary and secondary levels. Universities more and more often play a role of knowledge centres contributing to regional innovations and, therefore, to the competitiveness of social cohesion of the regions.

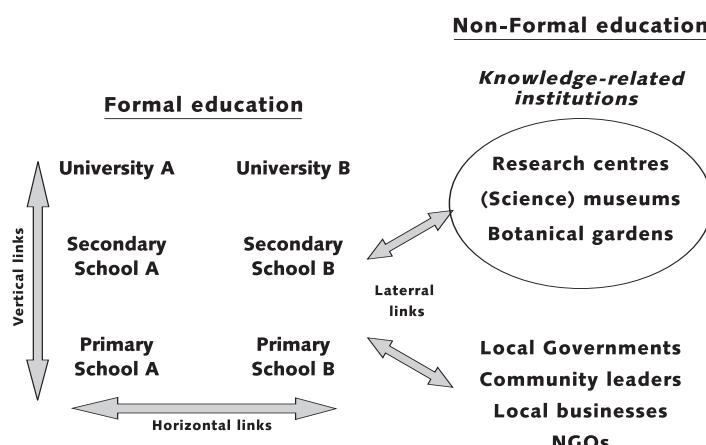


Figure 3.2. Collaborative Links of an RCE

RCEs will bring together a wide range of partners ready to contribute to ESD. It is essential to point out challenges that will emerge from such new and broad collaborations. RCEs should bring together those organisations that do not necessarily have prior experience of collaboration or/and that have different agendas and organisational culture. RCEs should be particularly sensitive to the differences of actors' positions and should anticipate contingencies in the networking process. Instead of simply viewing RCE as a means to a goal of ESD, allocating sufficient time, resources and expertise for facilitation of network building might help to create strong RCE.

Within the context of RCE, educators will work with other actors in the society, e.g. representatives of local governments, NGOs, etc. Some actors, such as NGOs, research centres, museums, botanical gardens and private companies could provide expert input into the educational content relevant for the sustainability agenda of the region. They will also lend their experience in training and education for particular groups outside of the formal educational system. Some other actors, in particular local and regional governments, are essential for creating conditions enabling modification of formal educational curricula as well as encouraging training and re-training of teachers on the issues relevant for sustainable development.

3.5.3 Research and Development

Designing an RCE and maintaining its activities will go beyond any conventional practices. The innovation will come from the width of sustainability agenda that is to be addressed by RCE, from the unusual consolidation of partners that come together to implement ESD and from emancipatory methods that will be employed in a course of actions. The innovative nature of RCE's undertakings calls for a reflexive approach to educational, awareness raising, training and collaboration building activities performed by RCEs. In other words, each aspect of RCE activities should be documented and evaluated in order to assess if it produces more innovative, more cost- and time efficient, less conflicting results in the area of ESD.

Box 3.4. Research and Development

- Address the role of research and how it is conducted in the RCE activities
- Address how RCE's activities are being documented for the research purposes
- Enhance the role of reflection in guiding further RCE activities
- Ensure that the latest achievements of science and technology are incorporated into RCE activities
- Devise strategies for collaborative research activities, including those with other RCEs

Some of the obvious areas of research supporting activities of individual RCEs as well as informing other regional ESD activities could be dealing with questions of the meaning of sustainability for a particular region, the design of an educational system that supports such sustainability vision, the content of ESD for different stakeholders groups, managerial aspects of RCE networking, and many others.

One of the ambitions of RCE is to engage expertise of various actors for ESD. While such collaborative undertaking could bring potentially good results, it is important to remember that many actors that are joining the ESD journey might not have prior educational experience. Education and style of learning are not value neutral. Assumptions about roles of educators, needs of learners, necessities of particular educational content, selection of pedagogical process will bring different results to ESD. Inconsistencies in epistemological assumptions and ways of implementation diminishes the results of ESD. In order to achieve successful ESD, the research should address relations between epistemological assumptions of partners participating in knowledge translation activities, learning strategies and educational results. In other words, research should guide selection of appropriate educational strategies and methods by utilising a clear conceptual framework (Babikwa, 2004).

Novelty and ambition of the ESD task puts forward a question of the optimal strategy for addressing sustainability challenges through RCE activities. Actors coming together under the umbrella of RCE face several critical challenges. Coming from different organisations they might have different understandings of sustainability and ways of implementing sustainability agenda through ESD. Assessment of the tried strategies and design of the new ones, including those dealing with network facilitation, could constitute an important body of research.

Another essential question that requires research is about results of RCE activities. Judging the results of collaborative undertakings is relatively unproblematic when the objectives of such initiatives are easy to define. ESD, however, deals with questions of high complexity both strategically and conceptually. Strategic complexity arises from the need for coordinating multi-organisational actions. Conceptual challenges are driven from the need to address highly complex issues of

sustainable development. In order to give justice to RCE's actions, its activities could be assessed, simultaneously, from different angles. For example, the RCE actors might need to assess the contribution of RCE activities into environmental, social, and economic aspects of regional development.

At the same time, RCE could be also considered as an institution that could potentially empower its members and that could create innovative forms of management and coordination among its members. Thus, one could question to what extent the results of RCE contribute to these two objectives. The research associated with RCE activities should address major challenges of developing and implementing framework for assessment of RCE actions. It is particularly important if RCEs have serious intention of contributing to sustainable development priorities of a region as well as to ambitions of DESD.

3.5.4 Transformative Education

Transformation for sustainable development is the ultimate goal of ESD, and each and every step should be assessed from this point of view. One of the main intended outcomes of RCEs is the transformation of the current education, public awareness and training systems to satisfy ambitions of the region regarding sustainable living and livelihood at the region.

The RCE should contribute to changing curricula, pedagogy, various forms of training, including corporate and media training and other forms of training, towards a sustainable future. While it will still be necessary to address the issues of sustainability within separate courses, it should be just a first step. Content of all courses at all levels, from primary schools to the universities should be eventually modified to address the challenges of more sustainable living.

Furthermore, it is no longer sufficient to modify the content of a course. Serious considerations should be given to the ways of teaching and learning. Within the context of ESD, education is no longer perceived as a process giving understanding of a particular subject. It is seen as a process of forming an ability that empowers individuals to act in ways that produce changes towards sustainable development. Such ambition requires pedagogies that are more participatory, empowering and suitable for particular needs of the target group.

The need of incorporating sustainability elements into learning is not restricted to the educational processes of institutions of formal education. All four thrusts of ESD, i.e. improving access to quality basic education, reorienting education, public awareness and training, require modifications appropriate for the challenges of sustainable development.

3.6 The Way Forward: First Steps

UNU is planning to support the development of a few demonstration projects on RCEs in several regions in different parts of our world as the first step to promote RCEs and their networking at the global level. In order to fully take into account the local, regional conditions and initiatives, RCEs might be acknowledged in a comparable way to the monuments on the cultural heritage list or probably the bio-reserves. In the process, it would be possible to mobilise many diverse actors and institutions, learn from their creative ideas, build on their diversity and, thus, promote international co-operation in ESD.

Although ESD covers not only environment and natural resources management but also much broader topics, one cannot address all these themes simultaneously. RCEs may wish to cover some specific high priority environment and development topics in the region at its initial stage and gradually expand its scope over time. For example, in Japan, many entities have been accumulating valuable experience on environmental education. In areas where people have serious concern about environment and/or development issues, RCEs may begin focusing their activities mainly on specific issues given priority in their own region. It is essential, however, to envision the ways for gradual broadening of RCEs' agenda taking into account the regional needs and experiences.

UNU will announce a few RCEs at the beginning of the DESD in 2005 as pilot projects. In subsequent years, UNU will grant RCE status to dozens of innovative partnerships that apply for such. By the end of the DESD in 2014, it is hoped that partnerships for ESD created through the RCE effort will flourish around the globe.

Part 2.

Efforts to Establish Regional Centres of Expertise

Chapter 4 A Case of the Greater Sendai Area RCE in Japan

By Yoko Mochizuki with Takaaki Koganezawa and Kazuyuki Mikami

The Greater Sendai Area RCE will build on existing collaboration and networking in the region. Since February 2004, when the UNU Rector met the Mayor of the City of Sendai and introduced the concept of RCE, the process of developing the Greater Sendai Area RCE has been not so much about UNU's asking local stakeholders to embark on an entirely new initiative but about collaboratively recognizing and redefining existing activities in alignment with the principles of ESD. Local stakeholders, in collaboration with the Education for Sustainable Development Team at UNU-IAS, have reflected on how an RCE can support existing activities in the region and how their coordinated efforts can support the United Nations Decade of Education for Sustainable Development (DESD) from the beginning. Emerging and dynamic partnerships in the Greater Sendai Area focus on forming a sense of ownership of the RCE initiative among the local stakeholders and creating connections to existing initiatives and networks. In addition to enhancing collaboration between different levels of formal education and facilitating partnerships between formal and non-formal education sectors, the RCE initiative provides UN recognition for local contributions to ESD, thereby legitimating and coordinating disjointed grassroots activities in environmental conservation, environmental education, and other ESD-related areas into a concerted endeavour to achieve sustainable society.

4.1 Background

4.1.1 National Context Relevant for Promoting ESD and RCEs in Japan

From the UN point of view, the significance of ESD is unquestionable and ESD must be infused at all levels of education. Japan can be safely described as one of the leading countries in promoting ESD. First, the DESD was proposed at the 2002 Johannesburg Summit jointly with Japanese NGOs and the Government of Japan. The Government of Japan is thus promoting ESD through substantial financial assistance to the lead agency of the Decade UNESCO as well as UNU. Second, Japan has a non-profit networking NGO dedicated to promoting DESD—"ESD-J".¹² This consortium of NGOs and civil society organisations explicitly aims at developing innovative ways of collaborating among various stakeholders—the national government, local governments, NGOs, civil society organisations, the private sector, and citizens—to promote ESD, and it will serve to support and validate the RCE effort across the country throughout the Decade.

In reality, however, the overwhelming majority of Japanese people do not even know what ESD is, or what 'sustainable development' means. Probably with exceptions of NGOs and civil society organisations working in ESD, there is no sense of urgency widely shared among Japanese organisations and individuals to instantly embrace ESD and start making tremendous efforts required to create an RCE. Rather than reiterating the rationale and need for ESD, therefore, this section will introduce the ongoing reforms in education that are intended to change the relationships between the national government, local governments, civil society, and the educational community. In Japan, national universities and public elementary and secondary schools are currently undergoing substantial reforms, which may provide organisations with diverse and competing priorities (i.e., municipal governments, universities, and schools) with justification and impetus to engaging in joint efforts to create an RCE in the Japanese context.

In June 2001, the then Minister of Education, Culture, Sports, Science and Technology Atsuko Tōyama announced the "Structural Reforms Policies for National Universities." It set forth the government's policies toward university reforms, including transforming national universities into "independent administrative corporations." Having been transformed into independent administrative entities in April 2004, Japanese national universities became more flexible and efficient in human resources, budget, management, and research systems. At the same time, this means that national universities, like private universities, are now subjected to market forces and have to be financially solvent in order to continue to operate. Coupled with the challenge of the falling birthrate and a drastic decrease in the number of children, Japan's national universities are being forced to develop strategies for survival. Many higher education institutions—public as well as private—are increasingly aware of the importance of promoting lifelong education and partnerships with local civil society and the private sector, and finding a means of survival in enhancing outreach and service. This gives higher education institutions very good reason to participate in RCE.

¹² See <<http://www.esd-j.org/>> for more information on ESD-J (Japan Council for the Promotion of the DESD).

Not only national universities but also primary and secondary schools—including highly centralized compulsory education (first through ninth grades)—are undergoing substantial reforms.¹³ The new curriculum standards went into effect for elementary and junior high schools in 2002 and for senior high schools in 2003, and the new Courses of Study introduced a new course called “Period of Integrated Study (PIS)” to promote interdisciplinary and comprehensive studies and to engage students in doing work away from textbooks, dealing with cross-cutting real-life problems.¹⁴ While Japanese school teachers work from well-scripted lesson plans detailing a sequence for each lesson according to the Courses of Study, Japan’s Ministry of Education, Culture, Sports, Science and Technology (MEXT) does not prescribe the content of PIS. PIS provides individual schools with flexibility and autonomy to devise a segment of nationally prescribed Courses of Study. In one sense, PIS symbolizes efforts to undo the bureaucratic stranglehold on curriculum and school administration which is often viewed as having exerted excessive conformity pressures and stifled creativity, diversity and flexibility. PIS can also be viewed as a response to demands by civil society for disclosure of information and community participation in formal education. Adjusting the content of PIS to regional/local characteristics and inviting guest teachers from local civil society have become standard—if not uniform—features of PIS. Furthermore, PIS often addresses topics related to ESD such as environmental education (EE), intercultural understanding, and Information and Communication Technology (ICT).

Significantly in Japan, primary and secondary schools are beginning to reach out to local civil society, just as higher education institutions have incentives to enhance links with the local communities including local schools. Although there have recently been moves to rethink PIS and revert to the curriculum emphasizing basic subjects due to the fear—both real and imagined—of a decline of Japanese students’ academic abilities, the ideals of PIS resonate with what UNU hopes to achieve through RCEs.¹⁵ Together with the Law for Enhancing Motivation on Environmental Conservation and Promotion of Environmental Education enacted in 2003, PIS gives justification to promoting EE in schools. While EE is not synonymous with ESD, the Japanese national context to promote school EE provides a lead on promoting ESD in the formal education sector in Japan. Moreover, the Ministry of the Environment, MEXT and other related ministries are working in partnership to facilitate citizens’, NGOs’ and corporations’ voluntary efforts to promote EE in the non-formal setting, while some of the central government’s control mechanisms are being reduced or abolished and ‘local autonomy’ is increasingly emphasised. By documenting a pioneering effort to create an RCE building on existing collaboration and networking with the national decentralization reforms in mind, this chapter will show concrete ways of collaborating to promote ESD in the regional (sub-national) context for the purpose of informing budding efforts to create RCEs elsewhere.

4.1.2 The Greater Sendai Area in the Tohoku Region of Japan

4.1.2.1 Geography

The City of Sendai is located in the Tohoku (literally "North East") region which consists of six prefectures in the north of Japan's largest island Honshū. Being a major rice-farming region, Tohoku is mostly rural with a few larger cities like Sendai. The rugged coastlines, vast mountain ranges, lakes and rivers offer scenic landscapes in the Tohoku region, which attract tourists together with ski resorts (in winter) and abundant hot springs.

Sendai is the capital city of Miyagi Prefecture, which aspires to becoming a prefecture founded on the principles of environmental conservation. The slogan of the City of Sendai is "Environmentally-Friendly City". Aoba Mountain overlooks the city of Sendai across the Hirose River. The plateau of Aoba Mountain, where the castle of the feudal Sendai Domain used to be situated, is joined to the spine of northern Honshū, the Ōu Mountain Range on its western side, and is guarded by thick forest to its west and cliffs on its southern and eastern sides. Aoba Mountain is designated as a National Natural Monument due to the diversity and rarity of its bio-system.

13 According to MEXT's annual school survey, while private universities and junior colleges enroll approximately 75 per cent of all university and junior college students in Japan, private elementary schools enroll less than 1 per cent of the age group (7-12) and private junior high schools enroll about 6 per cent of the age group (13-15). Private senior high schools comprise 24 per cent of all senior high schools in Japan, enrolling 30 per cent of all senior high school students. Detailed statistics are available at the MEXT homepage at <<http://www.mext.go.jp>>.

14 In line with the new Courses of Study, public schools have all gone to a five-day school week, and the curriculum has been reduced by 30 per cent. The new curriculum standards mark a shift from cramming knowledge into learners to giving them “room to grow.”

15 In December 2004, the OECD released the results of its second three-yearly survey on 15-year-olds. The survey was conducted in 41 countries and regions in 2003. The results showed Japan's drop from eighth in the ranking in 2000 to fourteenth in 2003 in reading skills, and from first in 2000 to sixth in 2003 in mathematical skills. The release of data on a national scale showing a drop in the scholastic ability of Japanese students has led many to question whether promoting “relaxed education”(“yutori kyōiku”) as antithetical to “cramming” or “rote learning” is a wise approach to reform Japanese education.

Since RCEs will not be limited by administrative and political boundaries, the Greater Sendai Area of the proposed RCE will cover the area within an approximately 100-kilometer radius and may include cities, towns, and villages in prefectures other than Miyagi.



Figure 4.1. Geographical Location of the City of Sendai

Source : City of Sendai <<http://www.city.sendai.jp/kikaku/kokusai/english/kaknkou.html#0>>

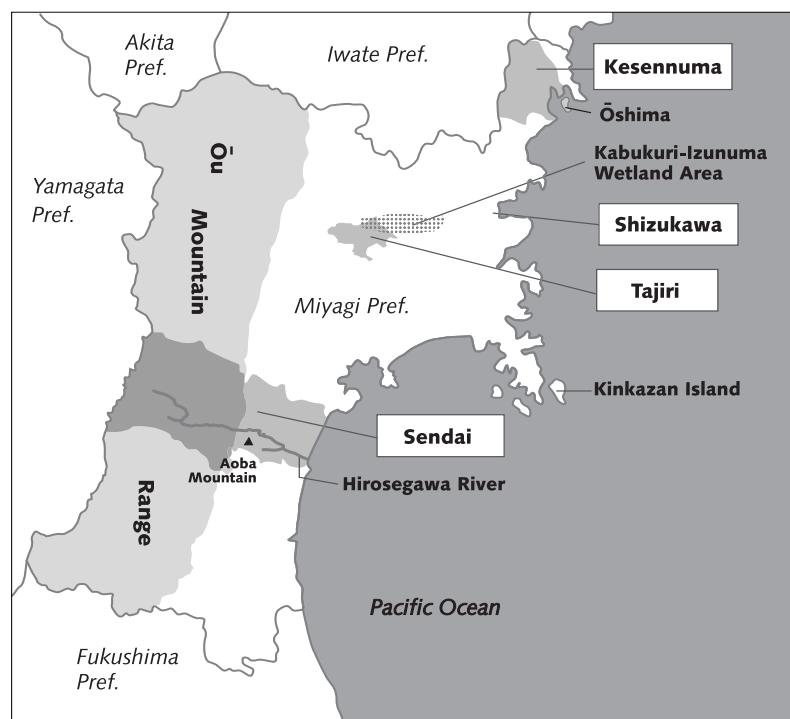


Figure 4.2. The Greater Sendai Area

4.1.2.2 History: Socio-Economic Development

Sendai has long served as the administrative and academic center of the Tohoku region. Sendai's roots date back to more than 400 years ago right before the start of the Edo period (1603-1867). In 1600, the leader of the Sendai clan, Date Masamune, built a castle town on the site that is modern Sendai. In 1889, Sendai was officially designated as a "city," and the Meiji government established regional offices for various national administrative bodies (those of the military, justice, transport, and telecommunications) as well as the Tohoku Imperial University (present-day Tohoku University) in Sendai. After World War II, in

its effort to rebuild the city, Sendai planted numerous trees and earned the nickname of the "City of Trees (Mori no Miyako)."

Today Sendai is the biggest city and the political and economic center of the Tohoku Region. During the economic boom, many branch offices of major corporations were established in Sendai, making Sendai into a major business center. In 1989, Sendai became the Tohoku Region's first "designated city" (seirei shitei toshi), which entitled Sendai to act virtually independently of the Miyagi prefectural government and answer directly to the national government.¹⁶ In 1999, Sendai reached another milestone when its population reached one million.

4.1.2.3 Culture: Hearts and Spirits of the Tohoku Region

The Tohoku region is blessed with abundant nature, and Tohoku people are in touch with the beauty of nature throughout the year. Urban life in Tohoku is remote from stereotypical images of urban life in Japan such as 'rabbit hutches' or the daily hell of overcrowded commuter trains. Tohoku people are often portrayed as being more relaxed and having lived harmoniously with the environment. Indeed, Sendai's nickname of the "City of Trees" may originate in the Sendai Domain's policy to encourage its feudatories to plant trees such as Japanese persimmon, chestnut, and plum on their premises and create plating fences with bamboos, tea bushes and the like. These premises forests, known as "*igune*" in dialect, allegedly constituted a city filled with greenery together with forests of temples and shrines and Aoba Mountain. The woods adjacent to the plateau of Aoba Mountain were strictly protected against human encroachment during the Edo Period, and today they are protected as a botanical garden attached to Tohoku University, offering one of the rare examples of virgin woodland left on the island of Honshū. "*Igune*" forests are still scattered about in the suburbs of Sendai, and recently there have been efforts to restore appreciation for nature and traditional knowledge about a sustainable way of life through "*igune*" (see Sidebar 1).

Sidebar 1

Restoring Appreciation for Nature and Traditional Knowledge about a Sustainable Way of Life

Traditional Knowledge about Sustainable Living: "*Igune*"

"*Igune*" (windbreak forests) is a model for sustainable living. During the Edo period (1603-1867), *Igune* was found around Samurai residences as well as in farming houses in the feudal Sendai Domain. *Igune* plays an important role as windbreak forests in protecting the residences against storm, fire, and crimes. At the same time, the residents utilize *igune* as fuel, livestock feed, fertilizer, construction materials, and food to sustain their daily lives. Although *igune* has been disappearing with urbanization, programmes to restore *igune* are ongoing. Not only does *igune* provide a scenic landscape throughout the year, it can be utilized as a tool for educating about sustainability. *Igune* exploration tours are being organised by NGOs to teach children about the importance of planting trees and preserving them and encourage children as well as adults to become aware of this life-supporting infrastructure. These *igune*-related activities serve to passing on the traditional knowledge about *igune* household woods as well as offering a place where children can experience nature and a site of relaxation for local residents.

Local Wisdom: Caring for others, consideration for all living things

The most valued principle still alive in Japanese society is harmony. The concept of "*omoiyari*" is closely linked to the concept of harmony and relates to the sense of empathy and compassion encouraged and practiced in Japanese society. Literally "*omoiyari*" means "to imagine another's feelings" or "to be thoughtful." Significantly, "*omoiyari*" is extended not only to other human beings but to everything living around such as birds and plants. In the Tohoku region, there is a practice of harvesting persimmons only from the middle branches of the tree, leaving those at the top branches for birds and those at the bottom branches for travelers. There is also a practice of collecting buds of aralia (*taranome*)—edible plants found in a mountainous forest area—by making sure to leave at least one bud for the plant itself so that it does not blight and another bud for the next person that comes to pick up this Japanese delicacy.

If 'environmental stewardship' is an approach to the earth and its resources that addresses the need for human beings to exercise caring *dominion* over creation and beneficial human management of the earth, these Tohoku practices attend to the human call for consideration for all living things. While *igune* is but one example of how Japanese people utilise nature in a sustainable way, the harvesting practices described above exemplify local wisdom based on the Japanese concept of harmony with nature. Following the country's defeat in World War II, Japan experienced a remarkable growth in its economy, and older people often lament that Japanese people have lost appreciation and respect for nature and that such local wisdom as described here has been lost. It is hoped that ESD and RCE serve to restore cultural knowledge and practices about a sustainable way of life.

¹⁶ A city can apply for the status of a "designated city" if it has a population of 500,000 or more, but most designated cities have a population of over one million. There are currently 14 designated cities in Japan (in order of population): Yokohama, Osaka, Nagoya, Sapporo, Kobe, Kyoto, Fukuoka, Kawasaki, Hiroshima, Saitama, Kitakyushu, Sendai, Chiba and Shizuoka.

4.1.3 Seeds of RCE in the Greater Sendai Area

As its nickname "the City of Trees" implicates, the City of Sendai has placed emphasis on measures to conserve the environment. As early as 1962, years before environmental pollution came to be recognized as a social problem in Japan, the City of Sendai Assembly resolved the "Declaration for a Healthy City," which aims at building "a city where all citizens can enjoy a healthy and cultural life." For more than 40 years since this resolution, the City of Sendai has strived to improve the health and welfare of its residents as one of its major urban policies. Nevertheless, Sendai is far from being untouched by environmental pollution. From the late 1970s to the early 1980s, the City of Sendai suffered dust pollution caused by studded winter tires, which led people to refer to Sendai as the "Sendai desert." Those tires provided drivers with good traction on frozen road surfaces, but the studs abraded the asphalt roads and caused detrimental effect on the living environment. In the campaign to eliminate studded tires, in addition to appealing to tire makers to develop 'studless' winter tires, Sendai's citizens, media, and government jointly encouraged 'green purchasing' of 'studless' tires and contributed to increasing the size of the market. At the World Summit on Sustainable Development in 2002, the City of Sendai participated in the municipality session and introduced its green purchasing measures. In October 2004, the 1st International Conference on Green Purchasing was held in Sendai jointly by the City of Sendai and the Green Purchasing Network, which consists of Japanese industry, governments and NGOs.

Table 4.1. The City of Sendai's Environmental Policy

1996	The City of Sendai Basic Environmental Ordinance
1997	City of Trees Environmental Plan (Local Agenda 21)
1998	Sendai Environmental Initiative Action Plan
1999	Acquisition of an ISO 14001 Certificate
2001	Guidelines of Green Purchasing in the City of Sendai

Miyagi University of Education (MUE), which started as a national teacher training institution in 1965, established the Environmental Education Center (EEC) in 1997 and has promoted EE in the area through education, research and outreach. While located in Sendai, EEC has carried out programs not only in the urban Sendai but also in remote and rural communities such as Kesennuma City, which lies approximately 80 kilometers northeast of Sendai and is famous for its fishing port, and Tajiri Town, which lies approximately 50 kilometers north of Sendai and famous for abundant rice production, in close collaboration with local people. Kabukuri Marsh of Tajiri Town lies eight kilometers from Izunuma/Uchinuma, which is designated as the Ramsar site,¹⁷ and both Kabukuri-numa and Izunuma/Uchinuma are famous wild goose habitat sites in Miyagi prefecture. In addition to supporting and implementing locally-based EE, EEC hosts a UNESCO/Japan Seminar on EE in the Asia-Pacific Region every other year. MUE and Tokyo Gakugei University serve as UNESCO-APEID (Asia-Pacific Programme of Educational Innovation for Development) Associated Centres focusing on EE, and these two institutions alternate the responsibility of holding this annual seminar.¹⁸

Parallel to EEC, Professor Koganezawa of MUE has also been instrumental in bringing actors together towards promoting ESD in the Tohoku region. With grants from Japan Fund for Global Environment, Professor Koganezawa launched Tohoku Global Seminar in June 2003 to (1) raise awareness about and promote DESD, (2) develop human resources who can contribute to DESD, and (3) promote networking among citizens, NGOs, public administration, and businesses. Tohoku Global Seminar has been held about four times a year, inviting speakers from UNU-IAS, the central and local governments, local NGOs, and local schools. This has created a forum for various stakeholders to come together and share ESD-related information, experiences, activities and visions.

¹⁷ The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources. There are presently 144 Contracting Parties to the Convention, with 1421 wetland sites, totaling 123.9 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance. See <<http://www.ramsar.org>> for details.

¹⁸ In 1973 UNESCO established, with the financial support of Japan, the Asia-Pacific Centre of Educational Innovation for Development (ACEID) in response to requests by member states in the Asia-Pacific region. Simultaneously with the establishment of ACEID in Bangkok, Asia-Pacific Programme of Educational Innovation for Development (APEID) was initiated. ACEID was given the responsibility for its implementation. Seminars are held to report various practices and exchange opinions about support activities for school education, such as teacher training by experts in the field of EE. MUE was designated as a UNESCO-APEID (Asia-Pacific Programme of Educational Innovation for Development) Associated Centre in 2003. Its implementation. Seminars are held to report various practices and exchange opinions about support activities for school education, such as teacher training by experts in the field of EE. MUE was designated as a UNESCO-APEID (Asia-Pacific Programme of Educational Innovation for Development) Associated Centre in 2003.

Sidebar 2

Sendai: Birthplace of the Non-Governmental UNESCO Movement

It may be a well-kept secret that the non-governmental UNESCO movement was initiated in 1947 by "Sendai UNESCO Co-operative Association" when the scars of defeat in World War II were still glaringly obvious in Japan. Voluntary, community-based activities by Japanese citizens who embraced the founding principles of UNESCO quickly spread to other parts of Japan, and the National Federation of UNESCO Associations in Japan (NFUAJ) was formed as early as 1948. Today there are about 300 UNESCO Associations across Japan. For example, Kesennuma UNESCO Association carries out international exchange activities (notably with Kangwon-do UNESCO Association in Korea which became its sister UNESCO Association in 1971) and organises an annual summer seaside camp for youth. It also participates in NFUAJ's major activities, including the literacy education initiative World 'Terakoya' Movement. NFUAJ initiated the World 'Terakoya' Movement as one of its core activities in the International Year of Literacy in 1990. Small-sized education facilities called 'Terakoya' are offered in developing countries to empower adults who have been unable to learn and children who cannot go to school.

4.2 Core Competencies of Main Actors of the Proposed RCE in the Greater Sendai Area and Existing Partnerships in the Area

In the same spirit of promoting a movement to ban studded winter tires, the City of Sendai has promoted not only green purchasing but also EE. The City of Sendai launched "Committee for the Promotion of Environmental Learning and Partnerships" in June 2002 and drew up "Environmental Education and Learning Plan—Collaboratively Creating Sendai and the New Environmental Age" in August 2002 in order to raise its one million citizens' awareness and lead to environmentally-friendly action for achieving a sustainable society. In May 2004, "Forum for Environmental Education and Learning in Sendai, City of Trees" (nicknamed "FEEL Sendai") was launched as an entity that coordinates partnerships between and among NGOs, schools, universities, public administration, businesses and others. FEEL Sendai aims at increasing public involvement in environmental administration since every citizen is an "interested party" when it comes to the environment. Currently FEEL Sendai consists of 16 members and strives to be "an engine which promotes environmental education and learning".

FEEL Sendai organises various awareness raising activities and social education programmes for the citizens of Sendai. "Citizen's Forum" is an open study session organised a few times a year to explore the method, nature and roles of EE and to support development and spread of EE mainly through the presentation of case studies of EE carried out by diverse actors such as NGOs, schools, and corporations. While "Citizen's Forum" serves as a forum primarily for those who are already engaged in EE to exchange information, learn from one another and network, "Environmental Forum Sendai" and "Sendai Eco Challenge" aim at motivating the broader public to be interested in environmental issues and to take actions to achieve sustainable society. "Sendai Eco Challenge" aims at motivating people to conserve energy and recycle at their homes by having them do self-check lists of their lifestyles, based on which the participants are divided into beginner, intermediate, and expert levels. "Environmental Forum Sendai" is an awareness-raising event planned and run by environmental NGOs and citizens on a voluntary basis. It has been held annually since 2001 and achieved a great success. For example, in 2003, Environmental Forum Sendai attracted 10,000 participants. It holds much promise for promoting ESD in the Greater Sendai Area that those NGOs and citizens involved in the planning and running of "Environmental Forum Sendai" are equipped with capacities to communicate what ESD is to the general public effectively.

Furthermore, to provide an opportunity for NGOs and civil society organisations to publicize their activities and spread their innovative undertakings in addressing environmental problems to a wider audience, FEEL Sendai invites NGOs and civil society organisations to participate in the "Social Experiments on the Environment" competition. After documentary elimination of proposals submitted, those proposals selected through a final public screening are adopted as sponsored projects. For example, in 2004, a proposal by the local NGO ACT53 Sendai to install trash separation stations at the venue of Tanabata Festival was carried out. Also in 2004, the Sendai Stadium Waste Reduction Plan, organised by Miyagi Environmental Life Outreach Network (MELON), was implemented.¹⁹ Since the Tanabata Festival attracts tourists from all over Japan and the Sendai Stadium draws a huge crowd of the professional soccer league J-League fans, these projects achieved a wide impact on a regional scale.

¹⁹ Following the 1992 Rio Summit, MELON was formed to act as a regional agent to carry sustainability messages to the people of Miyagi prefecture. In 2000, MELON was appointed as a Miyagi Centre for Climate Change Actions (MCCA) by the Governor of Miyagi. See <<http://www.melon.or.jp/melon/>> for details.

In addition to these advocacy and awareness raising activities, FEEL Sendai coordinates a multifaceted capacity development programme called “Mori Mori Environment Rescue Team Programme” (Mori Mori). Through development of EE programmes, Mori Mori aims at developing human resources, serving as a catalyst for engaging more actors in EE and ESD and encouraging partnerships to promote EE and ESD, and promoting regional development (see Box 4.1). All of FEEL Sendai’s activities—Citizen’s Forum, Sendai Environment Forum, Sendai Eco Challenge, Social Experiment on the Environment, and Mori Mori Environment Rescue Team Programme—are disseminated through FEEL Sendai’s homepage (<http://www.feel-sendai.jp>) and public forums so that anybody can access information on these activities easily.

Box 4.1. Main Actor of the Greater Sendai Area RCE (1): Local Municipal Government

Collaborative Capacity Development Projects Promoted by the City of Sendai's "Forum for Environmental Education and Learning in Sendai, City of Trees" (FEEL Sendai): Mori Mori Environment Rescue Team Programme

Utilizing the City’s rich natural environment—its forests, rivers, seashores, and foothills—and other distinctive local resources, FEEL Sendai promotes the development and implementation of EE programmes. “Mori Mori Environment Rescue Team Programme” (hereafter Mori Mori) was initiated in 2003 to enable Sendai citizens to engage in EE anytime and anywhere in the City and to build their capacities to contribute to creating an environmental city. Mori Mori mainly targets children who will be responsible for the next generation and teachers who instruct these children. Using the City’s natural environment as fieldwork sites for carrying out experiential EE, the Environment Bureau of the City of Sendai has developed EE programmes in collaboration with EEC of MUE (see Box 4.2) and local environmental NGOs. From FY2005, FEEL Sendai will coordinate Mori Mori projects as its main collaborative undertaking, assuming part of the responsibilities formerly carried out by the Environment Bureau.

First, FEEL Sendai commissions the development of environmental learning programmes to EEC and environmental NGOs. In 2003, Mori Mori developed six hands-on EE programmes based on a broad theme of water. Rivers penetrate the City of Sendai, providing the abundant nature that can serve as good fieldwork sites such as forests and foothills where the rivers originate, watersides, and the branching bay. Three different NGOs developed programmes utilising rivers as fieldwork sites, dealing with the issue of waterfront safety, biodiversity in the river, and how garbage travels in the river to the sea, respectively. The local NGO *Igune* school in Sendai, which hosts the Secretariat of Tohoku Global Seminar, developed a programme on farm irrigation that supports *Igune* (see Sidebar 1). EEC of MUE created programmes focusing on rainwater, while Miyagi Consumer Co-operative (Co-op) developed a programme on acid precipitation through observation of damages from acid rain in the City.

Once the programmes are developed, FEEL Sendai implements these Mori Mori programmes so that elementary and junior high school students, teachers, and other citizens can actually experience them. Each participant in the programmes goes home with an “Environmental Rescue Worker Certificate” as testimony to the transformation of the individual participant into a “rescue worker” who is committed to saving the Earth and the humankind, that is, to creating a sustainable future. The Certificate addresses the importance of transforming not only one’s own behaviours and lifestyles but also making efforts to change those of one’s family, friends, and community. As part of the implementation of the Mori Mori programmes, FEEL Sendai also holds workshops to train EE instructors and create a forum for networking and exchanging information. Finally, FEEL Sendai creates practitioner manuals of these programmes and disseminates them to all schools in the City—130 elementary schools and 73 junior high schools.

Not only does Mori Mori develop human resources who can make a full use of these experiential programmes, it builds capacities of local NGOs to document and communicate their activities to a wider audience. Mori Mori is also a good example of promoting collaboration with a local higher education institution. Mori Mori benefits from the expertise and practical know-how in EE offered by EEC, and at the same time, it provides undergraduate and graduate students with opportunities to participate in the development of practical EE programmes.

While Mori Mori is based on a broad partnership with local civil society and rooted in Sendai’s abundant nature, it also endeavours to cultivate global thinking on the issue of sustainable development by offering locally relevant education programmes. It is hoped that Mori Mori becomes an entry point for thinking about global issues.

Along with the City of Sendai, which has historically emphasised environmental administration and is equipped with strong administrative capacities, MUE is a core institution that leads efforts to create an RCE in the Greater Sendai Area. MUE offers undergraduate and postgraduate courses in teacher training, special education, and life-long education. MUE, through activities of its Environmental Education Center (EEC), promotes EE through the traditional roles of education, research, and service (see Box 4.2).

As a major institution that produces teachers for local schools, MUE is in a perfect position to link the the City of Sendai

Board of Education and the Miyagi Prefectural Board of Education. Under the tripartite collaboration between MUE, the City of Sendai Board of Education, and the Miyagi Prefectural Board of Education, EEC benefits from the expertise of Sendai Science Museum and Miyagi Prefectural Education Training Center. EEC currently hosts nine curators from the Museum and one supervisor of school education from the Miyagi Prefectural Education Training Center as visiting faculty members. Under this collaboration, since 2002, they have also co-organised large-scale conferences on themes such as education reform and special education and achieved steady success. For example, a full-day conference on education reform held in February 2003 attracted more than 1,000 participants.

Box 4.2. Main Actor of the Greater Sendai Area RCE (2): Higher Education Institution

Education, Research and Outreach Activities of Environmental Education Center (EEC) of Miyagi University of Education (MUE)

EEC assists in the development, dissemination, implementation, and evaluation of EE programmes focusing on elementary and secondary school teachers and students. EEC's activities are based on three pillars: (1) Field Museum Plan, (2) Friendship Project, and (3) School Supporting System.

EE research projects are carried out under "Field Museum Plan", investigating how to utilise local fields such as rice fields and wetland of Tajiri, the Hirose River (Sendai), Kinkazan Island, and the forests and the sea of Sizugawa for EE (see Figure 4.2). The research findings are applied to a teacher training programme EEC carries out. One of the core EEC activities is a pre-service teacher training programme called "Friendship Project", a national measure which aims at providing future teachers with opportunities to interact with school children in a setting outside of the school site. EEC has carried out "Friendship Projects" at Aoba Mountain, the Hirose River, Kabukuri Marsh and the adjacent rice fields of Tajiri, and Kinkazan Island.

EEC collaborates with Tajiri Board of Education (TBE) to implement "Friendship Project" in Tajiri. While EEC prepares teaching materials and trains MUE students for the Project, TBE puts out a call for elementary school students and volunteers to participate in the Project, arranges for transportation for local school children and MUE students, and takes care of other logistical matters. After the project is carried out, an evaluation meeting is held, and TBE often provides EEC with useful comments about how to improve the Project. As a collaborative endeavour, Friendship Project in Tajiri serves much more than a core function of training future teachers. First, it contributes to sound upbringing of local schoolchildren through the on-site EE programme. Second, EEC faculty members' expertise benefits local teachers and supervisors of education at Tajiri Board of Education. Third, participation of not only school children but also their family members (including their grandparents) in the Project serves to enhancing intergenerational exchanges and understanding in Tajiri. Last but not least, carrying out the Project in Tajiri has made local people proud of what they simply regarded as rice fields that look like any other rice field and has made them appreciative of the value of their rich environment. Overall, the Tajiri project has served to revitalizing the local community and making people aware of the quality of the nature surrounding them.

Building on the achievements of its research and teacher-training programmes, EEC is developing a "School Supporting System". EEC aims to support EE at public schools through cross-academic subject (interdisciplinary) EE curriculum development and the creation of "EE Support Techno Core". EE Support Techno Core aims at supporting school EE by delivering effective programmes and teaching materials online or via express courier service. Professor Kazuyuki Mikami (EEC Director, 2001-2004) distributed 4,000 CD copies of biological databases to schools all over Japan with the establishment of EEC in 1997, laying the foundation for development of EE Support Techno Core. He has also distributed 3,000 samples of microorganisms as living EE materials to schools across Japan.

Furthermore, MUE is creating an online database on EE practices (<http://dbee.miyakyo-u.ac.jp>) as part of MEXT's international education co-operation project. As a UNESCO-APEID Associated Centre focusing on EE, MUE is expected to contribute to reorienting existing education for a sustainable future at local (sub-national and national) as well as global levels. This database is being constructed in co-operation with Miyagi Prefectural Board of Education, the City of Sendai Board of Education, and local schools at all levels. More than 400 cases have been collected so far, and the database in Japanese are selectively translated into English, and both the Japanese and English databases are available online.

MUE is supporting the implementation of EE at a model school in collaboration with the local board of education, the Environment Bureau of the City of Sendai Government, and other regional partners. Kesennuma Omose Elementary School is currently designated as a model distant school. Kesennuma City is one of the most remotely located municipalities in Miyagi Prefecture with about 60 thousand inhabitants. Some part of Kesennuma is the designated area of Rikucyu-Kaigan National Park, and tourism is one of the important industries in the city in addition to fishery.

By organizing "Kesennuma Omose Elementary School (OES) Project Partnerships Promotion Committee" (see Table 4.2), OES has developed and implemented what it calls an "inquiry-based global environmental education program" across the

entire school grades (first through sixth grade) in collaboration with MUE and other research institutes and the local community (Oikawa, 2004a, 2004b). Along with other specialized knowledge institutions, local government, and local industry organisations, MUE provides guidance on the development of the EE programme at OES, assists the implementation of the programme, and dispatches guest teachers to OES. Since the EE programme of OES has been developed by forging dynamic partnerships with local civil society, learning processes of individual students at OES are closely linked to regional development processes (see Box 4.3).

**Table 4.2. Members of Kesennuma Omose Elementary School Project Partnerships Promotion Committee
(19 organisations, 28 individuals)**

Specialized Knowledge Institutes	Local Government (Public Sector)	Local Industry Organizations (Private Sector)	Educational Organizations
<ul style="list-style-type: none"> ■ MUE ■ Sendai Science Museum ■ Shizugawa Nature Center ²⁰ ■ Rias Ark Museum of Art ■ Kesennuma UNESCO Association 	<ul style="list-style-type: none"> ■ Miyagi Prefectural Kesennuma Civil Engineering Office ■ Environmental and Health Division, Kesennuma City ■ Planning and Policy Division, Kesennuma City ■ Kesennuma Small International Embassy ■ Kesennuma City Board of Education 	<ul style="list-style-type: none"> ■ Kesennuma Office of Tohoku Electric Power Co., Inc. ■ Kesennuma Society of Architects & Building Engineers ■ Tuna Fisheries Co-operative of North Miyagi Prefecture ■ Regional Fishermen of Oyster Farms 	<ul style="list-style-type: none"> ■ Kesennuma Greenmates (local volunteer group) ■ Kesennuma Omose Junior High School ■ Kesennuma High School ■ PTA of Omose Elementary School ■ Omose Elementary School Council

MUE's collaboration with local schools may constitute an important part of its research activities, for it allows MUE to collect data on the school sites, implement a pilot curriculum, and evaluate it. Outcomes of the research conducted by MUE in collaboration with local schools will contribute to the contents of the EE database and teaching materials MUE is developing. Indeed, research and outreach/service are mutually complimentary for MUE. To further enhance educational outreach and public service, MUE is also developing a regional EE network. MUE launched the email list "EE Tohoku Consortium" (eec-tohoku-request@miyakyo-u.ac.jp), a community consortium which aims at developing a system to support school EE at the regional level. This consortium was initially organised by members of the Japanese Society of Environmental Education in the Tohoku Region in order to respond to the local schools' requests for assistance to carrying out EE programmes. So far 100 people have been added to this list.

Box 4.3. Main Actor of the Greater Sendai Area RCE (3): Formal Education Institutions (Local schools)

Partnerships to Promote School EE in Kesennuma City

An ongoing experiment of the vertical alignment of EE curriculum from primary through high school in Kesennuma City started with voluntary actions of one teacher at Kesennuma Omose Elementary School (OES)—Mr Yukihiko Oikawa. As an alumnus of MUE and a former student of Professor Koganezawa, Mr Oikawa—together with the school principal Mr Kikuchi and the superintendent of the Kesennuma City Board of Education Mr Abe—has been instrumental in integrating the expertise of MUE with the best of educational practice of the community and regional partners.

²⁰ Sizugawa Town, which lies approximately 40 kilometers south of Kesennuma City, invited Dr Yokohama, Professor Emeritus of Tsukuba University and former Director of Shimoda Marine Research Centre of Tsukuba University, to serve as the Director of Sizugawa Nature Centre in 1999, offering him a post equivalent in rank to the deputy mayor. With Dr Yokohama's appointment as the Director, Shizugawa Nature Centre started EE centred on seashore experiential programmes for elementary and secondary school students such as making "pressed seaweeds" and rocky shore observation outings. As an expert on marine ecosystem, Dr Yokohama collaborates with Kesennuma Omose Elementary School in various capacities, including participating in the school's EE programme for fifth graders as an advisor (see Box 4.3).

(Box 4.3. Continued)

A systematic EE programme at OES—called “inquiry-based global environmental education program”(Oikawa, 2004a, 2004b)—aims at fostering an appreciation of nature and an understanding of ecosystems and environmental issues in children by utilizing the aquatic environment and regional characteristics of Kesennuma as a fishing port. For example, third graders create “BUGS Cyber Maps” based on the observations of dragonflies and other waterside life and consider the quality of the environment for these insects. Fourth graders learn about the ecological food chain and the conditions necessary to preserve the rich environment by gathering, observing and cultivating indigenous fish of the Omose River. A programme for fifth graders is centred around the broad theme of the sea. Students deepen their understanding of the sea through observation and cultivation of shoreline marine life, visits to Sizugawa Nature Center, and learning about the relationships between healthy forests and rich marine life. They also consider the connections between human life and the ocean environment by making field trips to observe long-line tuna fishing boats and oyster farms and learning about the main industry of the City fishery. Sixth graders consider how Kesennuma’s city, forest, river, and ocean can coexist and what Kesennuma City should look like in the future. The students contribute their ideas to planning and creating a miniature model of the entire city titled “Waterfront City of the Future”. Various regional partners offer guidance and advice to students in these learning processes (see Table 4.2).

In addition to establishing partnerships with MUE and local civil society, OES has secured additional resources to develop and run the “global inquiry-based environmental education programme” by taking advantage of external funding. OES participated in the Fulbright Memorial Fund’s Master Teacher Program (MTP)²¹ and Miyagi Prefectural Board of Education’s School Revitalization Proposal Model Project. MTP was launched by the Fulbright Memorial Fund in 1999. It aims to bring elementary, junior high and high schools in the United States and Japan together in a collaborative exchange and education process utilising Information and Communication Technology (ICT). US and Japanese schools form teams to collaborate on a long-term (one academic year at shortest) environmental project. Through MTP, OES worked with Lincoln Elementary School, which collaborates with the University of Wisconsin in teaching EE, for three years between 2002 and 2005. This collaboration between OES and Lincoln Elementary School led to forging partnership between MUE and the University of Wisconsin. From FY 2005, OES, Omose Junior High School, and Kesennuma High School together will participate in MTP and work with their counterparts in Texas, thereby strengthening the vertical links in the formal education sector and enhancing their links with schools abroad.

Omose’s case is significant in that the local board of education fully supports innovative ways of collaborating among various stakeholders—local and global—to promote EE. The Kesennuma City Board of Education has an institutional mechanism to support and spread the pioneering, experimental case of EE at OES to different levels of education as well as to other elementary schools in the City. In Kesennuma City, an in-service teacher training programme called “Education Researcher Programme” is carried out by the Board of Education. These researchers consist of elementary and junior high school teachers, and they conduct research on cutting-edge education topics and present the results of their studies to schools across the City.

Kesennuma City is also promoting on-site environmental learning, utilizing the City’s rich nature—its forest, river, ocean, and island. There are experiential programmes on Ōshima Island, which host school trips from the City of Sendai and Iwate Prefecture and serve as a means to revitalise the community. There is also a plan to utilise National Park Resort Village on the island as a centre of EE. Another example is a famous tree-planting campaign which aims at growing healthy forests as a water source to nurture marine life. In Kesennuma, fishermen plant trees every year under the catchphrase of “The Forest is the Sweetheart of the Sea”. Fishermen have been cooperating with residents in mountainous districts in planting trees at an annual festival of the same name for more than 10 years, and the Governor of Miyagi Prefecture himself attends this festival. This campaign has made residents along the river more conscious of their impacts on the water and added richness to marine life.

In addition to supporting EE in the formal and non-formal sectors, Kesennuma City is taking a unique approach to community development consistent with sustainability principles. In March 2003, Kesennuma City declared itself Japan’s first “Slow Food City”.²² This means that the City is committed to promoting fresh, locally produced food. The declaration states that the City will “create a more unique and attractive community sustained by rich variety of local food while

21 See <<http://www.fulbrightmemoralfund.jp/>>.

22 Kesennuma’s Slow Food Declaration includes the following principles:

- We will protect the local natural environment—the sea, mountains and rivers that bless us with food—so that we may leave it in good condition for the next generation;
- We will cherish, use, and provide traditional foodstuffs, recipes, and fine quality foods and drinks that have been nurtured in the local climate and culture;
- We will protect and train producers who can provide safe, reliable, high quality foodstuffs;
- We will share the joy of food, the importance of a sense of taste, and the true richness of the spirit with others, including our children;
- We will respect the diversity of foods beyond the boundaries of region, country and beliefs, strive to deepen mutual understanding through communication, and eventually contribute to world peace.

conserving nature and culture". With the spirit of "slow food movement", which was initiated in Italy in 1986 in response to the opening of a major fast food chain, Kesennuma intends to work on community building through raising awareness of local people and collaborating with local businesses.

Another interesting example of an innovative approach to community development can be found in Tajiri Town, where the famous wild goose habitat site Kabukuri Marsh is located (See Box 4.4). Unlike in the case of Kesennuma, this partnership for community revitalization is led primarily by local NGOs. With the leadership of the Japanese Association for Wild Geese Protection (JAWGP), a diverse array of local stakeholders—NGOs, farmers, local and national government authorities, researchers—came to be dedicated to managing Kabukuri Marsh to maintain its ecological functions. Overcoming the initial antagonisms between those who called for the protection of wild geese and rice farmers who viewed wild geese primarily as harmful birds, Tajiri Town is aspiring to demonstrate a case of mutually beneficial coexistence between wild geese and farmers and to pursue the preservation of biodiversity (in rice paddies) and sustainable agriculture simultaneously.

Box 4.4. Main Actor of the Greater Sendai Area RCE (4): NGO

Partnerships to Promote Environmental Conservation and Community Revitalisation Led by a Local NGO

Tajiri Town may exemplify mutually respectful co-operation among NGOs, local citizens and educators, and authorities at all levels towards a sustainable future. In 1996, the Japanese Association for Wild Geese Protection (JAWGP) learned that Kabukuri Marsh would be dredged as a floodwater reservoir. In order to communicate the alternative of preserving the ecosystem of Kabukuri Marsh and enabling it to function as a floodwater storage area, JAWGP started nature observation outings and meetings with the local, prefectural and national government authorities and legislators as well as with local schoolchildren and teachers, farmers and other stakeholders. Consequently, various local stakeholders became involved and came to be dedicated to conserving the site.

A programme to utilise "Fuyumizu Tanbo" or winter-flooded rice fields started in 1998. "Fuyumizu Tanbo" is considered a viable strategy to address different environmental, ecological and agricultural challenges. In this programme, farmers convert to organic methods to lighten pollution loads and leave their fields flooded over the winter for the benefit of wintering water-birds. In December 2004, Tajiri Town started a programme to subsidize cooperating rice-growers, and 13 organic rice-growers who own rice fields in the area adjacent to Kabukuri Marsh participated in the programme. The adjacent area was formerly part of the wetland but reclaimed for agriculture, so it does not pose a major technical challenge to flood these rice fields which total 20 hectares. Researchers have joined Fuyumizu Tanbo Project, which was launched in April 2004, to scientifically examine whether winter flooding of rice lands has positive effects on soil and water conservation, agricultural practices, and habitat for wetland wildlife. Fuyumizu Tanbo Project includes the local, prefectural and national government authorities, school teachers and college students, researchers, rice farmers and other stakeholders.

JAWGP worked with Tajiri Town to facilitate the transfer of the official managing authority of Kabukuri Marsh from the River Management Department of Miyagi Prefecture to a local public corporation, which allowed a roundtable committee that includes all stakeholders to manage the site under a local ordinance. More than 30,000 wild geese are now being recorded wintering at Kabukuri Marsh. In July 2004, Tajiri Town was designated by the Ministry of the Environment (MOE) as one of thirteen model districts to promote eco-tourism in Japan, and pilot tours are organised to watch large flocks of wild geese and other migratory birds taking to the wing at dawn, flying to their daytime feeding areas. There are also tours to watch thousands of wild geese coming back to the site for sleep. In September 2004, MOE designated Kabukuri Marsh and adjacent rice fields as one of the fifty-four wetlands that meet the criteria for inclusion in the List of Wetlands of International Importance ("Ramsar List").

As a Ramsar candidate site, Kabukuri Marsh and the adjacent rice fields will be designated by MOE as a "wildlife sanctuary", a prerequisite to planned registration as a Ramsar site at COP9, which will be held in Uganda in November 2005.²³ If Kabukuri Marsh is designated as a Ramsar site, the Kabukuri-Izunuma Wetland Area will increase a potential of attracting tourists as an internationally-recognized wetland area. Today 45,000 white-fronted geese (designated as a protected species in Japan)—90 per cent of those which stopover in Japan—winter at Kabukuri-numa and Izunuma. Rather than building its economy on tourism, however, Tajiri Town will use the brand name of Ramsar to support its main industry of rice production and achieve a twin goal of development of the region and environmental conservation. Rice harvest from Fuyumizu Tanbo rice paddies is already selling at a much higher price than regular rice grown by more conventional methods with agricultural chemicals, and the demand for safe organic rice—especially Fuyumizu Tanbo rice which gives people hope for sustainable society—is expected to continue to be high. By branding the Fuyumizu Tanbo rice also as Ramsar rice, Tajiri Town will pursue environmental preservation and economic development simultaneously.

²³ Ramsar COP 9 is the 9th ordinary meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar 1971).

4.3 Towards the Greater Sendai Area RCE: Evolving Processes

4.3.1 Embarking on the RCE Initiative

In February 2004, MUE held the Seventh UNESCO/Japan Seminar on Environmental Education in Asia-Pacific Region, "Environmental Education for a Sustainable Society: Principles and Practice of Environmental Education for School Children" in Kesennuma, jointly with MEXT and Japan National Commission for UNESCO. The UNU Rector Dr Hans van Ginkel was invited to give a keynote speech. On this occasion, the Rector visited Sendai and met the Mayor of Sendai. The Rector explained his idea on RCE and asked the Mayor to collaborate with UNU to realize RCE in the area. From April 2004 stakeholders in the area together with UNU-IAS have held several meetings to discuss how to establish an RCE in the Greater Sendai Area. In November 2004, UNU-IAS visited the office of the MUE President to brief the progress to develop RCE in the Greater Sendai area and to request the President to consider support of the whole university to promote RCE activities. The President expressed his strong support for promoting an RCE, based on his belief that MUE's contribution to the community must be enhanced.

As described earlier, many organisations in the Greater Sendai Area had well-established connections to UNESCO before the RCE initiative materialized in 2004. For example, the non-governmental UNESCO movement originated in Sendai in 1947, and the EEC of MUE was designated as the UNESCO-APEID Associated Centres focusing on EE in 2003. Furthermore, after attending the Johannesburg Summit, Professor Koganezawa of MUE decided to organise Tohoku Global Seminar, which has served as a forum for the key EE and ESD actors in Tohoku and other regions in Japan to come together and discuss ideas to promote DESD. Indeed, time is ripe for the Greater Sendai Area to embark on the RCE initiative.

It is no exaggeration to say that voluntary actions for a better society—be it for world peace, environmental conservation, educational reform, or sustainable development—and personal connections developed over time through the shared vision for a better future became the basis of the Greater Sendai Area RCE. Therefore, the proposed RCE does not begin by establishing connections to UNU and UNESCO or recruiting partners or forming working relations with local, regional and national authorities. Rather, since April 2004, various stakeholders in the area—including the central and local governments, a higher education institution, NGOs, local schools—together with UNU-IAS have discussed how to promote the Greater Sendai Area RCE by building on their existing activities and initiatives through a series of stakeholder meetings (April 2004, November 2004, January 2005 and May 2005). To date the stakeholder meetings have involved representatives from MUE, the City of Sendai, Kesennuma City, Kabukuri-Izunuma wetland area (Tajiri Town), Miyagi Prefecture, MOE, local NGOs, and UNU-IAS. These representatives include school administrators and teachers. At this stage, aside from UNU-IAS, all participating actors are in Miyagi Prefecture, but other groups and sites in the Area will be added as appropriate in the future.

4.3.2 Envisioning the Greater Sendai Area RCE

The Basic Plan of the Greater Sendai Area RCE is being prepared by local stakeholders. The Plan will overview the period of DESD and describe objectives, vision and goals of the RCE as well as activities. At the stakeholder meeting held in November 2004, UNU-IAS presented the following "global vision" of ESD embraced by UNESCO (2004) and asked for their reactions to it.

The vision of education for sustainable development is a world where everyone has the opportunity to benefit from quality education and learn the values, behaviour and lifestyles required for a sustainable future and for positive societal transformation. (UNESCO, 2004)

UNESCO (2004) states that the global vision of ESD "will find expression in varied socio-cultural contexts". While there is much emphasis on the importance of vision building in UNESCO's (2004) draft International Implementation Scheme for DESD as well as in this publication (see 3.5.1), discussions UNU-IAS held with the local stakeholders have pointed to the difficulty of coming up with a short, single statement of what the RCE in the Greater Sendai Area needs to become in order to address challenges of sustainable development. This difficulty is partly due to geographic diversity of the area which makes priorities for one sub-area irrelevant for another. For example, fishery is central to the regional development of Kesennuma City, while it does not have a place in Tajiri Town's vision of ESD which addresses the protection of wild geese and sustainable agriculture. The difficulty of building a vision of the Greater Sendai Area RCE can also be attributed to the pre-existence of highly articulated regional/local visions such as Basic Plans of Cities, Towns, and Villages, Long-term Development Plans of Prefectures, and Municipal Environmental Plans (Local Agendas 21). In addition, there are regional visions of education separate from regional policies with regard to sustainability.

Since Japanese municipalities have strong administrative capacities and have already developed visions to address sustainability issues and education problems specific to their locales, it would be inappropriate to ignore these existing visions and build a vision of RCE from scratch. Of course, this is not to deny RCE requires a long-term perspective on what is needed for sustainable development and how to achieve it. While achieving universal basic education or alleviating poverty may appear to be irrelevant in the Japanese national context, ESD could address different kinds of educational issues (such as bullying and school refusal syndrome) and other issues of regional and national concerns (such as the aging population, food safety, economic stagnation) and could revitalise Japanese society and lead local (national and sub-national) institutions and communities to a more sustainable future. It has also been pointed out that a vision of ESD needs to be built first, separately from a vision of RCE. The local stakeholders in the Greater Sendai Area reached a consensus that there can be more than one vision of ESD. Rather than contriving a highly abstract and far-fetched vision at this initial stage, each sub-area or participating organisation will come up with its own vision of ESD that it can relate to.

Each sub-area of the Greater Sendai Area will develop ESD based on its regional characteristics. The RCE will essentially be a mechanism to allow each participating actor to learn from each other. MUE will play a leading role and act as a coordinator of diverse locales in the Greater Sendai Area. Each actor will benefit from the diverse expertise, background and experience of one another. It has also been discussed that the launch of the Greater Sendai Area RCE should not discourage those organisations which are located in the Area but have not been involved in the process of creating the RCE at this stage from participating in the RCE in the future. The launch will inevitably cast spotlights on the activities of MUE, Sendai, Kesenuma, and Tajiri, while virtually ignoring activities carried out by other higher education institutions and other municipalities in the area. In order to make the RCE an inclusive and expansive endeavour, the local stakeholders agreed, it is important to have a clear understanding that activities highlighted in this chapter are not necessarily best practices or model cases but examples of possible RCE activities.

4.4 The Greater Sendai Area RCE in light of the Core Elements of RCEs

This section looks at the Greater Sendai Area RCE in terms of the core elements of RCEs: (1) governance, (2) scope of collaboration, (3) research and development, and (4) transformative education (see Chapter Three).

4.4.1 Governance and Sustainability of RCE

4.4.1.1 Methods of Operation and Decision Making

This section describes the formal actors involved in decision making and implementing the decisions of the Greater Sendai Area RCE and the formal structures set in place to arrive at and implement these decisions. The Steering Committee will be organised by key stakeholders in the Area to act as a decision making body on policy and management of the RCE. The Committee is scheduled to be launched on 24 June 2005. The tentative composition of the Steering Committee is shown in Table 4.3.

The UNU-RCE Promotion Committee of MUE, which was launched on 7 June 2005, hosts the Secretariat of the Steering Committee. In addition to assigning the Career Services and Coordination Division to take care of administrative matters, MUE launched the Liaison Council of University Centres, led by the Vice President. The Liaison Council coordinates all six affiliated centres of MUE, including EEC, International Education Center, and Special Education Center. This facilitates MUE to address diverse strategic perspectives of ESD not limited to the environmental perspectives and to undertake the responsibilities as the Secretariat of the Steering Committee of the Greater Sendai Area RCE. The launch of the Liaison Council of the University Centres at MUE shows much promise in terms of enhancing the role of higher education institutions in promoting ESD through interdisciplinary collaborations.

The composition of the Steering Committee reflects geographic diversity of the Greater Sendai Area at this initial stage of RCE, but there is a need to develop a mechanism to allow participation of actors from areas other than Sendai, Kesenuma, and the Kabukuri-Izunuma Wetland Area in the future.

Table 4.3. Tentative Composition of the Steering Committee of the Greater Sendai Area RCE

Geographic Scope		Organization(s) representing the Greater Sendai Area as a whole and each sub-area
The Greater Sendai Area as a whole		UNU-RCE Promotion Committee of Miyagi University of Education Environmental Policy Division of Miyagi Prefecture Environment Bureau of the City of Sendai Ministry of the Environment UNU-IAS ESD Tohoku Global Seminar <i>Kahoku Shimpō</i> (local newspaper) Tohoku Office of Japan International Co-operation Agency (JICA)
Sub-area within the Greater Sendai Area	Sendai	Forum for Environmental Education and Learning in Sendai, City of Trees ("FEEL Sendai")
	Kesennuma	Kesennuma Omose Elementary School Kesennuma City Board of Education
	Kabukuri-Izunuma Wetland Area	Tajiri High School Japanese Association for Wild Geese Protection (JAWGP)

4.4.1.2 Long and Short Term Financial Arrangements

Good governance means that the RCE produces results that meet the needs of the region while making the best use of resources at its disposal. It is not so easy to secure additional resources to operate the RCE. Since it is unfeasible to collect money from each of the three sub-areas (Sendai, Kesennuma, Kabukuri-Izunuma Wetland Area), participating organisations' resources secured for their current activities will be used efficiently to set the RCE in motion. This arrangement also rules out the possibility of main actors' quitting RCE as soon as the external funding runs out. MUE will allocate its budget for cross-academic subject/inter-disciplinary projects to carry out RCE-related activities in the immediate future. In order to access external resources to expand their activities, RCE stakeholders both individually and collectively will apply for grants of MEXT, Japan Fund for Global Environment and other funds. As RCE stakeholders create synergies between existing projects in the Greater Sendai Area, they will be able to improve the opportunity of gaining major grants.

4.4.1.3 Other Resources

As the case of Kesennuma Omose Elementary School demonstrates, schools can develop locally-relevant ESD by taking advantage of the expertise and resources offered by local research and other knowledge institutes. The City of Sendai is a home to close to twenty higher education institutions, a science museum, an observatory, and botanical gardens, which can enhance the local knowledge base of the Greater Sendai Area.

4.4.2 Collaboration

4.4.2.1 Existing Collaboration and Networking

UNU envisions RCE as a group of existing organisations of formal, non-formal, and informal education who are mobilized to deliver ESD to a regional community. In essence, it is a network of knowledge institutions (universities and formal education institutions at all levels), governments, NGOs, civil society organisations, corporations, and so on. Three sub-areas that constitute the Greater Sendai Area have their own cross-sectoral networking and partnerships. In addition, overarching networks that cover all three areas such as Tohoku Global Seminar and MUE's Environmental Education Tohoku Consortium have been established. Table 4.4 lists main participating organisations, and Figure 4.3 shows exiting collaboration and networking in the Greater Sendai Area RCE from the perspective of MUE. There is a need to establish a mechanism to promote RCE activities in areas other than Sendai, Kesennuma, and the Kabukuri-Izunuma Wetland Area.

Table 4.4. Main Participating Institutions/Organisations of the Greater Sendai Area RCE

Sub-area	Main Participants
Overarching Organizations	Miyagi University of Education Tohoku Global Seminar (Secretariat: Igune school in Sendai) Environmental Policy Planning Division of Miyagi Prefecture UNU-IAS
Sendai	"Forum for Environmental Education and Learning in Sendai, City of Trees" ("FEEL Sendai") (Secretariat: Environment Bureau of the City of Sendai) City of Sendai
Kesennuma	Kesennuma City Hall Kesennuma City Board of Education Omose Elementary School (OES) OES Project Partnerships Promotion Committee (see Table 4.2) Omose Junior High School Kesennuma High School
Kabukuri-Izunuma Wetland Area	Tajiri Municipal Government (Tajiri Town Office) Tajiri Board of Education Tajiri High School Farmer's co-operative NPO Fuyu-Mizu-Tanbo(Winter Flooded Rice Field) Project NGOs (e.g., JAWGP, Numakko Club)

4.4.2.1 Enhancing Outreach/Service Function of MUE

MUE's collaboration with Omose Elementary School has achieved significant results, but NGOs have not been included in this collaboration. MUE will work more closely with NGOs in Kesennuma City. On the other hand, in Tajiri, NGOs are very active and collaboration between the central and local governments and local NGOs is noteworthy, but MUE has not been actively involved in promoting EE in the area. MUE will carry out EE programmes in addition to the Friendship Project in Tajiri. In Sendai, partnerships between MUE and NGOs are well established, but MUE needs to facilitate partnerships between formal and non-formal education sectors by working more closely with the local boards of education and the Environment Bureau of the City of Sendai. MUE will influence the Miyagi Prefectural Board of Education and the the City of Sendai Board of Education to be active for promoting RCE activities at school levels by enhancing the tripartite collaboration between the three organisations.

Since it is not always easy for faculty members to travel to remote municipalities such as Kesennuma and Tajiri, ICT will be further utilised to enhance MUE's outreach activities. Through experience of working with local schools, MUE feels that video conferencing is not particularly effective for those who have never met. Therefore, MUE will continue to emphasise site visits and the establishment of connections with students and school teachers via face-to-face communication.

4.4.2.3 Expanding the Scope of Collaboration

Currently MUE is taking the lead in developing the Greater Sendai Area RCE, and no other IHE is involved in the process of developing the RCE. In addition to MUE, there are one national, one prefectoral, and eleven private universities as well as six junior colleges and two technical colleges in Miyagi Prefecture. While MUE is undoubtedly in an ideal position to take leadership in the RCE, the expertise of MUE is limited in the sense that it is a teacher-training institution and it does not have research capacities in certain areas relevant to addressing major sustainability issues. There is a clear need to engage other IHEs in the RCE in the near future. With its emphasis on positive aspects of collaboration and partnerships, the RCE concept largely ignores the fact that IHEs often compete to obtain grants from foundations, different levels of government, and other sources to fund their research and other activities. The banner of RCE may put MUE in an advantageous position in this competition. Unmistakably, there is a hierarchy of IHEs in the Greater Sendai Area in terms of prestige, resources, and research capacities. It is easy to state that the RCE will expand over the DESD to include a variety of partners, but the challenge is not so much to develop interest from other IHEs to join the RCE as to make strategic decisions about future partners. There is a need to discuss the timing and method of going beyond the initial partner group and expanding the scope of collaboration.

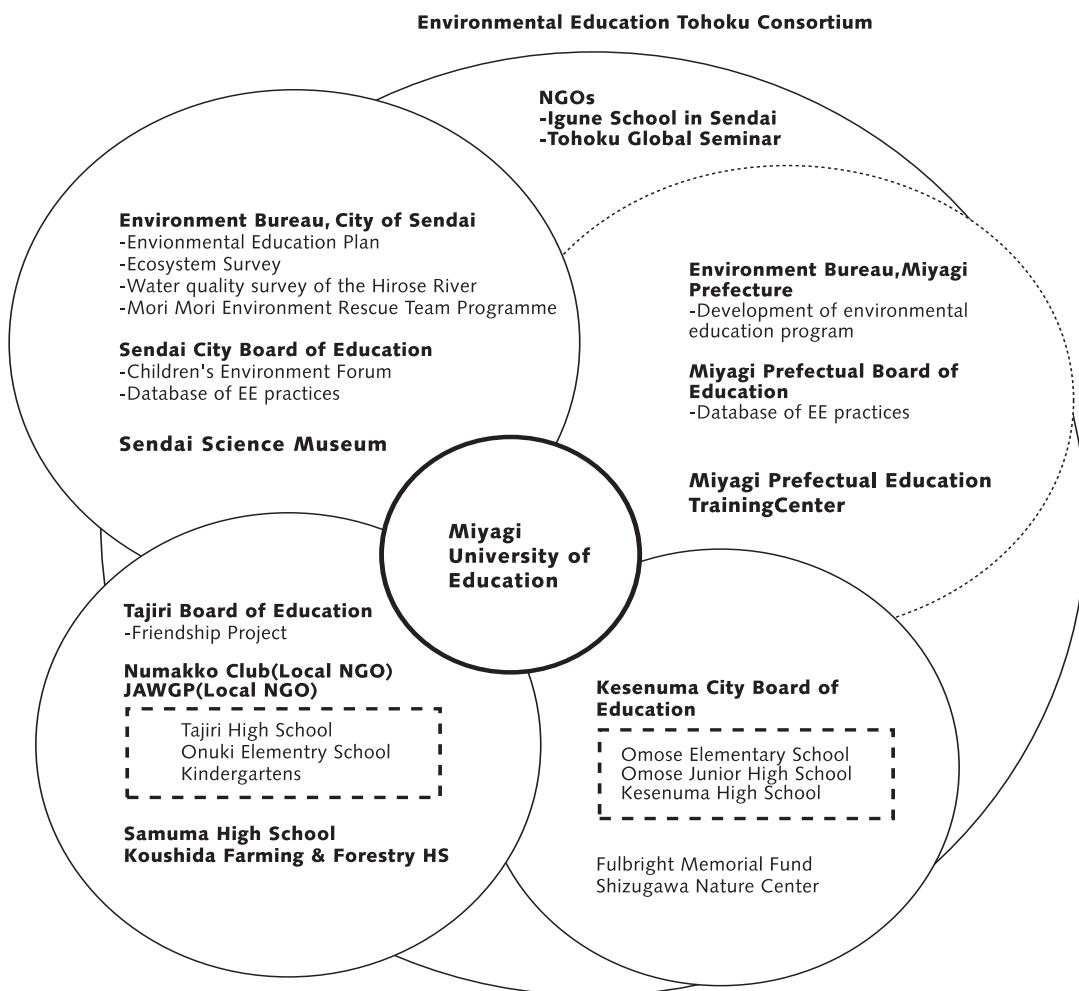


Figure 4.3. Existing Collaboration and Networking in the Greater Sendai Area from the Perspective of Miyagi University of Education

4.4.3 Research and Development

4.4.3.1 Planned Research Activities

Research is the basis for gathering information for evaluating the progress of RCE and for improving future practices. The draft DESD International Implementation Scheme points out the importance of conducting research on “[institutional] arrangements, modes of partnership and approaches to management in ESD with a focus on identifying and disseminating good practice” (UNESCO, 2004). Since October 2004, UNU-IAS, in collaboration with local stakeholders, has been conducting a qualitative baseline study to establish markers against which the progress of the Greater Sendai Area can be measured over the Decade and explored the specific nature and methods of ESD in the Greater Sendai Area.

MUE leads the incorporation of the work of RCE partners to promote integrated approaches into ESD. Building on the exciting activities of EEC (see Box 4.2), MUE analyses, synthesises and disseminates lessons learnt about ESD through collaboration with RCE partners. For example, a longitudinal study will be designed to collect data related to the effect of EE on the values, attitudes, and behaviours of individuals in Kesenuma. This longitudinal study will be made up of students who received EE at Omose Elementary School in the 2003-2004 academic year as part of the Master Teacher Program (MTP). These students will be surveyed during their attendance at Omose Junior High School and Kesenuma High School.

4.4.3.2 A Local/Regional Knowledge Base

In addition to making a wealth of data on ESD as practiced in the framework of RCE available, RCE advises and supports organisations of formal, non-formal, and informal education sectors in the region in how they can contribute to DESD more effectively and provides technical support in the area of education and training at key stages of DESD as well as in other, related UN system-wide processes as UNLD, MDG, and EFA. In other words, RCE develops regional capacity to supply consultancy services in ESD. RCE will design and facilitate formal trainers' training in ESD and identify and mobilize potential regional individual and institutional partners for more successful implementation of ESD at the regional level.

Within the context of UNU-IAS' strategic approaches to sustainable development and the framework of DESD, RCE will contribute to enhancing local (sub-national and national) capacity to mobilize and obtain social and political support for ESD, as well as to building local/regional capacity to supply technical and academic support in implementing culturally appropriate and locally relevant ESD. A local knowledge base which assists RCE activities will be built, with MUE playing the central role. MUE, in collaboration with other partners in the Greater Sendai Area, leads the process of ensuring availability and use at the regional level of technical information, best practices, lessons learnt, and other resources to improve the effectiveness of the RCE. Basic information will be made freely available and directly accessible to all stakeholders in easily understandable forms and media. Part of the information will be disseminated through the web site mentioned below (4.4.4.1). The creation of a local knowledge base will promote inter-RCE exchange of such information, thereby leading to a Global Learning Space for Sustainable Development.

4.4.4 Transformative Education

4.4.4.1 Public Awareness

Developing public understanding and awareness is one of the four major goals of ESD described by Chapter 36 of Agenda 21 (see Part 1 Chapter 1.1) as well as a crucial aspect of promoting RCE and mobilising more actors for ESD. As an important undertaking which aims at raising public awareness and improving educational practices, MUE holds "UNESCO-Asia Pacific Region Environmental Education Seminar" every other year. The next seminar is scheduled to be held in the City of Sendai in November 2005. The broad theme of the seminar will be ESD. In addition to holding ESD-related conferences, seminars and workshops, to raise awareness of the local people about ESD, DESD and RCE, it is desirable to create a brochure explaining these concepts in the local language (Japanese) and make copies available to the general public. It is also desirable to establish a web site of the Greater Sendai Area RCE and make key information available online. Local stakeholders need to discuss how to share costs for promotional publications and managing the web site.

On 25 June 2005, a seminar commemorating the inauguration of the Steering Committee of the Greater Sendai Area RCE will be held as part of the First Tohoku Global Seminar of 2005, inviting local media. Media and advertising agencies are the key to creating a broad public awareness and a sense of ownership over the Greater Sendai Area RCE to ensure that RCE achieves a wide impact on a regional scale. Tohoku Global Seminar will continue to play an important role in raising public awareness about RCE, ESD, and DESD. It has already started working with the major local newspaper *Kahoku Shimpō*, and this collaboration is expected to be enhanced. Responsible media organisations committed to creating an informed public are essential for the successful implementation of DESD. It would be desirable to incorporate the demonstration RCE projects into a high level strategic communications strategy for ESD coordinated at the national and global levels.

As the biggest consuming region and the business centre in Tohoku, Sendai will emphasise educating its citizens and businesses about sustainable production and consumption through green purchasing and activities of "Forum for Environmental Education and Learning in Sendai, City of Trees" (FEEL Sendai). By linking Sendai's social education and awareness raising activities with the "slow food" movement of Kesennuma and Fuyumizu Tanbo Project of Tajiri Town (see Box 4.4), the Greater Sendai Area RCE can address the issues of health, food safety, regional development, and sustainable production and consumption effectively. During April 2005 and March 2006, Tohoku Global Seminar will be held in sub-areas of the Greater Sendai Area (e.g. Kesennuma and Tajiri), not just in the City of Sendai, thereby connecting diverse activities and initiatives in the Area more tightly.

4.4.4.2 Education System

Reorienting school education

The Draft Asia-Pacific Regional Strategy for DESD (UNESCO Bangkok, 2005) highlights the role of APEID in the reorientation of existing programmes, and the MUE projects to develop a cross-academic subject (interdisciplinary) EE curriculum, EE Techno Core, and the database of environmental education will contribute to reorienting school education

towards sustainable development.

From FY 2005, Omose Elementary School (OES), Omose Junior High School, and Kesenuma High School together will participate in the Fulbright Memorial Fund's Master Teacher Programme, thereby strengthening the vertical links in the formal education sector. In addition to enhancing collaboration between different levels of formal education, participation in RCE is expected to facilitate relations between MUE, local schools, and local actors relevant for ESD. It will be arrogant for UNU to claim that the Greater Sendai Area RCE will facilitate communication between Mr Oikawa and MUE or between Mr Oikawa and other local stakeholders. For example, over ten years the Environment and Health Division of Kesenuma City Government and OES have jointly conducted water quality inspection of the Omose River through bio-assessment of aquatic life of the River. The Environment and Health Division gives advice and guidance on the "Waterfront City of the Future" project of sixth graders at OES, not simply because it is a member of the OES Project Partnerships Promotion Committee but because it has a long established relationship with OES (see Box 4.3). Personal and professional relationships Mr Oikawa has cultivated with the faculty and staff of MUE and local stakeholders are irreplaceable and cannot be duplicated easily. However, the RCE can facilitate relations between formal and non-formal education as well as different levels of formal education by creating an institutional mechanism of collaboration and legitimating and disseminating innovative undertakings at Omose to other schools in the Greater Sendai Area.

Reorienting the University curriculum

MUE can address issues in ESD by linking EE and ESD. This will be achieved partly by a curricular reform. By 2007, MUE will regroup interdisciplinary subjects (e.g., EE, human rights and welfare education, education for international understanding, special education) as sub-major subjects to train human resources who can contribute to ESD. MUE also hopes to enhance the basics of EE in undergraduate courses.

Campus operation towards sustainable development: Eco-Campus and Barrier-Free Campus Initiative

At MUE, there is an emerging 'Eco-Campus' initiative aiming at preventing global warming, saving energy and resources, and promoting reuse and recycling. In addition, a 'Barrier-Free Campus' initiative aims at making the campus sensitive to the needs of the physically challenged.

4.4.4.3 Training System

Strengthening pre-service and in-service teacher training

The successful implementation of ESD will unavoidably depend on the quality, commitment and expertise of the teacher. There is a need for capacity development at levels closest to schools and teachers. In order to strengthen pre-service and in-service teacher training towards sustainable development, MUE will

- strengthen a supportive structure for lifelong learners;
- enhance Friendship Project (see Box 4.2); and
- develop University extension courses on the satellite campus in Kesenuma City, which provides teachers with opportunities for co-learning with local people and local NGOs. This workshop will be offered as a graduate credit course in EE for teachers in their tenth year in the profession.

Corporate training

RCE needs to encourage values and skills within a company in alignment with sustainability principles. Increasingly, large corporations are embracing sustainability and corporate social responsibility (CSR) goals at the strategic level. While corporations will need to be equipped with an integrated set of corporate values and people with the knowledge and skills to address sustainability issues, there have not been substantial discussions about the state of corporate education and training on sustainability and CSR among the main actors of the Greater Sendai Area RCE. The City of Sendai will continue to promote green purchasing in order to advance responsible corporate citizenship, but there may be a need to involve local businesses in ESD more explicitly not only as supporters or providers of EE in schools and in the non-formal setting but also as promoters of corporate training in SD. As MUE is a teacher-training institution, it neither has a strong link to local business communities nor offers training for business people. While there are important EE activities carried out by corporate groups widely recognized by main actors of the Greater Sendai Area RCE, such as energy education delivered by Tohoku Electric Power Co., Inc., it has not been realistic to include corporate groups systematically in the process of developing the RCE so far. As a first step to enhance corporate training, discussions need to take place as to how to involve other IHEs in the Area which train current and future business leaders and managers.

4.5 Promises and Challenges of the Greater Sendai Area RCE

4.5.1 From EE to ESD

Those currently involved in the Greater Sendai Area RCE are primarily stakeholders in EE. Given the holistic and crosscutting nature of ESD, moving from EE to ESD is a key challenge for the successful implementation of RCE in the Greater Sendai Area. Stakeholders in EE do not necessarily overlap with stakeholders in other important components of ESD such as human rights, gender equality, peace, and poverty reduction. At the initial stage of launching the RCE, it is difficult for each participating organisation to address all fifteen strategic perspectives of ESD listed in UNESCO's (2004) draft DESD International Implementation Scheme.²⁴ While one obvious solution lies in forming a working coalition with stakeholders in non-EE components of ESD regarding RCE activities, identifying potential regional partners and inviting them to join the RCE at this stage will significantly delay the process of launching the RCE Steering Committee. It is not feasible to engage stakeholders in all ESD-related areas at the outset. Based on a clear recognition that EE is not synonymous with ESD, therefore, the current key actors of the Greater Sendai Area have held substantial discussions about how to expand the scope of their current activities.

One of the strengths of the Greater Sendai Area RCE is its internal diversity in terms of geography and industries. For example, Tajiri, a major rice producing area, will address biodiversity and sustainable agriculture, while Kesennuma, a major fishery harbour and a "slow food" city, will link formal and non-formal educational learning to regional development. Both Tajiri and Kesennuma address an important issue of food safety, and the RCE can link the food safety movement by food producers with the movement to educate urban consumers in Sendai. The RCE may organically link unique community revitalization initiatives in Kesennuma and Tajiri and show concrete examples of relating learning processes of individual students to sustainable regional development. With the involvement of diverse areas, the Greater Sendai Area RCE can also address the strong role rural communities can play in ESD as well as the role of urban communities.

Whereas a general consensus has been established that the Greater Sendai Area RCE *as a whole* will cover strategic perspectives of ESD, this is a compromise to start operating as the RCE and should be regarded as a preliminary step towards becoming a full-fledged RCE as envisioned by UNU. How to address all three spheres of sustainable development through RCE activities is an important question that deserves further discussion and is a major challenge for realizing the potential of the Greater Sendai Area RCE. The specific challenge to the City of Sendai lies in developing an institutional framework to promote ESD by coordinating different bureaus and sections that have jurisdiction over different components of ESD. Smaller administrative units of Tajiri Town and Kesennuma City have fewer hurdles to overcome in order to address multiple environmental, socio-cultural, and economic issues. For example, Tajiri Town has a single administrative unit called the "Division of Agricultural Policy Planning, Commerce and Industry, and Tourism".

Due to the all-embracing and cross-sectional nature of ESD, the question of supervisory authority of ESD is a common challenge for public administration at all levels. ESD-J (Japan Council for the Promotion of the DESD) requested the Japanese Government to establish the DESD Promotion Headquarters in the Cabinet Office and develop a national framework for promoting DESD. This clearly indicates that ESD is an expansive undertaking that cannot be entrusted to a single ministry. At the national level, ESD neither belongs entirely in the competence of MEXT nor comes exclusively under the jurisdiction of the Ministry of the Environment, which has promoted EE. At the prefectural and municipal government level, ESD needs to be undertaken both by the Board of Education, which is responsible for implementing formal education curricula, and the Environment Bureau, which promotes EE in collaboration with local NGOs.

²⁴ Fifteen strategic perspectives of ESD consist of seven socio-cultural perspectives (human rights, peace and human security, gender equality, cultural diversity and intercultural understanding, health, HIV/AIDS, governance), five environmental perspectives (natural resources, rural transformation, sustainable urbanisation, disaster prevention and mitigation), and three economic perspectives (poverty reduction, corporate responsibility and accountability, market economy).

4.5.2 Promoting ESD in the Formal Education Sector

4.5.2.1 Structure of Education Administration in Japan

In Japan education is a national, prefectural, and municipal responsibility. MEXT provides guidance and advice to prefectural governments on how education should be done. Recent reforms have handed over more power to prefectural governments, but MEXT's guidance and advice are still diligently observed with the worry that straying from them might result in budget cuts and other sanctions. Every prefectural government has its own Prefectural Board of Education that directs prefectural schools and private schools. This Prefectural Board of Education has a wide range of responsibilities including, but not limited to, choosing textbooks to use, hiring teachers, and along with the governor, drafting the budget. Both the MEXT and the prefectural government give guidance and advice to municipal governments which have their own municipal boards of education. Since Sendai is a designated city, the City of Sendai Board of Education has more autonomous rights (including authority over personnel issues) than the boards of education of other ordinary cities, towns and villages in Miyagi Prefecture.

Given this structure of education administration, it is crucial that MEXT encourages schools to incorporate ESD as integral parts of educational objectives and school curricula. A piece of paper from MEXT to the prefectural and municipal boards of education indicating its endorsement of ESD would make the life of those teachers trying to implement ESD at school in collaboration with local civil society much easier. At present, NGOs and other groups tend to go directly to an individual school, rather than go through the inflexible local board of education, to carry out innovative educational programmes.

4.5.2.2 Promoting Interdisciplinary and Comprehensive Studies and Collaboration between Schools and Local Civil Society

While the "Period of Integrated Study" (PIS) provides an appropriate framework for promoting ESD in schools (see 4.1.1), many teachers are perplexed as to how to teach PIS. Traditionally teachers have not been trained to teach cross-cutting, real-life problems away from textbooks, and pre-service and in-service teacher training needs to address this issue. For some, PIS is becoming a negative symbol of the seemingly failed policy of "relaxed education". Since the new Courses of Study were introduced to elementary and junior high schools in 2002 and to senior high schools in 2003, it is too early to judge whether they work or not. Discussions surrounding PIS, however, do illustrate the very difficulty of implementing interdisciplinary and comprehensive studies in elementary and secondary schools as well as of forging dynamic partnerships between schools and local civil society.

As the case of Kesennuma may exemplify (see Box 4.3), there are many encouraging examples of collaboration between formal and non-formal education sectors. In Tajiri, the local NGO Numakko Club offers EE in local elementary schools with financial assistance from the local municipal government. This provides a good example where NGO is trusted not only by individual schools but also by the local board of education. Nevertheless, there are also many cases of lack of collaboration between schools and NGOs. Given the strong presence of environmental NGOs in the Greater Sendai Area, it is impossible for schools to implement all programmes suggested by environmental NGOs in terms of time availability, safety, and financial resources. It becomes problematic when NGOs are perceived by schools as undertaking their own projects at schools, rather than supporting lessons and help teachers achieve educational objectives. Despite their good intentions, NGOs which lack understanding of how schools work could be perceived as intrusive by school administrators and teachers. As many NGOs lack information on how schools operate and many teachers do not know how NGOs work, the Greater Sendai Are RCE should aim at offering more opportunities for teachers and NGOs to have dialogues and deepen mutual understanding. Activities of Tohoku Global Seminar and FEEL Sendai have contributed to providing such opportunities, and it is anticipated that the RCE will create a space for co-learning and co-operation among diverse stakeholders in ESD by building on these activities.

4.5.3 Towards a Global Learning Space for Sustainable Development

By working together with other RCEs in Japan, a Japanese Network of RCEs can be established, which will constitute a Global Learning Space for Sustainable Development. The Education for Sustainable Development Team at UNU-IAS has already started discussions with several other municipalities in Japan and higher education institutions around the globe about creating RCEs. On 28 June 2005, the Asia-Pacific Regional Launch of DESD will be held in Nagoya, Japan, in conjunction with the UNU/UNESCO International Conference "Sustaining the Future—Globalisation and Education for Sustainable Development". The Conference will bring together key actors in creating the first group of RCEs from different parts of the world—including the Greater Sendai Area, Toronto (see Chapter Five), and Rhine-Meuse region (see Chapter Six)—for the first time. As part of this Conference, on 29 June 2005, there will be a workshop on "Local and Regional Initiatives on Education for Sustainable Development", as well as an official launch of RCEs, which gives the stakeholders in

the Greater Sendai Area RCE opportunities to exchange information and network with stakeholders in other emerging RCEs.

In addition to interacting with other pioneering RCEs, to promote ESD and the RCE initiative worldwide, the Greater Sendai Area RCE can utilize international networks which its main actors have developed over time. For example, EEC of MUE has established connections with Chulalongkorn University (Thailand), Eco Center of Griffith University (Australia), and the Wisconsin Center for Environmental Education (WCEE) of the University of Wisconsin-Stevens Point (USA) and the Center for Biology Education (CBE) of the University of Wisconsin-Madison (USA). MUE may conduct RCE-related research jointly with these international partners. Municipalities have their own international networks as well. Other potential networks that can be utilized to make ripple effects around the globe are the network of "slow food" cities, to which Kesennuma City belongs, and the network of Ramsar sites, which Kabukuri Marsh and its adjacent rice fields will join in November 2005.

Chapter 5 Toronto: A Case of a North American Regional Centre of Expertise

By Joel Weiss, Charles Hopkins, Mary MacDonald, Robert S. Brown, Paul Harple and, Robert Spencer

5.1 Background

The November 2004 announcement from the World Conservation Union (IUCN) at its annual meeting in Bangkok was staggering. More than 15,000 plant and animal species are coming close to extinction. One in eight bird species, nearly one in four mammals and one in three amphibian species are at risk of elimination from the world's genetic pool. Today in Canada, the agency that monitors endangered wildlife (COSEWIC) reports that 33 species of animals and plants have disappeared, and a further 423 species are currently designated "at risk".

Human activity is the prime culprit, destroying wildlife habitat for agricultural, industrial and urban development purposes. All of the basic services and amenities that people need – food, water, shelter, clothing, transportation, waste management, recreation and community – come at some cost to the environment. But the degree of mankind's impact, commonly measured by our "ecological footprint", is dramatically different around the globe. It is true that our environmental impact can be managed, and therefore reduced, by considering the consequences to the environment of our social and economic decisions.

The loss of biodiversity is merely one of several pressing global issues. Since the human race is here to stay, the larger issue becomes how we can live in a more ecologically sustainable way. A challenge of this scale presents enormous opportunities and international organisations have answered the call to action by developing frameworks to guide countries in setting policy and allocating resources to meet environmental goals.

In December 2002, the United Nations General Assembly declared that 2005-2014 would be the UN Decade of Education for Sustainable Development. Sustainable development is an ever evolving concept that integrates environmental stewardship, economic development and the well-being of all people – not just for today but for generations to come. Education has been widely identified as a key and necessary element in moving sustainability forward.

It is well known that the worst offenders of the decay of our natural environment and its impact at the local, regional national and world levels are those inhabiting North America. We believe it would be informative to inquire about the various approaches taken in North America to not only reverse this trend, but to determine if real progress can be achieved. While nations have long negotiated the policies and parameters of sustainable development, it is at the community level where most of the progress will likely be made in the near future. As the largest city in Canada, the City of Toronto can and should play an important role in leading the sustainable development effort.

One of the sustainable city/regional efforts that are emerging internationally is the United Nations University Regional Centres of Expertise (RCE) initiative. This programme focuses upon the roles that can be played by education, public awareness and training regarding sustainable development in achieving more sustainable human habitats. While this entire report elaborates on the concept of RCEs, this chapter focuses upon Toronto as it emerges as the first RCE in North America. This is the story of both why Toronto makes a good launch site and sheds some light on how the RCE was constructed.

5.2 Sustainability and the City of Toronto

Toronto, Ontario has been a recognized leader in both sustainable development efforts, and education for sustainable development programmes. Part of an understanding of the city is to recognize that it is part of a country that was one of the first to ratify the Kyoto Accord. The province of Ontario through its Greenbelt Protection Act, 2004 Blueprint and "Places to Grow" documents is currently developing policies for balancing the interests amongst the natural environment and social and economic developments.

Toronto : Gateway to North America

City of Toronto is the 5th largest city in N. America after Mexico City, New York, Los Angeles, and Chicago

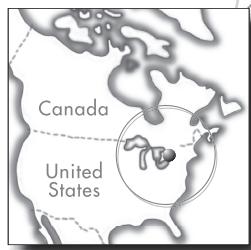


Figure 5.1. Geographical Location of Toronto Regional Centre of Expertise on ESD

Source : Corporate Finance, City of Tronto

The City is located on the northern shore of Lake Ontario, the easternmost of the Great Lakes, and at 2.5 million people, is the largest city in Canada. It is the fulcrum of the Greater Golden Horseshoe, the fastest growing metropolitan area in Canada (and one of the fastest in all of North America) that represents the economic engine of the country. It is a region that mixes a highly urbanized setting with mature suburbs and agricultural land undergoing transition. According to the Ontario Ministry of Municipal Affairs and Housing in their 2005 publication *Places to Grow: Better Choice-Brighter Future*, the Greater Toronto Area is expected to grow by more than three million people over the next thirty years. Toronto has been very much in the forefront in the important challenge of meeting the needs of the present without compromising the ability of future generations to meet their own concerns. It provides an excellent case study for how a cosmopolitan North American jurisdiction is facing issues in sustainable development from three interrelated perspectives: environmental problems, social developmental concerns, and economic considerations. There have been a number of initiatives surrounding education for sustainable development that address objectives for raising public awareness; creating educational programmes and policies; Higher Education initiatives; and public, private and NGO sector activities. In this chapter, we will describe some of the initiatives and challenges facing Toronto and several of its partners, and illustrate how working together strengthens the likelihood of success for both the present and the future.

The City of Toronto is a thriving, vibrant, multi-cultural city that is committed to global leadership in sustainability. "Diversity our strength" is the City's official motto and this diversity can be seen in the people, the economy, the natural environment and the cultural, recreational, technological and educational resources the city has to offer. The city has been recognized by The United Nations as the most multicultural city in the world.

The recognition of the benefits of diversity, including broad and on-going collaboration across sectors and interests, is at the heart of moving forward on sustainable community development. Toronto is well positioned to become a truly sustainable city through leadership, commitment, partnership and network building and innovation.

5.2.1 Current Conditions

A snapshot of existing environmental, economic and cultural conditions includes:

■ Natural Environment

The City of Toronto is situated within an ecosystem that includes over 300 kilometres of rivers and creeks that flow into Lake Ontario and that are part of the Atlantic Ocean Drainage Basin. With local, regional, provincial and national partners the City has plans and resources in place for storm water management, shoreline management, ravine protection, and coastal wetlands rehabilitation. The streams and rivers within the area are home to a variety of species including fish, stream insects and smaller microscopic organisms.

Currently, close to 20 per cent of the city is green space with a goal to reach a tree canopy of 35 per cent in the future. Due to public health and safety concerns linked to pesticides, Toronto is one of 65 cities in North America that have restricted the use of pesticides on public and private property.

Air quality is generally good when compared to other North American cities but can sometimes deteriorate when climatic and local conditions combine to result in higher concentrations of pollutants at ground level. The City has averaged 10 "smog alert" days per year over the last decade and has a set of protocols in place to reduce pollutant emissions from industrial processes and transportation during days of poor air quality.

■ Economy

Toronto is the corporate capital and financial centre of Canada and the fourth largest financial centre in North America. One-sixth of the Canadian workforce is employed in the Toronto region. Key industrial sectors for the city include aerospace, biomedical and biotechnology, business and professional services, design industry, fashion and apparel, financial services, food and beverage, information technology and telecommunications, and media.

Many of these sectors are supported in their bid for competitiveness by multi-disciplinary research institutions located in the City's universities and hospitals and in the private sector. Examples include the Medical and Related Science (MaRS) Discovery District that is dedicated to accelerating the rate of successful commercialization of research and innovation in Canada and the Centre for Research in Earth and Space Technology. Toronto is rich in world-class institutions of higher learning including The University of Toronto, York University, and Ryerson University. A strong cadre of Colleges of Applied Arts and Technology provide important training for a highly educated workforce.

■ Culture and Heritage

Arts, culture and heritage institutions and initiatives are central to quality of life in the City of Toronto. The City itself operates 12 cultural centres and 12 historic museums and is home to the Royal Ontario Museum, the Art Gallery of Ontario, and The Ontario Science Centre. Toronto ranks as the third largest theatrical city in the English-speaking world after London and New York. The City also has a Poet Laureate who serves as the City's literary ambassador and acts as an advocate for poetry, language and the arts.

It is also home to several cultural events that regularly draw audiences of over 500,000. These include Caribanna, The Toronto Jazz Festival, Taste of the Danforth for Greek Town, Indy Motor Racing, and Gay Pride Day. The Toronto Film Festival has grown over the last twenty years to become a world-class event. Toronto is the host for major league sporting teams in hockey, baseball, basketball, and lacrosse. The Opera, Toronto Symphony, National Ballet are well attended but so too is a unique cultural festival where over sixty ethnic groups host live cultural performances featuring food and entertainment of their community. Toronto embraces countless other community arts, cultural and heritage properties and programmes. Heritage and ethnicity are features that are warmly and visibly celebrated.

The Toronto Zoo is one of the largest zoos in the world and features more than 5,000 animals and 460 species in their natural environments.

5.2.2 Toronto's Challenges for a Sustainable Future

Like many large cities, Toronto has several major issues that pose a challenge to making broad progress on sustainability. The purpose of establishing an RCE in Toronto is to explore how education, public awareness, and training can help address the sustainability issues that are either currently facing Toronto or are anticipated in the foreseeable future. The following section outlines a few examples of the social, environmental and economic sustainability issues that Torontonians must address.

■ Homelessness

Homelessness is an on-going challenge in Toronto. The rise in homelessness is linked to a number of government policy decisions such as the withdrawal from funding new social housing by senior levels of government and reductions in social assistance benefits. There remains a lack of community-based mental health supports to help people who have been discharged from institutions

Toronto's economy is strong and continues to grow, but the people most vulnerable to homelessness - the people with the lowest incomes - do not appear to be seeing tangible benefits from economic growth. There is growing evidence of an increasing gap between rich and poor incomes

Some positive steps have been taken in recent years. Governments are working in a more collaborative fashion to address the problem. Over the last decade no new subsidized housing was built but plans are now underway to include rent-gearied-to-income housing and other affordable housing options in the new developments being planned on Toronto's waterfront and elsewhere.

■ Waste Management

The City ran out of landfill space in December 2002 and since that time has been transporting waste across the Canada/United States border to private landfills in the state of Michigan. A number of operational and cross border issues have created difficulties over the last two years. Longer wait times have been experienced as a result of U.S. Homeland Security and radiation detection systems. In addition, the State of Michigan has taken a number of steps regarding the management of its landfills.

Established in January 2001, the Waste Diversion Task Force 2010, comprised of all Toronto City Councillors, is charged with finding a 'made in Toronto' solution for waste diversion from landfill. The goal of Task Force 2010 is 30 per cent diversion by 2003, 60 per cent by 2006 and 100 per cent by 2010.

An extensive recycling programme is in place to divert waste from landfill. It includes management of separate waste streams for food and other organics as well as glass, paper and some plastics. These programmes have allowed the City to surpass its goal of 30 per cent diversion by 2003.

However, the City's current waste management programme is vulnerable to border closure or operational upset and long range transport of waste contributes to the build up of greenhouse gas emissions and air pollutants due to increased levels of transportation-related fossil fuel consumption.

■ Infrastructure

The City is falling behind with some of the building and maintenance of the infrastructure required to deliver on sustainability. Toronto's public transportation agency, a model to the rest of North America for many years, is now suffering from funding cuts from other orders of government.

The City is still almost entirely reliant on nuclear and coal-fired energy supplemented with hydroelectric energy to meet its energy demand. While coal-fired plants are scheduled to close in 2007, programmes and projects for renewable forms of energy such as wind, geothermal, solar and small-scale hydro power are still in their infancy.

5.2.3 Response to the Sustainability Challenge

In spite of on-going issues and challenges, the City of Toronto is committed to becoming a global leader in sustainability.

5.2.3.1 Council's Strategic Plan

Advancing sustainability at the local level requires a great deal of commitment and planning. Toronto City Council has approved a Strategic Plan that supports the underlying principles and strategies for achieving sustainability – which it describes as "integrating environmental, social, economic and fiscal perspectives in our actions."

The Strategic Plan incorporates many fundamental elements of sustainability including good governance, civic participation, equity, and social, environmental and economic vitality.

The Plan contains four critical vision statements:

1. Toronto is a caring and friendly city

There are opportunities to sustain and enrich our lives and reach our highest potential. The city's diversity is valued and celebrated and its communities are a source of pride. The city is actively involved in the social, cultural and political life of the community.

2. Toronto is a clean, green and sustainable city

The city integrates environmental stewardship into its daily activities. It maintains and improves the health of the environment for present and future generations.

3. Toronto is a dynamic city

As the nation's leading economic engine, the city is a centre of innovation and growth with a strong international presence, and is well positioned to succeed in the world economy.

4. Toronto invests in quality of life

The community invests in quality of life – socially, economically, culturally and environmentally – to make Toronto a desirable place to live, prosper and visit.

The City of Toronto's Official Plan site contains two areas of interest that are suggestive of ways for implementing these principles. The first is chapter 3, Building a Successful City; section 3.2.2, Community Services and Facilities, which articulates policies to encourage "adequate and equitable access to community services." The second is an overall theme of food security that encourages developers and builders to be aware of the needs for access to food sources and encourages urban agriculture in all planning applications.

5.2.3.2 Sustainability Leadership and Market Transformation

Two major developments in the City are taking an innovative approach to community revitalisation and land use planning that is consistent with sustainability principles. The Toronto Waterfront Revitalization Corporation, established in 2002, has worked with a variety of stakeholders from across the city to produce an innovative and progressive sustainability policy and implementation guidelines that are guiding all facets of procurement, planning, design, construction, operations and community programming on the more than 1000 currently underutilised hectares of land along the city's waterfront. This represents the current largest potential urban renewal programme of any major city in the world.

Council recently adopted planning approvals for the redevelopment of the Regent Park housing project in east downtown Toronto. Regent Park, built for low-income residents in the 1950s and 1960s, consists of more than 2,000 rent/geared-to-income apartments in blocks of buildings and has no public streets. The ambitious plan will replace the current buildings and create a sustainable mixed-income community in housing built on a traditional street grid.

Activities at Regent Park and the Toronto waterfront that include development and implementation of high standards for community consultation and inclusiveness, green building guidelines, and sustainable energy plans and technologies, are slowly shifting the development market away from business-as-usual to a more sustainable approach that will provide environmental, economic and social benefits to the city, the region, the country and the globe in both the short and longer term.

5.2.3.3 Innovative Community Collaboration

One of City Council's nine priorities for the 2003 –2006 term is to increase public involvement in civic affairs. To help meet this objective, the Mayor has invited individuals with experience and expertise to join six multi-stakeholder roundtables.

The Roundtables are an opportunity for concerned Torontonians to have input into the policies of the Mayor's Office and City Council. Each Roundtable is comprised of a small number of City councillors and a larger group of experts and stakeholders from relevant fields. They are convened to provide advice on 1) environment, 2) arts and culture, 3) beautiful city, 4) seniors, 5) access, equity and human rights and 6) children, youth and education.

Torontonians have identified litter as one of the top problems in the city today. As part of his successful election campaign, the Mayor promised to create a programme for cleaning up the city's parks, streets, laneways and ravines. The city had set ambitious goals for a five year period. From 2003 to 2007, the plan has been to reduce litter by 50 per cent, and a number of partners are involved in this venture. The 'Clean City Task Force', initiated by the Toronto Board of Trade in 2004, has participation by the City, the two school boards (Toronto District School Board and Toronto Catholic District School Board), Business Improvement Areas and other groups. This campaign is a good example of developing an effective way to educate the public, school children, and business groups around a locally based problem that has implications for the larger communities in which we live.

An important part of the Clean City campaign is the community clean-ups organised by the city, schools, police and other groups. This activity consists of a group of people coming out to clean up and improve an urban or natural area in their community. There are several ways that this has occurred: a day set aside for a quick weekday "20 minute makeover", where all are invited to improve their local space outside of their place of work, school, or home; and Mayor's Cleanup days, usually reserved for weekends and especially focusing on parks and other communal areas. An example of the success of this venture has been the development of The Clean City Community Clean-Up Guide by the Toronto District School Board (TDSB). This is just one example of how the schools have participated in education for sustainable development.

An important component in community development is to create policies for improving public safety. The Mayor's Community Safety Plan was approved by City Council in March 2004. The plan is "a package of prevention initiatives that will act as a catalyst for civic action to improve public safety." The Mayor's plan recognizes that an effective plan "must build on the communities' strengths in each neighbourhood."

5.3 Engaging Public Education to Address Sustainable Development

The Toronto Region is fortunate to have a history of excellent school districts and post secondary institutions that continue to display leadership in addressing social, environmental and economic issues. The city has three universities, several community colleges and two school districts funded with public funds, The Toronto District School Board and The Toronto District Catholic School Board. We will describe the Toronto District School Board (TDSB) as but one example and some of the additional initiatives it has undertaken around sustainable development issues.

5.3.1 Demographics and Socio-economic Characteristics of the TDSB

The TDSB is the largest school district in Canada and the fifth largest in North America, after New York, Los Angeles, Chicago and Miami-Dade. It has around 280,000 students attending over 550 schools according to official records (although if adult students are included, and all first semester, second semester and summer schools are added together, the number of students attending the TDSB at some point over the school year exceeds 320,000).

The complexity of the TDSB is not so much with its size, as with the characteristics of its students, which will be described below.

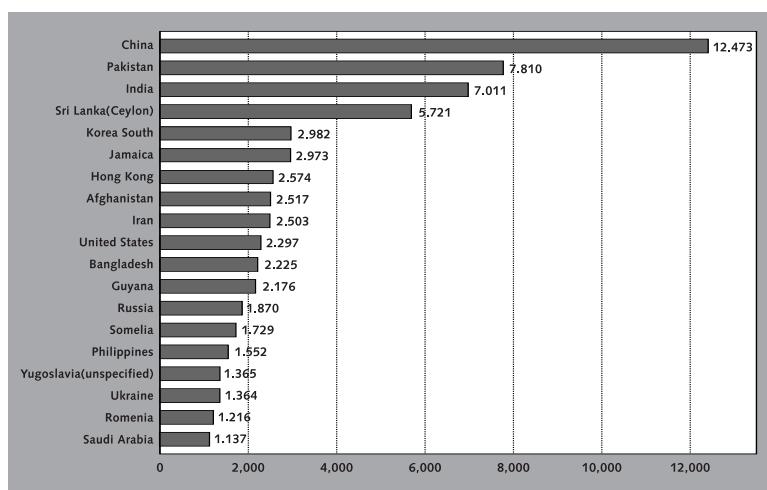
5.3.1.1 Demographic Characteristics

Nearly half (48 per cent) of Ontario students who have recently arrived from other countries attend the TDSB, although the TDSB has less than a fifth of all Ontario students.

The population description below is taken from a demographic profile compiled through a joint project of the TDSB's Data Warehouse and Research and Information Services, using information collected as of March 31, 2004.

Country of Birth

- 69.2 per cent (192,956) of TDSB students were born in Canada.
- 30.8 per cent (85,998) of TDSB students were born outside of Canada in more than 175 different countries.
- Of those TDSB students born outside Canada, the greatest numbers were born in China (12,473 or 4.5 per cent) and Pakistan (7,810 or 2.8 per cent)

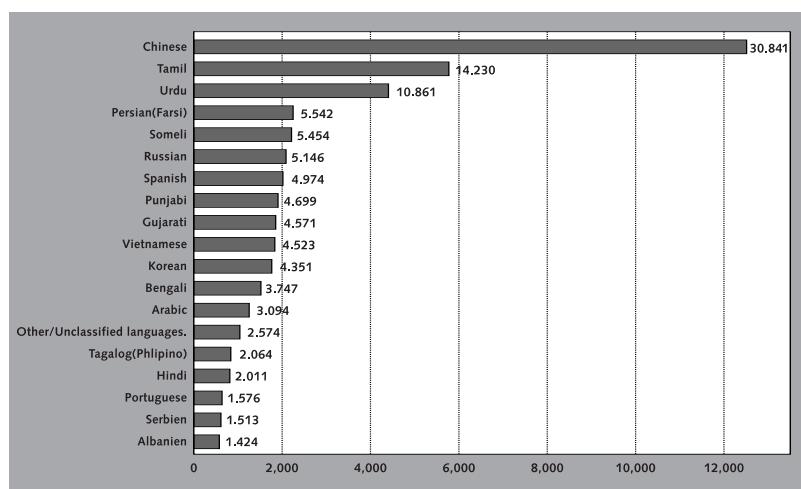


**Figure 5.2. Most Common Countries of Birth of Students Born outside Canada, Spring 2004
(Elementary and Secondary Schools)**

Source : TDSB's Data Warehouse and Research and Information Services, 2004

Language

- English is the mother tongue or primary home language of 53.3 per cent (148,660) of TDSB students.
- 46.7 per cent (130,306) of TDSB students have a language other than English as their mother tongue or as the primary language spoken in the home.
- Over 75 languages are reflected in the language background of TDSB students.
- Chinese and Tamil are the most common languages other than English of TDSB students: 11.1 per cent (30,841) of students have Chinese in their language background and 5.1 per cent (14,230) have Tamil.



**Figure 5.3. Most Common Home/Primary Languages other than English, Spring 2004
(Elementary and Secondary Schools)**

Source : TDSB's Data Warehouse and Research and Information Services, 2004

Length of Time in Canada

- 11.8 per cent (33,024) of TDSB students have arrived in Canada in the last three years. An additional 6.4 per cent (17,755) have arrived in the last four years.

**Table 5.1. Summary of Recent Arrivals: Year of Arrival in Canada, Spring 2004 TDSB System Report for Total
(Elementary and Secondary Schools)**

Year of arrival in Canada	Number	%
2003	9,563	3.4%
2002	11,016	3.9%
2001	12,445	4.5%
2000	10,474	3.8%
1999	7,281	2.6%

Source : TDSB's Data Warehouse and Research and Information Services, 2004

5.3.1.2 Socio-economic Issues

In fall 2002, the Board provided a submission to the Education Equality Task Force, commissioned by the province to examine inequities in educational funding. According to the submission, research comparing Toronto to the rest of the province showed that an "extremely large number of students within the TDSB are disadvantaged in school" according to key background factors. Among these issues:

Using an estimate of one in three students living in poverty, the Board has close to 100,000 students attending its schools whose families are living in poverty (a number greater than the total enrolment in all but two of the remaining school boards in Ontario);

The proportion of lone parent families, and the percentage of Toronto's adult population with less than a Grade 9 education, was significantly greater than the population of the rest of Ontario.

At the same time, the Board's own data on the success of students showed significant differences when family income is included in the analysis. While large numbers of students in the lower income levels were achieving the intended outcomes, it was clear that families at the lower levels of income were not experiencing the same degree of success as students from families with higher incomes. This pattern was evident for both external measures of success, such as results from the provincial testing authority, and internal indicators of success (e.g. secondary course achievement).

5.3.2 Social Programmes in TDSB Schools

Since the first part of the nineteenth century the Toronto Board of Education (now TDSB) has implemented programmes that can be considered social interventions. One of the earliest examples of applied educational social science research, the 1863 examined school attending habits of all Toronto children between the ages of 5 and 16. The Census clearly documented many of the social and socio-economic reasons for not attending school, such as child work, and the lack of sufficient clothing. Consequently, there has been a tradition of establishing social programmes to assist students in what is presumed to be an ultimate social and educational benefit. This includes the establishment of outdoor education classes and schools, which still exist today but can be traced to late nineteenth and early twentieth century initiatives, such as the "open air" classes at Orde Street School and "forest schools" at Victoria Park and High Park. The initiatives often involved collaboration with the City of Toronto. The series of playgrounds that form much of the jewel of the city's Parks and Recreation started with five Toronto Board playgrounds in 1908, and the Playgrounds & Recreation Branch set up by the city in 1913 was headed by a school principal. The Board founded a School Medical Inspection Department in 1911 to address medical, dental and nursing services within the schools: this was transferred in 1917 to become part of the Toronto Department of Public Health. The Toronto Attendance Department, set up in the 1920's was the ancestor of today's Psychoeducational and Social Work departments.

The current direction of social programmes in the TDSB can be seen to reflect nearly two centuries of local tradition.

A wide variety of specialised programmes and services exist in the TDSB to address the impact of socio-economic and demographic challenges to learning. For high-risk students, this includes the areas of literacy and numeracy, nutrition, early years, parent and community involvement, interpersonal development and social skills, safe schools, equity and the arts.

A small number of exemplar programmes and initiatives will be briefly outlined below. It should be noted that many of these programmes are multi-partner, involving not only the TDSB and component school communities, but also other school boards, and local municipal, provincial and federal political authorities.

5.3.2.1 School Nutrition (Food) Programmes

Food programmes had been set up in Toronto schools over the years-- for example, during the Great Depression in the 1930's, and in the 1950's. However, these programmes tended to be local school initiatives, often responses to specific problems at one point in time, and were not maintained over extended periods.

The current programmes can be traced to the School Food Nutrition Programme launched in the beginning of the 1991-92 school year. In addition to providing nutritious food, the programme was also intended to "change children's eating habits by good example and direct instruction". The City of Toronto and Toronto Board, working with the Toronto Educational Opportunity Fund (TEOF) and the Coalition for Student Nutrition, an advocacy group of parents, educators and politicians, had developed the programme. Focus of the programme centred on local school control, in that it needed to be planned and administered at each school by a local committee composed of parents and school staff.

The Toronto Board of Education and City of Toronto provided partial funding, with costs shared by the school community and parents through direct contributions and fundraising. There are three main types of programmes: breakfasts, provided to students before school begins; snacks, usually provided around first recess, to all students in participating classrooms; and lunches. Breakfast and lunch programmes are served at a specific location (such as a cafeteria) outside of classroom time.

In 1991-2, funding was provided to eight schools. By 2003-4, there were over 400 programmes in more than 240 TDSB schools and community sites across the city. The Toronto Catholic District School Board also administers additional programmes.

Up to 67,000 students participated daily—a 90 per cent increase over 1998. Over 900 volunteers contributed about 130,000 hours of community time. Approximately 8 million meals and snacks were served during the 2003-4 school year. The distribution of these programmes is similar to the distribution of lower family income across the City of Toronto.

Joint funding is provided through the municipal and provincial governments, the Toronto Foundation for Student Success, parents and local communities. The largest contribution comes from parents. Cost of the programme is estimated at 7 million (including estimated value of in kind food donations and volunteer labour). An essential part of the mandate of the food programmes continues to be nutritional and environmental education.

5.3.2.2 Settlement and Education Partnerships in Toronto (SEPT)/Settlement Workers in Schools

In 1999, Citizen and Immigration Canada worked with the Board in setting up the Settlement and Education Partnerships in Toronto (SEPT), a programme that connects families that have just immigrated to Canada with services and resources in their local school and community, to promote settlement and foster student achievement. The programme has expanded throughout Ontario as Settlement Workers in Schools (SWIS). It continues to be known in Toronto as SEPT.

It is an outreach programme to assist recently arrived families with all the details of life in Canada.

"Families may need help learning English, finding a job, getting health cards and driver's licenses, gaining access to legal services—any and all elements of Canadian life that others take for granted. Newcomers may also need an introduction to our system of three levels of government: federal, provincial, and municipal. They may also benefit from explanations about various aspects of the school system, new learning methods, homework, evaluations, report cards, parents' nights, middle school, and high school, applying for university. Some may need guidance as basic as what to pack for children's lunches". (Hildebrandt, 2004)

This is an especially important programme for a region that has the largest concentration of immigrants in Canada. It demonstrates the role that schools can play with partners in other jurisdictions to ameliorate potential social problems. It is also a good illustration of how concerns with appropriate socialization to new surroundings may influence economic considerations. The argument is that such programmes eventually enable people to become better adjusted, obtain appropriate work skills and contribute to the well being of the community.

5.3.3 TDSB and Environmental Initiatives

The Board has had a long history of placing a high priority on environmental education in their curriculum programmes. They have had several innovative out-of-school settings where students have the opportunity to have a more hands-on exposure to the natural setting and to integrate this knowledge within their urban setting. Every student in grades five, six or seven, has an opportunity for an outdoor learning experience as part of their learning environment. More than 85,000 students and 6,500 teachers visit an outdoor education centre every year. While the policy is to have students pay for these field trips, the Board's neediest students, as determined by the Learning Opportunities Index (LOI), do not pay user fees. This represents one of the ways that the TDSB tries to provide equitable opportunities for all students.

The Toronto Board, in 1960 was the first in Canada to open a residential outdoor education school. In 1978 it was the first in the Americas to open an Urban Studies Center and remains as the sole example of a school board owned and operated urban studies centre in the Americas to this day. Currently, there are five residential Centres: Etobicoke Outdoor Education Centre (Albion), Mono Cliffs Outdoor Education Centre, Scarborough Outdoor Education School (Kearney), Island Natural Science School and Sheldon Centre for Outdoor Education. Three Centres were recently closed: Boyne River Natural Science School, Pine River Outdoor Education Centre and Noisy River Outdoor Education Centre due to provincial budget cuts. Unfortunately the closing of these very successful sites is part of the larger issue of limited resources available for public programmes yet their popularity amongst the citizens of Toronto remains very high.

5.3.3.1 TDSB Eco Schools

Earlier we described the participation of the Board in the Clean City Campaign. The Clean City Community Clean-Up Guide was developed as part of the TDSB Eco Schools programme. This is a comprehensive, system-wide programme designed for school staff, students and parents. It also includes initiatives being undertaken by central support staff in a wide-variety of areas (including energy management, design and construction, maintenance, purchasing and curriculum).

5.3.3.2 Green School Buildings: Thomas L.Wells Public School

On June 28, 2000, the Toronto District School Board approved the Environmental Policy that states, 'The Board aims to

develop environmentally sound practices consistent with what students are learning in the classroom. In this way, curriculum and board operations become part of a single organisation dedicated to learning how to live more sustainably.¹ The design of this school will meet the spirit of the Policy by incorporating principles and targets of sustainable school design.

Recent research has convincingly shown that children learn best in environments where controlled daylight is abundant. The process of daylighting has been adopted as a primary design feature, significantly impacting site orientation and building layout. Daylighting design features also contribute to energy efficiency objectives by utilising the thermal mass of the building to harvest passive solar energy. Window and light monitor design increases passive solar heat gain in winter and minimises cooling load in summer by shading windows.

Thomas L. Wells Public School (a new 64,940 square feet K-8 Public School, opening during September 2005), rated to accommodate approximately 668 students, is the first example of a green school building in the TDSB. The project is located on a brownfield site in the new subdivision of Morningside Heights in Northeast Toronto. In addition, numerous other green building measures will be assessed for incorporation into the design as funds permit. The result will be a school filled with natural light and views, providing excellent air quality to students and staff, exemplary energy efficiency and durable low-maintenance building finishes and systems.

5.3.3.3 Parents' Environmental Network

The Parents' Environmental Network (PEN) is an official Liaison Group of the TDSB. PEN holds regular meetings, presenting parents with opportunities to become more aware of a wide range of environmental issues, especially as they relate to the health of our children and our communities. PEN encourages the TDSB to provide all children with an education that will help them understand the needs of healthy eco-systems, and the range of choices and evolving sustainable technologies and practices that will help protect the natural environment on which their future - and all life on earth -depends.

5.3.3.4 Green School Grounds

The report Gaining Ground: The Power and Potential of School Ground Greening in the TDSB presents the findings of a 2003 study that systematically investigated the influence and potential of green school grounds in the TDSB. The report was commissioned by Evergreen, a charitable organisation whose mission is to bring communities and nature together for the benefit of both. Gaining Ground explores the impacts of greening initiatives on curriculum delivery and teaching practices, as well as on student learning, behaviour, play and environmental awareness. It also considers issues of social inclusion, health and safety. In so doing, it identifies the major challenges and opportunities that must be addressed to realize the full potential of greening. This report presents clear evidence that green school grounds in the TDSB are a significant asset. They positively influence many aspects of students' educational experiences, including their learning, their social interactions, their health and safety and their environmental awareness. Green school grounds have the potential to enrich the quality of life, education and the environment for present and future generations of young people.

5.4 Public Institutions, NGOs and Other Sources of Sustainability Education (ESD)

While the above description of the TDSB gives an understanding of how one entity in formal education helps address ESD, there are a host of complimentary entities from the non-formal and informal sectors that also contribute to ESD in Toronto. The following examples of non-governmental organisations (NGOs) and other institutions illustrate how they too contribute to public awareness, understanding and even training of ESD in Toronto.

5.4.1 The Toronto Zoo – A History of Conservation Education and Sustainability Innovation Design

The Toronto Zoo was the first large zoo-geographically organised zoo in the world. The Zoo site is 710 acres in size including five climate controlled Pavilions and indoor and outdoor animal exhibits with plants from all over the world. Public and animal spaces are complemented with natural field, forest, tableland meadow, valley lands forest and wetlands. The Zoo, a significant natural area in itself, being a significant area included within the natural area boundaries of the famous Rouge Park, designated by Canada as its first urban park. The initial Zoo site design benefited from detailed plant inventories and sensitive site layout in the early 1970's that were new and innovative considerations protecting the environmentally significant locations like the Core Woods area of the Zoo and parts of the Rouge Valley. The zoo worked

closely with community groups to ensure that potential environmental issues had successful resolutions. Today the Toronto Zoo is part of the City of Toronto, and its Board of Management is appointed by City Council.

The Toronto Zoo was designed and constructed from 1969 to its public opening in 1974. At that time the Toronto Zoo was a leader in zoo exhibitory and environmental design including earth sheltered structures, passive solar building locations/orientations, large naturalistic exhibits, drop moats and water and wetland features. In the succeeding thirty years, its interpretation, planning and design efforts have been continually adding innovative features to numerous projects.

The Toronto Zoo has been a member of The World Conservation Union (IUCN) for thirty years and actively participates in international and national programmes. Toronto Zoo is a major supporter of the Conservation Breeding Specialist Group (CBSG), which is part of the Species Survival programme for IUCN. Through the IUCN Commission on Education and World Parks Commission, it participates in numerous strategic planning workshops and activities with indigenous peoples and stakeholders around the world to support endangered species and habitat protection programmes and to promote conservation and sustainable efforts.

Zoos traditionally have played a leading role in captive breeding programmes that have been important in preserving endangered and threatened species. The Toronto Zoo is presently involved in 40 Species Survival Programmes (SSP's) and numerous related conservation efforts that involve habitat protection and sustainable use programmes. The Zoo participates in many national and provincial recovery teams, working with government agencies such as Environment Canada, provincial Ministries of Natural Resources and many NGOs.

Zoo staff have been very active in wildlife reintroduction projects, which have included successful programmes such as Wood bison, Black-footed ferret, Vancouver Island marmot, Puerto Rican crested toad, Trumpeter swan, Bald eagle, Wild turkey and Eastern loggerhead shrike. In addition, Toronto Zoo is actively involved in various habitat restoration projects in Ontario and locally the Redside Dace Rouge River restoration project is a model for broad community effort and has a conservation education outreach component. Toronto Zoo administers various stewardship grants for Parks Canada for habitat protection in Ontario. The Zoo staff works with the Rouge Park to implement biodiversity and monitoring studies, habitat protection, restoration and environmental activities. The Adopt-A-Pond programme has now over 3000 participants including about 50 per cent of the schools in Ontario and has evolved to establish the Ontario Frogwatch and Pond Guardian programmes with the co-operation of a web site and monitoring programme set up in partnership with funding from the Canadian Wildlife Service, Environment Canada.

The Toronto Zoo has developed an extensive collaborative network involving government agencies, NGOs and universities and colleges. Undergraduate and graduate opportunities and research programmes have been organised over the last thirty years in conservation topics including education, veterinary science, nutrition, reproduction, landscape architecture, curatorial studies, museum studies, genetics and conservation biology. The Zoo staff and research team have numerous academic appointments and a wide variety of programme opportunities. Conservation programmes are funded in a combination of means including academic grants, government support, corporate and private donations and collaborative grants. The Toronto Zoo maintains an Endangered Species Fund that is dedicated to conservation and education programmes.

It has been a world leader in efforts at conservation education. All conservation activities require an education component and involve the participation of indigenous peoples or local communities. The Vision Statement cited in the recent Toronto Zoo's Strategic Plan clearly recognises education as a key component in the success of the zoo's mandate:

Toronto Zoo is Canada's premier zoo known for its interactive education and conservation activities. As a unique wildlife experience, we inspire people to live in ways that promote the well being of the natural world.

There are a number of innovative educational activities and sites that foster this mandate. An extensive school visitation programme successfully brings thousands of students from a number of school boards every year. The highly sought after Zoo Camp and Safari Camp provides opportunities for summer activities for children and families, respectively. Additional opportunities for zoo visitors (both in real life and virtually) to interact with the natural world can be found in Meet-the-Keeper sessions, animal demonstrations and the Adopt-A-Pond programme (which provides interactive outreach to all schools and communities in Ontario). The recent opening of Zeller's Discovery Zone for children enables the Zoo to concentrate its educational mission on preschoolers and primary school children and their families. The Zoo offers educational opportunities for the Ontario Region with programmes that range through all ages and cultures from the toddlers to the post doctorate Ph.D. student.

There are many well established programmes and progressive studies are in place for a green society, including waste reduction, recycling, composting, chemical and pesticide reduction and habitat restoration. There is a great opportunity to expand this activity and develop sustainable education programmes for the region. The Toronto Zoo could become a major regional showcase for public display and related education programmes in the environmental field.

Plans are now underway to create an International Learning Centre that would complement the efforts of The Regional Centre of Expertise on Education for Sustainable Development. (An outline of the Learning Centre will be presented in a later section.)

Continuing the natural and ecological ambience of the zoo site, capital redevelopment projects over the last decade have demonstrated natural environmental design principles within the philosophy of landscape immersion methodology. Key projects demonstrating these principles are the award winning African Savanna and Gorilla Rainforest projects. These projects continue, and expand upon, the Zoo's famous tradition of sustainable design features.

5.4.1.1 The African Savanna Project

The African Savanna was a major 30-acre exhibit initiative designed and constructed as a natural landscape redevelopment simulating an African Savanna. Exhibits were developed, for example, to provide south-facing slopes and simulated African rock features, naturalistic in detail, and allowing winter warming of spaces for animals such as lions and White rhinos. Exhibit tree features which simulate African species, are sited to create strategic shade and natural cool zones for animals and human visitors.

5.4.1.2 Gorilla Rainforest

The Gorilla Rainforest was the largest indoor Toronto Zoo exhibit and public area redevelopment since the Zoo opening in 1974. Design changes respected the world famous African Pavilion and involved a complete redesign of the whole north half of the Pavilion. The re-creation was a representation of the Cameroon rainforest exhibiting the Zoo's Gorilla family along with other mammals, birds, fish and reptiles from the rainforest. Recycled waste wood was employed for natural interpretive signposts throughout the project. This was a good use of natural wood from live trees cut for road construction that was destined for landfill or burning as waste. A key component of the large Gorilla exhibit design was employing environmental design planning which utilised natural pavilion light in existing Pavilion glazing locations. This is one of the very few indoor Gorilla exhibits in the world to use natural light, year round that allows for natural grass to grow in the indoor exhibit area, conserve electricity and the expense of using grow lights.

5.4.1.3 Future Project in Sustainability: The North Zoo Site Redevelopment Project

The next large Capital project the Toronto Zoo is undertaking is the North Zoo Site Redevelopment. The project encompasses many design developments but one key goal is the strong incorporation of sustainable design principles and solutions. Basic feasibility stage planning has identified the use of sustainable design components in the re-creation of the Canadian Tundra environment in the first phase of the initiative. The sustainable goals of reducing capital, operating and infrastructure costs will be a critical aspect of project detailed design.

The continued use of natural, sustainable and re-use materials, natural energy generation systems, and new energy efficient building systems are some of the areas that research and design will focus on in the future at the Toronto Zoo. It is expected that some of this work will have some transfer power beyond the zoo to other city agencies having to cope with sustainable design issues.

5.4.1.4 Education for Sustainable Development: Toronto Zoo Learning Centre

The Toronto Zoo has an enviable record in conservation education. A Learning Centre will help establish a much-needed coordinated approach to conservation messages throughout the Zoo and provide formal professional development for staff and volunteers. Presently the demand for informal and formal education programmes exceeds the capacity afforded by suitable programme space. With additional space, current programmes will increase in number and variety and provide opportunities for new programmes such as Zoo School, professional development for teachers and businesses.

Sweeping changes in the Provincial curriculum and the closing of outdoor education centres, places the Zoo as an attractive alternative to providing teachers and students with hands on learning approaches to science as well as outdoor experiences. Children, especially from urban centres are becoming increasingly detached from nature. The Zoo, exhibiting animals from around the world and surrounded by a large natural area is perfectly suited to make the connection.

For the past ten years, zoos have increasingly dedicated resources to develop their educational impact on visitors and surrounding communities. It is now recognised that conservation of species and habitats should be supported by a strong communication component in order to be successful. The zoo is now in the process of choosing a consulting firm to conduct a feasibility study for developing the Learning Centre in order to achieve the goals and objectives of the Zoo's Strategic Plan. Several components of a learning centre drafted by the Education staff and the Zoo's Education Advisory Committee are presented in the Box 5.1.

Box 5.1. Components of a Learning Centre of The Toronto Zoo

Goals

- a. **Support the development of interactive and learning strategies that focus on sustainable development with particular emphasis on biodiversity**

Objectives:

- Increase number and variety of elementary and secondary student workshops
- Initiate programmes for post-secondary students that reinforce curriculum in the sciences, arts, graphic design by involving key staff from throughout the Zoo
- Establish a Zoo School (utilise existing Education Centre as dormitory facility)
- Deliver Corporate team building events– with a green touch
- Provide experiential programming for students with learning disabilities
- Host traveling exhibitions

- b. **Deliver the unifying component of professional development**

Objectives:

- Expand the “Teach the Teacher” programme for teachers in formal and informal learning situations
- Lead training workshops in the field of teaching methods and substance for other conservation education organisations
- Provide professional development for staff and volunteers leading to the result of a cohesive organisation with a dedicated, well informed workforce
- Unify educational initiatives of Zoo (provide coherent messages to staff and visitors)

- c. **Provide leadership at the Municipal, Provincial, National and international levels in the development, evaluation, research and dissemination of informal and formal education**

Objectives:

- In partnership with universities, conduct research to provide information on how best to shift behavior to produce a more sustainable lifestyle
- Develop a close relationship with school boards and universities
- Use new communication technology to create an impact on the greatest number of people
- Partner with like-minded organizations for purposes of advocacy for sustainable development
- Bring together foundations/partners with similar goals in a co-operative effort to create an atmosphere/chemistry that allows change to take place (public, staff, and other professionals) Create a bridge between academic science and action
- Provide a link between the concept of sustainability and the many cultures and communities across Canada
- Broaden the tools of influence to include various art forms
- Demonstrate sustainable methods of construction and products used in the Centre

5.5 Toronto and Region Conservation Authority (TRCA)

As the agency responsible for managing the renewable natural resources within nine Greater Toronto Area (GTA) watersheds, the TRCA continuously strives to improve its policies and approach to land use planning and development. Currently, the TRCA is reviewing and developing several policies and programme to help meet the goals of the Authority in conserving the natural features and functions of our watersheds.

5.5.1 Valley & Stream Corridor Management Programme (VSCMP)

The TRCA recognizes valley and stream corridors as important natural resources that act as the foundation or backbone of the green space system. The TRCA's Valley and Stream Corridor Management Programme (VSCMP) outlines policies that seek to retain watercourses and valley and stream corridors as open, natural landforms, from the headwaters to the river estuary marshes. These policies guide Development Services staff when commenting on land use planning policy documents and development applications.

5.5.2 Public Engagement

In keeping with the TRCA's ecosystem approach to planning and management, the TRCA incorporates public participation and science in the development of watershed management strategies. These strategies provide an overall vision and goals for improving the watersheds and help guide TRCA staff in the application of land use planning policies and regulations.

In order to live in greater harmony with the natural world, we need to change the way we think. We need to make decisions about the way we live that take into account our impact upon the ecosystem. A Living City is committed to providing people, particularly young people with an appreciation of nature and the information they need to live in a sustainable way.

5.5.3 Public Education

As a leader in the environmental education field, it is the TRCA's objective to assist teachers by providing information and experiences in the natural environment that complement and enhance their classroom lessons. If The Living City is our future, it is children who will build it.

5.5.4 Residential Field Centres

Three residential centres provide opportunities for visitors to live with nature and learn about the importance of a healthy environment. The TRCA offers full-week or half-week and weekend bookings; centre capacities vary from 34 to 60 students.

5.5.5 Watershed on Wheels

Watershed on Wheels provides exciting and unique conservation programmes to schools and community groups that come directly to the door. Run by experienced staff, TRCA programmes promote healthy environments in the watersheds by teaching students through active and fun educational experiences.

5.5.6 Day Facilities

Programmes are designed to provide students from kindergarten through secondary school with the opportunity to apply their scientific knowledge beyond the classroom. The TRCA properties offer many different settings - forests, streams, ponds and wetlands - even a restored rural community filled with sights, sounds and smells of the 19th-century - ideal for studying environmental topics from sustainable living to maple syrup making.

5.6 NGO Partners and Sustainability

The partnership of a variety of NGO partners to Toronto's efforts in sustainable development is quite significant. They provide financial resources, expertise, leadership, and often a combination of these features that demonstrate effective forms of community building. While there are potentially dozens of such organisations, we have chosen a few to illustrate some of their work.

5.6.1 United Way of Greater Toronto

United Way of Greater Toronto is an incorporated non-profit charity focused on improving the long-term health of our community. They run Canada's largest annual fundraising campaign in support of 200 social and health service agencies, providing a vital network of support. A volunteer Board of Trustees of leading community members governs all United Way decision-making. The Board oversees how donor money is used, shapes its strategic vision and plan, and monitors organisational performance.

The United Way fulfills its mandate in many ways but one of interest here is its commitment to partnerships for community research. Recently it has organised and published the results of two task forces. In 2002 the United Way of Greater Toronto organised a Task Force on Access to Space chaired by business leader, Torstar Chair Dr. John Evans. The group released a comprehensive plan to increase access to space for community purposes. The Strong Neighbourhoods Task Force is a current partnership arrangement between the city and the United Way, looking at the factors that produce sustainable or strong neighbourhoods. The Strong Neighbourhoods Task Force will build on co-operative work done in the past and make recommendations to all levels of government to improve the quality of life in the city. The task force has commissioned and then published several important studies. In November 2004 it published: Why Strong Neighbourhoods Matter: Implications for Policy and Practice by Christa Freiler. This document gives many reasons both social and economic for policies that would strengthen local areas.

5.6.2 Toronto Region Conservation Foundation

The Conservation Foundation is an independently governed charitable organisation dedicated to the protection and restoration of the natural environment across greater Toronto. Since its inception in 1961, the Conservation Foundation has

raised more than \$22 million for a wide variety of environmental and heritage projects. The Conservation Foundation raises funds in support of programmes administered by the Toronto and Region Conservation Authority (TRCA). TRCA has more than forty-five years of experience in the planning and implementation of environmental protection and enhancement programmes, as well as public stewardship and outdoor education. Through the support of our many donors and other partners in the past three years we have been able to:

- Secure more than 650 hectares of land
- Plant more than 600,000 trees and shrubs
- Engage nearly 50,000 residents in environmental projects in their communities
- Deliver education and outreach to over 400,000 students and youth
- Initiate The Living City Centre at the Kortright Centre for Conservation in Kleinburg as a centre of excellence in sustainable practices
- Identify 500 species of concern that may be lost as a result of traditional land use practices
- Publish report cards on the health of the Don and Humber Rivers
- Launch The Mayors' Megawatt Challenge to reduce municipal energy use (led by Mayor Hazel McCallion of Mississauga)

5.6.3 Evergreen Foundation

Evergreen is a non-profit environmental organisation with a mandate to bring nature to our cities through naturalisation projects. Specifically, its mission is "...to bring communities and nature together for the benefit of both. They engage people in creating and sustaining healthy, dynamic outdoor spaces - in our schools, our communities and our homes. They believe that local stewardship creates vibrant neighbourhoods, a healthy natural environment and a sustainable society for all." Its objectives are to motivate people to create and sustain healthy, natural outdoor spaces and to give them the practical tools to be successful through its three core programmes:

- Learning Grounds - transforming school grounds
- Common Grounds - conserving publicly accessible land
- Home Grounds - for the home landscape

Community naturalisation is a collective effort that includes people from all walks of life in the revitalisation of their schools, homes or community and, ultimately, in the environmental, social and economic functioning of their cities. Evergreen's funds come from individual Canadians, foundations, businesses, and a variety of federal, provincial and municipal governmental agencies.

Currently, Evergreen is in a partnership with both Toronto school boards in the Learning Grounds project. This brings teachers, students and neighbours together to transform traditionally barren asphalt and turf school grounds into natural outdoor classrooms. By planting trees, shrubs and wildflowers, planning meadows or ponds, and creating murals, sculptures, vegetable gardens and other theme areas, the learning opportunities literally come alive. These outdoor classrooms provide students with a healthy and safe place to play, learn and develop a genuine respect for nature and each other.

The other core programmes provide additional opportunities for educating the public in sustainable development. Common Grounds is a national service set up to help conserve natural and cultural sites (land), create more parks, and protect open spaces for recreation, education, and enjoyment to ensure that Canada's common grounds grow sustainably and prosper through the 21st century and beyond.

Home Grounds enables people to restore and enhance the natural environment where they live by encouraging them to practice environmentally friendly gardening techniques. The goal is to teach people to garden without chemical pesticides and artificial fertilisers, to plant with native species that require little maintenance and water, and to grow gardens on under-utilized space such as rooftops and gardens.

5.7 The Creation of Toronto as an RCE

While Agenda 21(developed as an outcome of a meeting at the Rio UN Conference on the Human Environment by 21 key nations gathered to discuss the impact of globalisation on the environment) clearly laid out critical issues which governments around the world need to address, the concept of sustainability is evolving and will continue to do so as societies change and our awareness and perceptions of Earth, humanity, and human-environmental interactions correspondingly change. The subtle changes, shift in focus, and emphasis will of course be regional in nature to reflect the conditions of local ecosystems and cultures. As a result of the maturing nature of issues of sustainability, those educating for sustainability should continually adapt the content, scope, and methodology within geographic and temporal contexts.

This constant adaptation will require flexibility on the part of educators and communicators as they work together on both local and international projects. Definitions and practices, which are admirably effective in one part of the world, can be ineffective or inappropriate in another. The task of designing an RCE specifically for Toronto is a unique but worthy challenge.

The task of teaching the broad content base of sustainable development within the various pedagogical traditions, communications strategies and cultural contexts around the world, seems overwhelming. That is why the specific selection of a city or region for an RCE is less formidable. So too, formal education does not need to carry this educational responsibility alone. The non-formal and informal education communities are preparing to work in tandem with the formal educational community for the education of Torontonians of all generations and walks of life.

How does a community decide to initiate a dialogue among organisations, groups and agencies that are engaged in a variety of activities around ESD? In the Toronto area, in addition to those formally assigned an educational role, there are many non-formal and informal organisations that are implicitly and explicitly engaged in educating the public, workers, and special groups. Sometimes in partnership with other organisations, but often by itself such groups conduct their important work without the larger community context in mind. It takes a catalyst and at least one group to facilitate the larger dialogue.

The catalyst for Toronto was the awareness of the United Nations designation of 2005-2014 as the Decade of Education for Sustainable Development. For a number of reasons, the Toronto Zoo made a conscious decision to provide the initial facilitating work in engaging the City of Toronto to provide the essential leadership role. The Zoo has been a world leader in sustainable development efforts through its emphasis on conservation education and research on endangered species. It was engaged in the process of developing an International Learning Centre for programme development, professional development and research on conservation education to serve a variety of audiences including schools, the public, zoo staff and other professionals engaged in sustainable development activities. Several staff and a representative of the Zoo's Board of Management had participated in a World Conservation Society Conference on ESD held at The Bronx Zoo in November 2004. There was a consensus among Board of Management, its Educational Advisory Committee, administration and staff that the Toronto region had much to offer and much to learn about ESD. Since the Zoo is an agency of the City of Toronto and Toronto city councillors are members of the zoo's Management Board, including its Chair, the decision was taken to approach the city through the Mayor's office and City Council's Roundtable on the Environment. After several meetings with the Deputy Mayor who Chairs the Roundtable, and with the enthusiastic support of the Mayor, the decision was taken for the City and Zoo to coordinate efforts to cultivate other groups to share in the development of a partnership for ESD.

A number of organisations were approached through both formal and informal contacts to determine interest in sharing in this important project. Individuals associated with the city, the zoo and the University of Toronto took on the role of approaching potential partners in ESD. The TDSB was a natural choice to be involved because of its leadership in many formal educational programmes and activities. Although a city agency the Toronto Region Conservation Authority works closely with a number of jurisdictions and influences many of the environmental activities over a broad region. It also would be helpful in working with the Ontario provincial government's Greenbelt initiative in the Golden Horseshoe Area. The choice of NGOs to participate was based on their previous initiatives in issues related to environmental concerns, social development considerations and economic initiatives, and combinations of all three ingredients of ESD.

As we pursued this process, it was quite clear that there were a number of important initiatives underway on ESD within the Toronto region. One of the exciting prospects was that each of the organisations believed that their efforts would be enhanced by involvement with other groups, that each could learn from each other and work towards potentially important joint ventures. The result of these efforts was the decision by the United Nations University to choose Toronto as the North American Regional Centre of Expertise on ESD. Approximately ten RCE's will be chosen worldwide in 2005, the first year of The Decade of ESD. The plan is to incrementally name other communities as RCE's over the full Decade.

5.7.1 The Way Forward

As we commence our journey to fully develop Toronto as a successful RCE, we have already begun the planning process. It is recognised that the initial plans will not be a blueprint set in stone, but an evolving structure, one open to potential possibilities and realistic about limitations. The full participation of local institutions and community organisations is crucial to the Centre's success.

The initial plan to move forward with the development of the Toronto RCE is to focus on three key steps. The first step is to identify the "messengers" of sustainability education, public awareness and training in the Toronto region and form a working coalition regarding our activities. The term "messenger" includes formal, non-formal and informal educators. To begin the process several key representatives from each of these 3 sectors are involved but the numbers are limited at the

outset to facilitate the development phase. Others will be invited once the governance and other issues are worked out. The concept is outlined in figure 5.4.

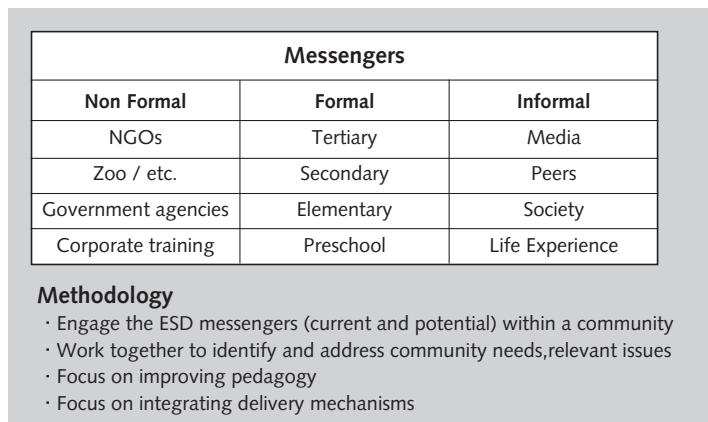


Figure 5.4. Implementation of RCE Concept: Identification of Messengers for ESD

The second step is to identify the sources of relevant, current data and information regarding the sustainability issues, programmes and policies facing the Region and trying to infuse these items into the ongoing work of the educators, trainers, and media specialists. See figure 5.5 for illustration.

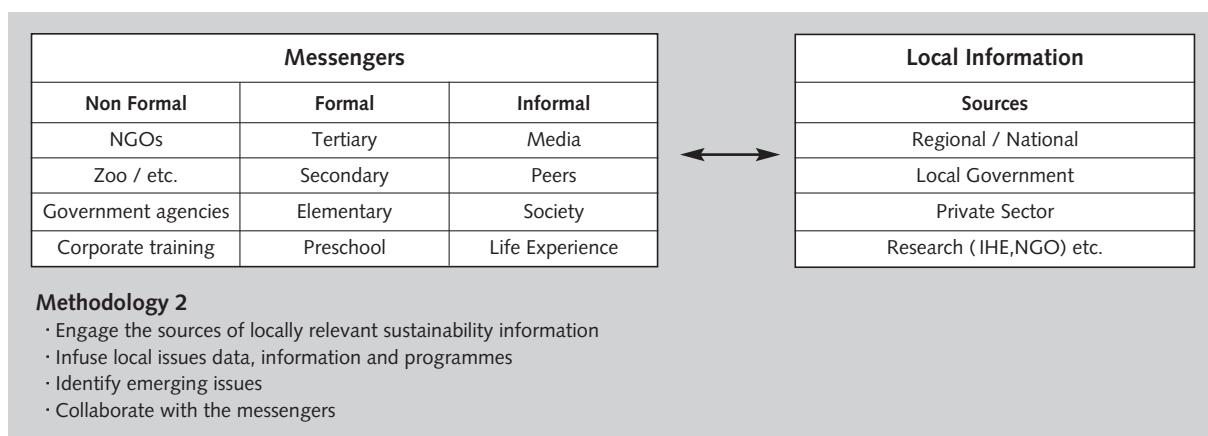


Figure 5.5. Implementation of RCE Concept: Providing Information to the Messengers

The next step is to focus on nurturing this process of integrating local sustainability challenges into the information/education flow of the Toronto citizenry with the anticipation of the following outcomes outlined in Figure 5.6.

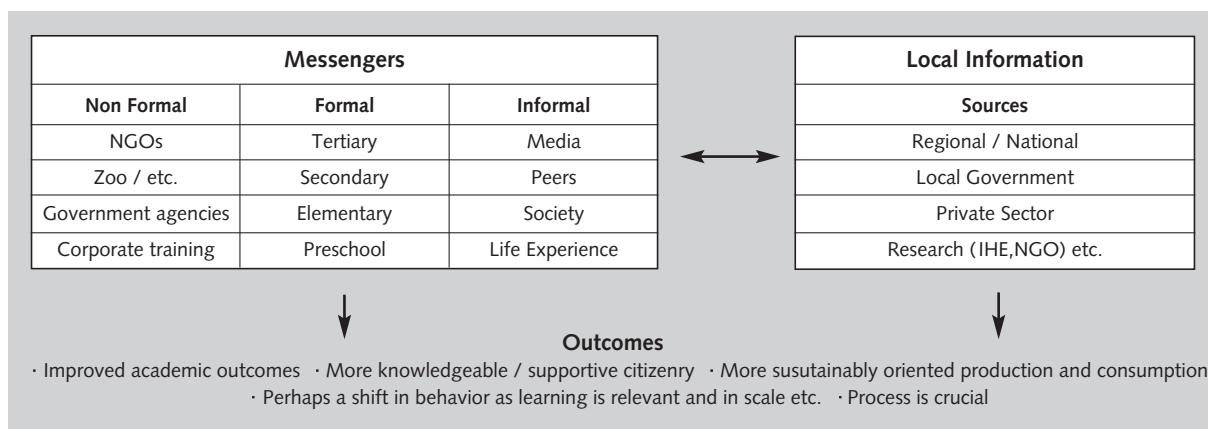


Figure 5.6. Implementation of RCE Concept: Maintaining Process and Anticipating Outcomes

Our planning has concentrated on four areas: Governance and Sustainability; Creating, Maintaining and Expanding the Partnership; Research and Development; and Objectives.

5.7.2 Governance

The City of Toronto will take the lead in developing and implementing the RCE. It is in a prime position because of its past record in sustainable activities, its present vision of priorities being enunciated at its Environmental Roundtable, its close working relationships with agencies such as The Toronto Zoo and Toronto Region Conservation Authority, a long history of close working relationships with local school boards, universities, and with a number of NGOs and local businesses. It is also an integral part of the Greater Toronto Area (GTA), and has working relationships with officials and programmes at the provincial and federal levels. During the start-up phase (2005-2006), it is anticipated that an Executive Management Committee will be established with representatives from the initial partners group. This Committee will include: The Chair of the Mayor's Roundtable on the Environment, The Deputy City Manager responsible for Environmental Services, and representatives from The Toronto Zoo, Toronto District School Board, Toronto Region Conservation Authority, University of Toronto, York University, and one or more NGOs. It is anticipated that other groups will provide membership to the Committee. The Chair of the Mayor's Roundtable on the Environment will Chair the Committee.

A Staff Steering Committee will be established and include staff from the city of Toronto, the Toronto Zoo and other agencies and organisations involved in the Centre. An initial budget will be developed with each group represented on the Executive Management Committee providing their share of resources to enable co-operation and building of the knowledge network and programme implementation. During the first year, resources will be in the form of staff time for organisational and informal and formal communication activities. Funding for specific resource needs over time will be sought through fundraising directed at Foundations, other levels of government, future partners, and the private sector. During the first year, the Toronto Zoo will provide operating space for the Centre. It is anticipated that the Centre will expand over the next decade to include a variety of partners, programme development, research initiatives, and policy formulations.

5.7.3 Partnership Expansion

The initial group of partners represents the current situation. Through the discussions and planning activities of The Executive Management Board, and the communication activities of Centre staff, decisions will be made about future partners. Given the importance of the ESD movement in formal education, additional groups might include the Toronto Catholic School Board, Ryerson University because of its expertise in community planning, as well as one or more of the Colleges of Applied Arts and Technology in the Toronto region. A formal communication system, including Newsletters and other vehicles would be instrumental in developing interest from other groups involved in ESD activities. An important component in educating for public awareness will be decisions as to how the media can be involved in articulating the work of the Centre and of the important work conducted by the various partners. The Executive Management Committee will have to be mindful about determining the optimal size of the Centre and the sustainability of its own agenda.

5.7.4 Research and Development

There are at least two types of expectations surrounding research activities for the Toronto RCE. The first is that the Centre provides an example of a case study of a "community in action", an opportunity to study itself—its formation, governance, activities, programmes, research endeavours and impact. This is an example of the process of action research, inquiry that provides information to those in the Centre on their activities and the larger audiences interested in the story of Toronto and its efforts at ESD. The second research expectation is to conduct various studies on specific programmes to determine efficacy and potential improvements. This might also include research that looks at the links among the three components of ESD: environmental concerns, social issues, and economic development. It is expected that staff from different partners will engage in this research agenda through the normal procedures already established within an agency, or that partnership arrangements will enable personnel across partners to engage in mutual research projects, especially involving faculty from the various institutions of higher education. The development of The Toronto Zoo's Learning Centre will be an important component in developing a research agenda and conducting studies on learning ESD. There will be a heavy emphasis on enlisting Foundations, different levels of government, and other sources to fund this research.

5.7.5 Objectives

Throughout the process of creating the Toronto RCE, there has been a consistent set of objectives driving our agenda.

These ESD objectives are: Enhancing Public Awareness and Understanding; Improving the Quality of Public Education; Recognising and Changing the Role of North Americans in Sustainable Development Practices; and Developing Specialized Professional Learning Programmes. We intend to do this by bringing together educators of all persuasions—formal, informal, non-formal—to help define the issues underlying these objectives. The next steps will be to create learning situations, activities and programmes that are realistic and relevant for enhancing sustainable development. A most important ingredient, especially in a highly urbanized environment, is to make the connections among environmental features (both natural and built), social issues and economic activities. It is our expectation that we will learn what is successful and profit from an understanding of what doesn't work.

Creating and implementing the Toronto RCE requires vision, a purposeful plan of action, resources, and persistence during implementation. From current and previous ESD programmes and other educational reform efforts, we have learnt of issues and pitfalls, which have proved to slow or thwart progress. As we move forward, we remember that implementing ESD programmes and reorienting curriculum requires experimentation. Some ideas and programmes will be better than others. We must allow ourselves to experiment and make mistakes. We will share those with each other, in the hope that we can discuss and plan for them in our own specific RCE efforts. Sustainable development will require major changes in policy and mindset. The mindset will include fundamental changes in our lifestyle, economy, and worldview. Torontonians will need to examine how our goods and services are created and consumed; the way we use, preserve, conserve, and restore natural resources; and the way we perceive and prioritize our social, political, and economic needs. Sustainable development will require that we learn new ways to think about problems, create solutions, and make decisions leading to those solutions. Education is the key if we are to learn the new ways and mindset which sustainable development requires of us. We already know that our current path will not result in sustainability; so we have to build another path, and educational input is a primary tool to accomplish this essential activity.

Chapter 6 A Regional Centre of Expertise 'Learning for Sustainable Development' in Europe

By Rietje van Dam-Mieras with Jos Rikers, Jos Hermans, and Pim Martens

6.1 Introduction : Some Reflections on Knowledge Generation and Policymaking

It has been calculated that "System Earth" could feed about ten million people living as hunters and gatherers in a sustainable way. Nowadays, the world population amounts to six billion. By the year 2050, the population may become ten billion. This tremendous growth has been possible because of the scientific and technological developments. It must be emphasised, however, that there are serious conflicts between the growth of the world population, development of science, knowledge and economy and the carrying capacity of "System Earth". Moreover, the differences in welfare among societies in the world are enormous, which seriously endangers a sustainable future. Thus, a lot of innovations will be needed in the technological and in the social domains to bring us towards a more sustainable path of development.

It is not only new knowledge that we need, we also require educated people able to apply that knowledge for the benefit of their society and well-being of our planet. Therefore, it might be good to start planning for sustainable development with some reflections on established methodologies of knowledge generation and use of knowledge in policy-making.

From a European perspective, a good starting point for such a reflection could be ancient Greek culture. In the context of knowledge generation we could start at the methodology used by natural philosophy, and in the context of policy-making we could begin at the Delphi oracle.

Natural philosophers wanted to understand their physical environment and the changes taking place in it. For developing knowledge they observed the environment using their senses, constructed mental models based on these observations, challenged these mental models during discussions with others and, finally, reconstructed or refined the models. The word *scole* comes from this time and means "a free space to think together with others". Since that time, methodology for knowledge generation has developed greatly. In Europe, especially from the 17th century, the process of knowledge creation could be defined as "knowledge revolution". Methodologies of observations were "expanded" using experiments, discussions were organised in academies of science and scientific journals, and a system of quality was secured by peers. This methodology developed during the seventeenth century has led to the organisation of knowledge generation in disciplinary domains and to the creation of educational programmes based on this disciplinary approach. This has been rather successful in some parts of the world in the past century. We have to ask ourselves, however, if this established methodology is also appropriate for the future.

Knowledge is very important for the society, and among other things for policy development. Let us consider policy-making. Policy development means development of a "feeling for the future" using the knowledge of today. As to the use of "knowledge" for policy-making we could go back to the ancient Greeks' tradition of oracles, specifically the Delphi oracle.

The methodology of Delphi was that a female oracle, or sibyl, would enter a trance uttering "sounds" that were interpreted by the priests in the neighbouring room. This information was then used for forecasting. Rulers came to the oracle for information about the future of their cities and states and, if the prediction was favourable, showed their gratitude by leaving presents for the oracle. The oracle gave predictions nine months of the year. In the remaining three months the priests travelled around gathering strategic and political information that could be incorporated to the oracle's forecasts in the next season.

The Delphi oracle had a lot of influence in the Mediterranean region at that time. Since then future-oriented research has greatly advanced. Nowadays, scientific findings are used for policy-making although there is a tension between knowledge development according to the methodology of disciplinary-oriented knowledge-generation and application of this knowledge to complex societal contexts. When one talks about sustainable development, one is speaking about difficult dilemmas in complicated situations. Therefore, reflecting on learning for sustainable development means rethinking practices of knowledge generation and documentation. The question remains "does our more or less standard methodology still fit for the challenges of sustainable development?"

6.2 Learning, Education and Learning Environments

People and organizations will have to learn a lot to realise a development that is more sustainable than the present one, which makes it important to ask the question 'What is learning?'. Learning could be described as the result of the process of interaction between an individual or an organisation and its physical and social environment. Described in this way learning is a process that takes place in different learning environments—formal, non-formal and informal—and continues life-long. Formal learning occurs within the educational system, non-formal learning refers to on the job training and informal learning occurs in all other learning environments: social interaction with family and friends, holidays, museums, mass media etc. It can be calculated that on the average only about 5 to 10 per cent of the life long learning process of an individual takes place in this formal learning environment. For the life long learning process informal and non-formal learning and interactions between the different forms of learning are much more important. Learning for sustainable development could therefore be described as a search for effective context embedded learning of individuals and organizations with the objective to realize a sustainable balance between the carrying capacity of 'System Earth', economic development and individual well being of people in their own environment.

During the learning process new options are tested and choices are made continuously as to which of those new options should be maintained. Two most important factors in the process are the learning individual and the learning environment. For the learner, the learning process contributes to the formation of social identity in which the individual can recognise him- or herself as a valuable individual with respect to others. The format of the learning environment depends on age, prior knowledge and social activity and therefore will continuously change during the lifelong learning process (Wolf de, 2000; Dam-Mieras van, 2002b).

Education could be described as an institutionalised process aimed at realising defined learning objectives for defined target groups. The learning objectives comprise disciplinary, social, cultural, and economic items. The target groups can be divided according to age and the level of prior education or development. The educational system tries to provide contexts that support the learning of individuals. Starting from theoretical concepts of learning, it tries to create a set of conditions favouring the individual learning processes. The learning environment is designed, the content is structured, the learning process is supervised and the results are tested. As the educational system has the ambition to prepare children and young adults for functioning in society and on the labour market both, the socio-cultural and the economic aspects are important.

Traditionally, content of learning ('learning facts') gets much emphasis in education, which is in agreement with the classical ideals of erudition and scholarship. In this classical approach, the ordering of knowledge within specific domains or disciplines plays an important role. The objectives of the learning process are often described starting from these disciplines. An analysis of the objectives must give insight into optimal conditions to realise the learning objectives. This approach can be effective in domains that are characterised by independent learning objectives, but is less satisfying in situations characterised by a more integrated and complex set of learning objectives. For the didactic design of learning environments a starting point in a specific discipline mostly implies a learning process in a relatively closed system. For the learner it means that the formal learning process takes place in a learning environment that is relatively shielded from society and that the application of knowledge in vocational or societal practice only occurs after the formal learning process has finished. One may wonder if this way of teaching is still 'in harmony with society' (Dam-Mieras van & Jong de, 2000; Ivens, 2002; Ivens et al., 2002).

Our society can be characterised as a society in which, because of the ongoing process of globalisation, boosted by ICT and a policy of trade liberalisation during the last decades, continuous change seems to be the most stable factor (Breton 2003). The content of most professions is changing and most people must be able to integrate the use of ICT-instruments in their (professional) life (European Commission 2000). Furthermore people should be able to reflect critically on information, should develop good social competencies, both normative and communicative, and should be able to work in multidisciplinary teams on complex problems (Gibbons et al. 1994; Gibbons, 1998, 2003). Reading this characterisation of our society we can ask ourselves if our educational systems—historically grown in our societies and thus reflecting characteristics of yesterday's societies—still optimally support the learning process of individuals who must become world citizens. It is tempting to state that in our present society individual learning environments should become more dynamic and individualised on the one hand and introduce the international aspects of economic globalisation and its consequences on the other. Creating authentic learning environments in which learners become both rationally and emotionally engaged and in which learners are challenged to create, in interaction with others, their own knowledge can be seen as a challenge. A meaningful learning environment not only supports the cognitive aspects of learning but also the social aspects. Interactions with other learners are, thus, important. In the physical environment where learners are living this can be realised relatively easy. The challenge is to bring in the global dimension which is so relevant to the education. In a globalizing world in which virtual (social) space becomes more and more a "natural" complement to physical space, ICT instruments have a great potential to be explored in that respect (Kerka, 1997; Lynch, 1997; Loo van & Semeijn 2000; Westera et al., 2001; Kreijns et al., 2002; Dam-Mieras van, 2003; Kreijns, 2004).

6.3 The European Urban Environment as a Learning Environment

As all economies are continuously developing within the framework of system Earth sustainable development is, or better should be, relevant to all world citizens, not only to the so-called developing economies or economies in transition. Literacy in the field of sustainable development is very important to all of us and therefore learning for sustainable development deserves a place in our learning environments. A highly relevant question therefore is: 'How do we encourage people to learn for sustainable development?'

In most regions in Europe the population is concentrated in urban areas. This means that if sustainable development is to become a mainstream concern in Europe, the challenges and contradictions between economic development, ecologic sustainability and individual well-being should also be related to living in urban areas. Enhancing knowledge in the field of sustainable development, therefore, implies that in addition to a continued concern for the countryside and nature protection, there must also be a focus on the European urban areas. Such a shift of attention is considered to be a necessary next step because if one wants to motivate people for sustainable development, one should make clear that it is relevant in their daily lives.

Any urban region can be seen as a complex system where people interact with the environment, with economical options, with socio-cultural options and with each other. Studying this complex system and looking for optimisation of interactions and processes within it can be a good basis for sustainable development. A core question is how to maintain a specific urban area in the long run without decreasing opportunities in other regions. Furthermore, what can be learnt in a specific urban area by looking at solutions for that area can be of importance for other areas and for their future planning and policy-making. Creating practices of co-learning of different stakeholders by using a specific area as a joint meaningful learning environment can be of great value to that area. By doing so learning processes of individuals and groups can become closely linked to regional development processes. Similar things can be said of creating synergy between learning processes in different areas.

Within urbanised areas many topics that can contribute to an overall sustainable development should be addressed. But how should such topics be studied? A classical approach would be a disciplinary approach, which means an in-depth study of a specific part of the complex system. Such a disciplinary approach has contributed a lot to technology development, innovation and economic development over the past centuries and certainly will be most useful for the future as well, but, as was indicated in a previous section, there is a risk in studying topics in such a way. What seems an optimal solution in a specific disciplinary context can be an ineffective solution in another, more complex, context. What seems to work on a detailed scale can turn out to be a rather bad idea on a larger scale. Therefore, in addition to the disciplinary approach, which remains necessary to develop new scientific knowledge, a complementary approach to context-embedded knowledge generation in a (more) integrated environment, like for instance an urbanised area, seems highly necessary. Figure 6.1 provides an abstract model of a typical European urban area.

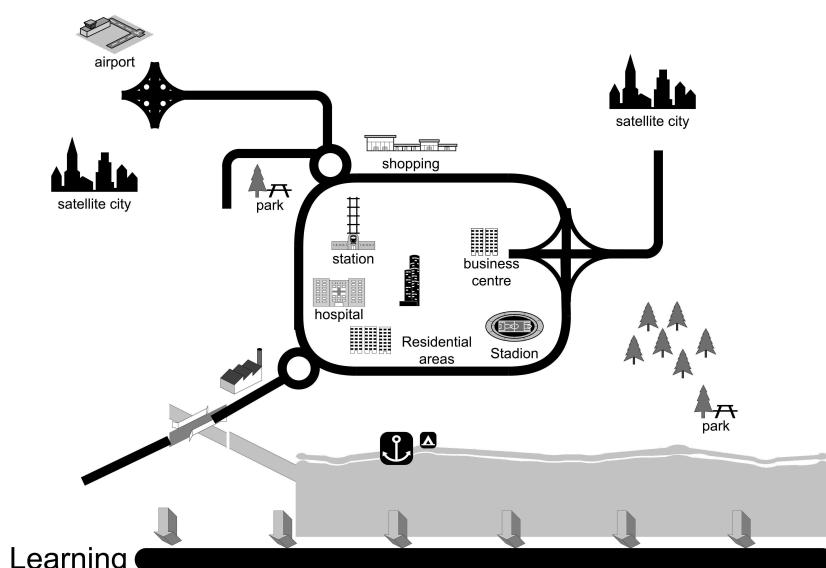


Figure 6.1. An Abstract Model of a Typical European Urban Area

Within the integrating framework of an urbanised area several topics can be studied without losing an overall view. Examples are:

- Energy efficient living (housing, commuting, recreation etc)
- Water efficient living
- Massive events (large scale events that have implications for infrastructure, city development etc)
- Corporate social responsibility in SME's
- Aging population
- Awareness creating at schools (start with the youngest, the future generation)
- Materials cycles (waste management, resource recycling etc.)
- Urban neighbourhoods development
- Interfaces with surrounding areas
- Stakeholder dialogues
- Cultural heritage

The considerations given above constitute the components from which the initiative for the Regional Centre of Expertise on Learning for Sustainable Development in the European Rhine-Meuse + " region emerged.

6.4 A Regional Centre of Expertise 'Learning for Sustainable Development' in the Rhine-Meuse + Region

As was described in the UNESCO Higher Education Information Brief RCEs organise their activities locally and aim at:

- a) enhancing collaboration between different levels of formal education, i.e. between primary, secondary and higher education
- b) facilitating relations between formal education and local actors relevant for ESD, such as research centres, local businesses, museums, local governments, etc.

Starting from this conceptual idea for an RCE, and taking into account the framework for UN DESD developed by UNESCO, the UN ECE strategy ideas and EU policies in the field of sustainable development, an RCE initiative was started in the EU Rhine-Meuse + region.

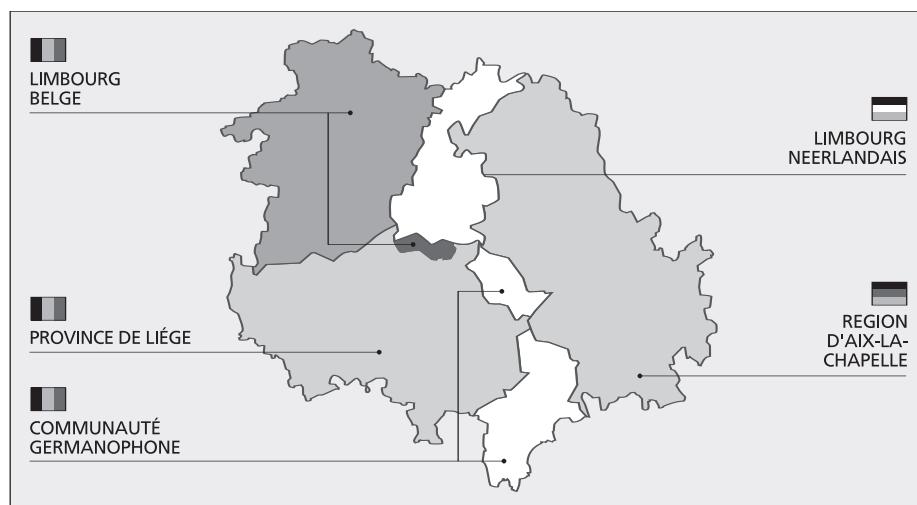


Figure 6.2. EU Rhine-Meuse Region

Source: Foundation Euregio Maas Rijn <<http://www.euregio-mr.org>>

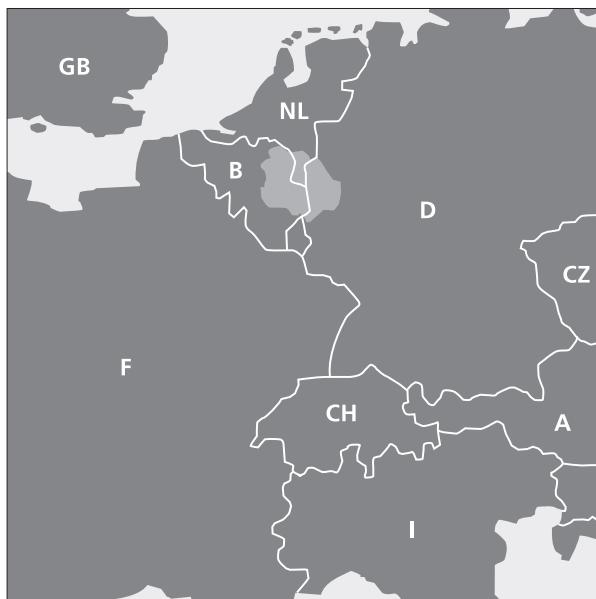


Figure 6.3. Location of Rhine-Meuse Region in Europe

Source: Foundation Euregio Maas Rijn
<http://www.euregio-mr.org>

bodies, community based organisations and companies). We deliberately use the somewhat vague term "knowledge interactions" here because the classical concept of knowledge generation in universities and research centres and subsequent dissemination of knowledge to society is too limited for the generation of knowledge relevant for sustainable development in our present society. All actors in society can – or even have to – contribute to the participatory process of context embedded knowledge generation for sustainable development. By formulating our activities in this way we do not mean to say that the generation of scientific knowledge according to an agreed upon scientific methodology would not be relevant for sustainable development. On the contrary, it remains very important and belongs to the core business of some of the RCE partners. However, the focus of the local RCE is on knowledge generation embedded in the regional societal context.

The centre will develop activities for both the present generation – especially for people in positions to make decisions in relation to sustainable development issues – and, via education, for the future generations. The centre will also contribute to awareness building in civil society because we want to convince all citizens that a more sustainable development than the present one starts with individual responsibility. To realise its goals the centre will organise activities, projects, information channels and the like to reach different target groups.

The centre has the additional ambition to support, via co-operation, the formation of RCEs in other regions of Europe and the world and to work together with these in a global network of RCEs. Jointly the RCEs could build a global learning space for sustainable development. Figure 6.4 gives a schematic representation of the interaction between the different scale levels.

The nodal network

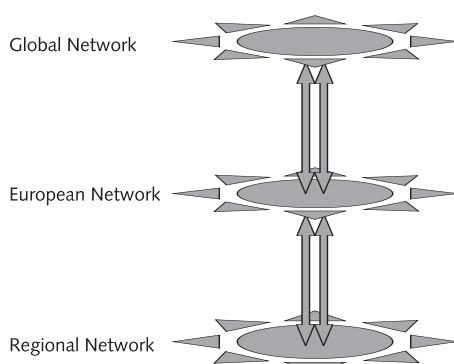


Figure 6.4. Interaction between Different Scale Levels

6.4.1 Scope of Collaboration

We would like to call the local region in which the activities are developed the Rhine-Meuse + region because it is geographically somewhat larger than the official EU Rhine-Meuse region. In the region, there are seven research universities, fifteen universities for applied science, several multinationals, a large number of SMEs including innovative SMEs, and regional governments with policy plans in the field of sustainable development. In collaboration with these knowledge institutes, governments, companies and NGOs active in the region, the RCE wants to function as a broker for knowledge transfer and as a meeting point for decision- and policy makers.

6.4.2 Research, Development and Transformative Expectation

The objective for the RCE is to function as a connection point for knowledge interactions on sustainable development issues among stakeholders in society (knowledge institutes, governmental institutes and

6.4.3 Governance and Sustainability of the RCE

To realise the RCE ambitions, the Open Universiteit Nederland and the Hogeschool Zuyd, both located in Heerlen, the Netherlands, established a foundation. This foundation will facilitate the network via a small office. Other partners in the network associate with the foundation for a long or short period to become an active partner in the network organisation. This format for the organisation of RCE activities is chosen by starting from the following description of an organisation. An organisation is the sum total of individuals, relations among them and processes that are most optimal for realising defined objectives in a given societal context. The objectives to be realised and the societal context of the organisation define its effectiveness and form. A flexible network organisation coordinated from a small office appears most optimal given the most constant factor in society is change. Such an organisation format will allow minimal overhead costs. For strategic and policy development two groups are active, a Scientific Advisory Board and a Steering Committee. The Scientific Advisory Board consists of professors from different universities in the region. The task of this board is to look at the strategic and policy plans from the scientific perspective. The Steering committee consists of persons having a leading position in the different organisations (public, private, NGOs) that associate with the RCE. They have to make sure that the strategic and policy developments meet the regional needs. Safeguarding both scientific quality and stakeholder participation is considered necessary to guarantee more than short term enthusiasm and commitment of regional actors.

The central co-ordinating office forms the legal and administrative core of the network. While the strength and reach of the network will be determined by the activities of its associated members. The main task of the co-ordinating office facilitating the (inter)actions in the network will be communication between members and communication with the outside world. The projects, forming the real core of the RCE activities, will be run by the associated members.

The development plan for the RCE in the Rhine-Meuse+ region is given in the box 6.1.

Box 6.1. Planning and Growth Path for the RCE in the Rhine–Meuse+ Area

Phase 0 September 2004 – December 2004: Establishing the foundation

The legal basis for the centre will be a foundation (Foundation Expertise Centre Learning for Sustainable Development). Within the home region of the centre the first partners are recruited. The focus is on larger organisations that have an impact on local development. Next to the legal base a connection to UNU/UNESCO is established to ensure the status of RCE within the framework of the Decade of Education for Sustainable Development.

Phase 1 2005: Start of the Centre

An office will be installed and two coordinators (from Hogeschool Zuyd and Open Universiteit Nederland) and a secretary will formally start office activities.

In this phase the partners for the network will be selected and contracted through the office. Project plans will be developed with and by partners. These plans will be submitted to various subsidy programmes.

The centre will aim at regrouping existing activities. By doing this the centre will gradually develop into a central point for structuring various initiatives and activities in the field of sustainable development. The centre will quickly develop an added value for parties and members.

During the year the centre will focus on visibility and positioning. For this purpose a communication policy will be developed. Based on this policy an action plan will be developed to position the function of different communication channels.

On the global level the preparation of a global network will continue. During the year the collaboration with UNU, UNESCO and GHESP will continue.

Phase 2 2006: Expanding the Centre's base

The network will be expanded and potential partners in the home region (the triangle Eindhoven – Cologne – Leuven) will be attracted. The centre will start new initiatives and new services to facilitate the expanding network.

The centre will establish working relations with local, regional and national authorities.

The centre will focus on being a central support point for European Regional collaboration.

The centre will work on its visibility as a network by organizing a Studium Generale, events organised throughout the home region in collaboration with the network partners.

Phase 3 2007/2008 Full grown centre

After 2 years of pioneering the centre must have established a proven base. From there the centre will develop into a full grown centre. In this phase the centre will start to create new knowledge products and training activities and will become a meeting place for those interested and involved in sustainable development.

The centre will be one in a global network of centres.

6.5 A European Network of RCEs

In parallel with organising activities in the Rhine-Meuse+ region, we have also explored whether there are opportunities for collaboration with other RCE initiatives in Europe. The idea is that living in urbanised areas could be seen as a shared European characteristic and therefore the theme 'Learning for Sustainable Development in Urbanised Areas' could be a suitable umbrella theme for creating synergy. A network of European RCEs working together under that umbrella theme could form a European Learning Space for Sustainable Development. Working together in such a European network could be of interest to all because, although the European regions may share the characteristics of urbanised area, there is a great cultural diversity among them as well, especially in an enlarging Europe. That cultural diversity can be an inspiring source for a joint learning process. So far we have collaborated with our colleagues in the following regions: Antwerp, Barcelona, Göteborg, Graz, Jelenia Gora Lüneburg and Prague. Recently the universities of Geneva and Zagreb expressed interest to participate. They and other regions that would like to join the initiative are invited to do so. The idea behind the European network of RCEs is that all joining regional initiatives agree to work according to the basic principles of RCE – a) collaboration between different levels of formal education and b) facilitating relations between formal education and local actors relevant for ESD, such as research centres, local businesses, museums, local governments, etc. All RCEs work according to the format that suits best the local societal conditions. Therefore, RCEs will most probably present a large variety of organisational forms. By sharing knowledge, expertise and good practises and through co-operation in joint projects the European RCEs will constitute a learning space for sustainable development. Of course, this European Learning Space for Sustainable Development must be seen as part of a much larger Global Learning Space that, hopefully, will be formed towards the end of UN DESD.

Creating synergy between European regions in their search for creative, effective and efficient learning for sustainable development would be the objective of a European network of RCEs. Such a network can gain momentum by cooperating with United Nations University (UNU) and UNESCO during UN DESD. In the UNESCO Higher Education Information Brief, regional centres are described as important actors in the effort to build a global learning space for sustainable development. The network of RCEs in Europe wishes to create the European part of that Global Learning Space envisaged by UNESCO and UNU.

Within the European network of RCEs the individual RCEs will function in the European regions where they are engaged with local and regional stakeholders in research, development and implementation. They organise the activities in their home region using a organisational format that is most optimal in their regional context. Of course, the organisational format can be completely different from that chosen for the RCE in the Rhine-Meuse+ region. The network will allow regions to communicate, exchange information and learn with and from each other.

Early 2005 the following mission statement has been formulated for the European network of RCEs:

'Contribute as a European-wide network to mainstreaming sustainable development in all societal activities by (re)defining -- in interaction with a broad range of stakeholders -- good practices for lifelong (co)learning for sustainable development in formal, non-formal, informal environments.'

The European RCE network is made-up of regional RCEs formed by public and private domain organizations, NGOs and knowledge institutions that co-operate in establishing innovative and mutual learning processes'.

The partners in the network aim to:

- reconsider critically the effectiveness of scientific knowledge in the complex societal context
- remove the boundaries between formal, non-formal and informal learning and make sure that learning becomes a life-long process
- identify the opportunities that the urban areas present for learning for sustainable development
- link sustainable development cluster partnerships across European regions
- map the competencies of the clusters and organise a process of continuous benchmarking to identify improvement potentials and best practise exchange opportunities
- convert the outcomes into tools and policies to enable regions to apply sustainable development principles to transition processes
- promote public-private co-operation in the innovation of knowledge generations and transfer
- contribute to awareness-raising on sustainable development in society

The activity lines for the European RCE network include research, development and implementation projects. These projects will be initiated throughout the network and in collaboration with other existing networks. Moreover, the network facilitates activities in the regional RCEs by:

- Developing methodologies for effective and efficient co-learning for sustainable development
- Identifying relevant stakeholders for effective and efficient co-learning for sustainable development
- Creating synergies between existing projects in the regions and the regional RCE in the context of European Framework Programmes
- Identifying opportunities for funding in both the public and private domain
- Sustaining the network via for-profit-projects although remaining a not-for-profit-network
- Working on effective cost reduction by using virtual space

The European RCE network wishes to make the joint knowledge base accessible by developing/organizing:

- E-journal
- Website
- Workshops
- Learning materials
- Scientific publications

In addition to these joint activities the network and its members will also actively use existing dissemination channels. The European RCE network does not want to reinvent the wheel, but would create connections to existing initiatives and structures. Integration of existing structures/dialogue platforms is a most important objective for the regional RCEs. Every regional RCE will, thus, be a member of several existing networks and will co-operate with partners that are part of those networks.

The European network will also be a part of the global network of RCEs formed in the context of UN DESD.

6.6 Conclusion

Realising a development trajectory that is more sustainable than the present one in our globalising world is a most difficult and challenging, but highly necessary endeavour. The Regional Centre of Expertise Learning for Sustainable Development in the Rhine-Meuse+ region will work, together with other partners, for that global objective using its local resources in a creative, effective and efficient way.

Creating learning environments that facilitate learning for sustainable development implies that one has to reflect on the characteristics of the world we are living in, on the meaning of the concept of 'sustainable development', and on the way we have organised learning processes in our societies. We think that learning for sustainable development should be part of a life-long process taking place in formal, non-formal and informal learning environments.

We feel that collaboration with other parties motivated to build together a Global Learning Space for Sustainable Development in the context of UN DESD will be most rewarding.

Chapter 7 First Lessons and Future Challenges

By Zinaida Fadeeva, Yoko Mochizuki, and Rietje van Dam-Mieras

This publication is a first attempt to bring together hours of discussions and pages of writing on the nature of ESD, its priorities for various regions and means of implementation. The contributions that constitute this report were written for various occasions and at different times over the last year. Not surprisingly, the challenge of bringing them together highlighted important questions and concerns that may serve as focal points in our future publications. For the time being, we wish to briefly indicate these areas of interest and, therefore, invite contributions of others to explore these important topics.

Discussions with the authors and participants of the up-coming RCE initiatives that constituted chapters in Part Two (Efforts to Establish Regional Centres of Expertise) also lead to some initial observations. While these observations are very preliminary, we consider them important points of reference for those who are searching for experiences with implementation of the RCE concept.

7.1 Moving Beyond Good Practices : Building Visions for DESD

This report presents a variety of challenges that ESD will face in different societies in order to prepare their citizens for actions towards sustainable development. In the limited space of this publication, we were restricted to indicating the "basics" without much elaboration on possible solutions appropriate for various circumstances. While examples of RCE initiatives give an inspiring illustration of organising for ESD at the local level, we are still restricting our solutions for the problems of un-sustainability to the use of existing good practices. However respected, this way of facilitation has its limitations. "Best", "good" or "better practices" are often criticised for not being able to provide rich enough material for re-thinking and re-designing systems of knowledge by others. Human knowledge is deeply contextual, which makes codification of best case practices an extremely challenging affair producing results of limited use. Best practices are also recognised as management techniques that require discipline, time and resources and could be prohibitively expensive.

In addition to the discussion of stories of ESD accomplishments rooted in existing educational infrastructure, we recognise a need for strategies that enable radical innovations. That is important for actors dealing with ESD at all levels. When it comes to local initiatives, it becomes essential. In the case of RCEs, for example, actors, often for the first time, come together to create long term plans for collaboration. They face a task of learning about trends, uncertainties, opportunities and risks in their reality and, on the bases of these lessons, drafting new ESD strategies. They should also face a challenge of re-defining their traditional roles in the context of education. In these circumstances, it would be helpful to provide the actors with a structured and creative learning process of planning for RCE. In order to create such conditions one could turn to a visioning process, for example, through scenario exercises. Visions built on the bases of scenarios will enhance perception of actors by taking ESD strategy building beyond currently observed trends, will make risks and uncertainties explicit, will mobilise thinking processes of participants and will give them a sense of agency. Planning and management tools based on such visioning processes could become more suitable for dealing with highly complex situations. Remember Lewis Carroll's "Alice's Adventure in Wonderland", wherein the Cheshire Cat replies to Alice's question "Would you tell me, please, which way I ought to go from here?", by saying, "That depends a good deal on where you want to get to" (Carroll, 1983). Where we want to go and what the future holds are essential questions in planning our actions. It is important to initiate visioning exercises for ESD and share stories resulting from these exercises. After all, we are facing a decade of actions that is to lead to a more sustainable world.

7.2 Need for Engaging Other Disciplines and Discourses

We also recognise that there is a variety of disciplines and perspectives that could complement views expressed in this publication. Many principles of ESD resonate with the modernisation thinking that became dominant during the post-war period and has been challenged as culturally biased. Development practitioners and thinkers promoted ideas of 'development' that enhance individual and collective qualities of life and are, generally, beneficial for all (e.g. Simon, 1999, p.21). Scholarship critical of 'development studies,' collectively known as 'post-development' studies, has recently challenged not only bureaucratic 'top-down' approaches to 'development' but also allegedly transformational and empowering 'bottom-up' approaches we propagate in this publication. Problematisation of the notions of development, civil society, empowerment, partnerships, and other key concepts in mainstream development discourses could enrich the ESD debates and practices. Interacting with post-development studies is also useful in terms of monitoring DESD.

Measuring the success of ESD is a daunting task. How is it possible to demonstrate and analyse the impact of ESD on the lives of individuals and communities? Precisely because ESD is fundamentally about values, it is important to be familiar with perspectives that can address the ‘value-laden’ nature of ESD.

Yet another reason for calling upon other experiences and inviting other disciplines is an old issue of specialisation around particular discourses and academic disciplines. It seems to us that there are two main communities dealing with questions of ESD. One, that is formed around the Education for All movement and consists mainly of education researchers and practitioners, aims at education as a fundamental human right and a means to promote individual and collective development. This movement focuses primarily on improving education for marginalized groups such as girls' education, education of indigenous people, literacy education, adult education and so on. Another community is formed around the environmental aspect of sustainable development and historically represented and inspired by natural sciences, technology and management practitioners. Representatives of this movement—many originally from the field of environmental education—believe in the need for education, or rather, ‘capacity development’, to achieve a sustainable future. Both of these communities have a lot to contribute to the ESD process. We see an urgent need for creating platforms where ideas of these movements could be exchanged and collaborative ESD actions formed.

7.3 Interactions Between Sciences and Policy

Another issue that surfaced during our discussion with the authors is a challenge of integrating scientific data into policy and action. The science policy interaction is not unproblematic. On the one hand policy makers tend to be disappointed with the usefulness of scientific findings in policy-making practice while, on the other hand, many scientists do not feel at ease with the way results of fundamental research are used in that practice. To understand the tensions in the relation between policy and science, it is important to realise that policy-making essentially has normative and subjective elements while good scientific practice asks for objective evidence. Funtowicz and Ravetz (1991, 1994) have analysed the interaction between policy-making and scientific research in a systematic way and came to the conclusion that scientific arguments are often (mis)used to empower normative conclusions. They developed a classification of the way scientific data are used in policy practice based on uncertainty of those data and the interests at stake. Funtowicz and Ravetz discriminate between normal science, expert science and post-normal science. In normal science puzzles are solved according to agreed upon scientific methodology and scientific quality is assessed via a peer-review system. The results of normal science are valid within the scientific model in which they are verified. Outside this model, they are not irrelevant but they tend to remain rather remote from great societal interests. However, as research and development are at the basis of innovation and economic development, there will be many situations where scientific results will more directly influence societal interests.

We then enter the domain of expert science. An expert is a person that has proven quality (by peers) within a certain scientific domain and who is, in addition to that, trusted to be able to contribute importantly to solving a problem of great societal interest. An expert, thus, is a person trusted to be able to use scientific findings in a societal context that is, of course, much more complex than the scientific model context in which the findings were derived. This implies that the expert will work with greater uncertainty. If there are great interests at stake the opinion of one expert is not enough. A first step to be taken in such situations is to ask a second expert, but in situations with great interests and high complexity, like for instance environmental and sustainable development issues, expert science is no longer sufficient; we then enter the domain of post-normal science. The domain of post-normal science is characterised by great societal interests, great complexity and great uncertainty. These problems ask for a multidisciplinary approach and for stakeholder participation because the results should not only be of good scientific quality but should also be socially robust. There is neither yet an established methodology for post-normal science, nor a system for quality assessment of post-normal science. The field urgently needs to develop these. In the field of sustainable development, one always has to deal with these types of complex problems. Sustainable development, therefore, is a field in which much learning on how to tackle and solve problems of great societal interest, at all scales from local to global, has to occur.

7.4 Knowledge Translation: Contribution of Science to Decision Making and Education

One of the critical questions for the success of ESD is a question of knowledge utilisation. Relations between knowledge-producing institutions, among which IHEs play a critical role, and decision makers highlight one of the challenges of channelling knowledge to those who could utilise it in actions. This challenge is, to some extent, addressed by the previous section. To satisfy societal needs and to be useful for the decision makers, knowledge-generating institutions should move away from specialised scientific disciplines and narrowly-defined problems towards inter- and intra-disciplinary approaches dealing with system problems. Formulating relevant questions is one part of effective knowledge utilisation. Another part of it is effective knowledge translation to the users. The process of knowledge translation is often downplayed within the area

of sustainable development. Experts able to contribute conceptually to the challenges of sustainability are often asked to provide their expertise to the users. Many of these experts might not have sufficient knowledge about particularities of communication and learning processes. Such possible lack of appreciation for pedagogical processes is often based on the assumed self-sufficiency of expert knowledge for solving societal problems (Babikwa, 2003). Inadequate attention to the process of teaching and learning might lead to the lesser or inadequate results in the knowledge translation process.

The idea of knowledge translation (Callon, 1991; Callon & Latour, 1981) is different from the idea of knowledge transfer or diffusion. Transfer or diffusion implies a process where the meaning of ideas remains unchanged. The processes of knowledge translation assumes a flexibility of interpretations and variety of meanings associated with learning processes. The concept of translation highlights the importance of various factors that affect learning processes of individuals and organisations.

Another challenge is translation of scientific knowledge within the educational column. While considerations of pedagogy are also essential for this process, the real challenge is a commitment of knowledge-generating institutions to actively collaborate with different levels of schools. While there are important examples of collaboration towards sustainable development between IHE and policy-makers, private sector and NGOs, such examples are less common between IHE and schools. As a result, the latest achievements of science and technology do not benefit broad educational process.

7.5 Mobilising for RCEs : Some Initial Challenges

An RCE as a network of organisations is viewed as being able to resolve complex local problems. An RCE is a network of local actors from the formal educational sector, knowledge-generating institutions and organisations interested in learning for sustainable development. The activities of RCEs will be defined by the regional (local) conditions. In general, activities of RCEs could serve to promote development and exchange of information relevant to ESD, assist in sustainability curricular development and implementation, facilitate collaborative projects to straighten ESD activities, facilitate efficient and effective use of limited resources and raise an awareness about ESD.

Networking, as a governance structure, allows RCEs to address complex problems. If certain conditions are fulfilled, networks could lead to increased knowledge, reflexivity of actions, greater satisfaction for the involved parties, cost and time efficiency and reduced conflict (e.g. Janicke & Martin, 1997, Sydow & Winddeler, 1998). Such perception about networks, promoted by the widespread popularity of partnerships, might overshadow possible challenges imposed by collaborative networking. For example, networking could cause silencing of uncomfortable actors, create conflict and tension, create visibility of sustainability actions without any significant improvements, or take large resources for maintaining collaborative links (Kitchen, 2000; Lahusen, 2000; Fadeeva, 2003). Overcoming potential pitfalls and inefficiencies might be possible if an RCE is able to follow some strategic considerations. While the number of such considerations could be quite significant, we restricted ourselves to a selected few that appeared relevant to the RCE initiatives currently being developed. All of these initiatives are at the very initial stages of developing, therefore, our observations relate to the initial stage of RCE strategising.

It might be useful, both at the stage of RCE establishment and maintenance, to consider regional policies and development trends with regards to sustainability and education. Strategic capability to find and interpret such information might lead to effective acquisition of knowledge and resources. Such strategic capability could help to identify synergy with on-going processes, as well as to manage conflicting processes coming from outside.

RCEs are not envisioned as an entirely new activity but as an organisation/a network built on the basis of existing projects. It is important that RCEs bring these activities together under common goals instead of keeping it as a formal umbrella for disparate actions. A critical factor of success for any RCE is to agree on common goals and clearly articulate them. It is essential as actors coming together could have their own perception of goals. Provision of the interactive space in various forms could help in achieving this ambition. For example, an RCE could make sure that there is sufficient time allocated to the initial discussions clarifying benefits for all involved actors and assuring 'added value' from joining an RCE. It is also important to monitor and evaluate the networking goals and effectiveness of the on-going activities in achieving these goals.

Another question that RCEs will face from the very beginning is the question of optimal network composition. Selection of core partners will significantly affect the agenda for RCE actions and way of implementation. While it is natural that activities might start among the actors that already identified common interests and/or have experience of working together, an RCE should have a clear plan of engaging other actors relevant for achieving RCE goals. Familiar collaborators and, generally, homogeneous actors, influence the effectiveness of idea implementation. On the other hand, more diverse membership will bring different perspectives and, potentially, enrich the RCE agenda. While homogeneous members could reduce uncertainty, the more heterogeneous ones could bring more "revolutionary" information and skills.

Attending to the question of membership might be worthwhile from the beginning, considering that maintaining the collaborative links requires resources (Burt, 1992). With projects and other activities unfolding, it might be challenging to expand the core membership of an RCE significantly unless strategic considerations for such expansion are envisioned from the very beginning. It might be useful to make sure that all three dimensions of sustainable development and all main stakeholder groups are represented in the organisational structure of an RCE. For example, an RCE could form an advisory board consisting of experts in social, environmental, economic and cultural issues and with the knowledge of different sectors to safeguard the sustainability agenda of the RCE.

One of the critical ambitions of RCE, and ESD in general, is to bring together actors that traditionally do not work with each other. Different departments of universities or government might not have had an opportunity to engage in collaborative activities. Relations between schools and universities might not have been common in some regions. Universities, schools, governments, private sector, media companies and many others relevant for RCE activities come from different institutional fields. Their goals, styles of working, values and measures of success are different. This requires serious consideration when establishing an RCE. Some novel ways of working should be developed, which requires provision of sufficient resources, including time allocation.

This report highlighted the main elements of RCE concept and presented the first initiatives putting this concept into practice. The three cases, in the Greater Sendai Area of Japan, Canadian Toronto and Rhine-Meuse+ region of Europe, are pioneering initiatives in a larger group of up-coming RCEs that are mobilising for learning for sustainable development at the local level in different regions of Asia and Pacific, Africa, America and Europe. As emerging initiatives mature, more in-depth observations and analysis will become available. Variety of challenges in various regions will define variety of organisational forms and actions employed by different RCEs. Lessons from up-coming RCEs and collaboration among them will constitute the content of our future publications.

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Appendices

Appendix A. The Ubuntu Declaration

On Education and Science and Technology for Sustainable Development

In an effort to make integrated solutions work for sustainable development and to mobilize the education sector to contribute to sustainable development;

We, the education and scientific organizations of the world,

United Nations University United Nations Educational, Scientific and Cultural Organization African Academy of Science International Council for Science International Association of Universities Copernicus-Campus Global Higher Education for Sustainability Partnership Science Council of Asia Third World Academy of Sciences University Leaders for a Sustainable Future, and World Federation of Engineering Organizations,

call for an initiative to strengthen science and technology education for sustainable development.

Cognizant that integrated solutions for sustainable development depend on the continued and effective application of science and technology, and that education is critical in galvanizing the approach to the challenges of sustainable development.

Endorsing the Earth Charter as the inspiring, fundamental and balanced set of principles and guidelines for building a just, sustainable and peaceful global society in the 21st century, which should permeate all levels and sectors of education.

Noting that science is all science - natural, social and human.

Recognizing the necessity to bridge the knowledge gap between the nations of the world through a fundamental redress of the distribution of education for sustainability.

Acknowledging that the ultimate goal of education in all its forms is to impart knowledge, skills and values to empower people to bring about changes.

Concerned that education has not been utilized as a vehicle for attaining sustainable development.

Reaffirming the indispensable role of education in achieving sustainable development, and the important role education plays in the mobilization of science and technology for sustainability as contained in Chapter 36 of Agenda 21.

Recalling the Lüneburg Declaration on Higher Education for Sustainable Development of 10 October 2001, and its emphasis on the indispensable role of higher education informing and supporting all education in addressing the critical challenges of sustainable development.

And recognizing that the Scientific and Technological community, as represented by the International Council for Science, Third World Academy of Sciences, and World Federation of Engineering Organizations in the WSSD process has called for a new social contract between science and technology and society for sustainable development.

Determined to work towards the goals contained in the Millennium Declaration, Monterrey Consensus and the Doha Development Declaration.

Call on Governments of the World Summit for Sustainable Development and the Post-Summit agenda to:
Designate educators as the tenth stakeholder group in the WSSD process.

Call on educators, Government and all relevant stakeholders to:

Review the programmes and curricula of schools and universities, in order to better address the challenges and opportunities of sustainable development, with a focus on:

- Plans at the local, regional and national country levels;
- Creating learning modules which bring skills, knowledge, reflections, ethics and values together in a balanced way;
- Problem-based education at primary and secondary levels in order to develop integrated and non-instrumental approaches to problem solving at an early stage in the education cycle;
- Problem-based scientific research in tertiary education, both as a pedagogical approach and as a research function;

Promote efforts to attract young people to the teacher profession both to meet the Millennium Development goals of universal access to primary education as well as to further strengthen primary, secondary and tertiary education. In developed countries the major challenge in the coming years will be to offset the high outflows of experienced teachers reaching retirement age or taking up other challenges.

Develop mechanisms to continuously inform teachers and update programmes on major progress in scientific and technological knowledge relevant for sustainable development.

Promote knowledge transfers in innovative ways in order to speed up the process of bridging gaps and inequalities in knowledge. This is the shared responsibility of teachers, schools, research and education institutions and governments.

To achieve these challenges and objectives, we are resolved to work towards a new global learning space on education and sustainability that promotes cooperation and exchange between institutions at all levels and in all sectors of education around the world. This space must be developed on the basis of international networks of institutions and the creation of regional centers of excellence, which bring together universities, polytechnics, and institutions of secondary education and primary schools. We invite all other responsible stakeholders to join us in this endeavour.

Appendix B. Historical Milestones in the Field of Education for Sustainable Development

Date	Event	Content
1972/6/6-16	UN Conference on the Human Environment (Stockholm Conference)	This was the first high level intergovernmental conference on the environment held in Stockholm. The Declaration of the United Nations Conference on the Human Environment was adopted. Principle 19 of the declaration states "Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension" (1)
1975/10/13-22	UNESCO/UNEP International Workshop on Environmental Education (Belgrade Charter)	This was the first international conference on environmental education (EE) held in Belgrade, former Yugoslavia. The philosophy and principles of EE were articulated in the Belgrade Charter. (2)
1977/10/14-26	Intergovernmental Conference on EE (Tbilisi Declaration)	This was the first intergovernmental conference on EE organised by UNESCO, in cooperation with UNEP, held in Tbilisi, USSR. The Tbilisi Declaration was adopted. It noted an unanimous accord of the important role of EE in the preservation and improvement of the world's environment, as well as the sound and balanced development of the world's communities.(3)
1987	Publication of "Our Common Future"	"Our Common Future" is a report of the World Commission on Environment and Development, which was chaired by Ms. Brundtland, former Norwegian Prime Minister. The book popularized the notion of sustainable development. (4)
1988	CRE-COPERNICUS	COPERNICUS, the "COoperation Programme in Europe for Research on Nature and Industry through Coordinated University Studies" was launched by CRE, the predecessor of the European Universities Association EUA. (5)
1990/3/5-9	World Conference on Education for All	The conference was held in Jomtien, Thailand. Delegates from 155 countries, as well as representatives from some 150 organisations agreed to universalise primary education and massively reduce illiteracy before the end of the decade. (6)
1990/10	Talloires Declaration	The Talloires Declaration is a consensus statement authored by 31 university leaders and international environmental experts representing 15 nations from around the world. It was developed at the Tufts University at Talloires, France. As of the April 1999, the declaration had been signed by over 250 universities worldwide. (7)
1991/12/11	Halifax Declaration	Before the UNCED, university Presidents and senior officials from universities, governments, the business community and NGOs from five continents met in Halifax Canada to discuss the role of universities in improving the capacity of countries to address environment and development issues. They adopted the declaration based on the dedication of all universities moving towards the actions for sustainable development. (8)

1992/6/3-14	United Nations Conference on Environment and Development (UNCED)	The United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro, Brazil. Five major agreements on global environmental issues were signed. One of them was Agenda 21. It is a wide-ranging assessment of social and economic sectors with goals for improving environmental and developmental impacts of each of sectors. The section 36 is titled as "Promoting education, public awareness and training. (9) (10)
1993/11/19	Kyoto Declaration	Some 90 international university leaders assembled at the 9th International Association of Universities (IAU) Round Table, and adopted the Declaration. It is a declaration of principle in support of sustainable development as a dynamic and evolving expression of purpose to guide IAU up to the year 2000. (11)
1994/5	CRE Copernicus Charter	The University Charter for Sustainable Development is an instrument created by Copernicus, an inter-university co-operation programme on the environment, established by the Association of European Universities (CRE). The Charter expresses a collective commitment on behalf of a large number of universities. It represents an effort to mobilize the resources of institutions of higher education to further the concept and objectives of sustainable development. (12)
1997/12	Thessaloniki Declaration	The Declaration was presented and unanimously adopted by the 83 countries present at the International Conference on Environment and Society Education and Public Awareness for Sustainability, which was organised in Thessaloniki by UNESCO and the Government of Greece. (12)
1998/10/5-9	World Conference on Higher Education (WCHE)	The Conference was held at UNESCO Headquarters in Paris. Over 180 countries as well as representatives of academic communities took part in the event. The objective of the Conference was to lay down the fundamental principles for the in-depth reform of higher education systems throughout the world. The participants reiterated the need to maintain, reinforce and strengthen the core missions and values of higher education, in particular the mission to contribute to sustainable development and the improvement of society as a whole. (13)
2000/4	Dakar Framework for Action	More than 1,100 participants from 164 countries gathered at the World Education Forum held in Dakar, Senegal. They adopted the Dakar Framework for Action, Education for All. It commits governments to achieving quality basic education for all by 2015 or earlier. (14)
2000/9/6-8	UN Millennium Summit	The Millennium Summit was the largest ever gathering of heads of state/government. It was a unique opportunity for leaders to push forward the UN agenda on topics such as poverty eradication, peacekeeping reform and Africa. The Millennium Declaration on the future role of the UN was adopted. The Declaration spells out values and principles, as well as goals in the key priority areas of peace, development, the environment, human rights, protecting the vulnerable, the special needs of Africa, and strengthening the UN. (15)(16)
2001/9	56th UN General Assembly	The General assembly recognized the Millennium Development Goals as part of the road map for implementing the Millennium Declaration. (17)(18)

2002/8/26-9/4	World Summit on Sustainable Development	A decade after the UN Earth Summit in Rio, the international community met again in Johannesburg, South Africa to renew commitment at the highest level to sustainable development. The summit sought to overcome the obstacles to achieving sustainable development and to generate initiatives that would deliver results and improve peoples' lives while protecting the environment. "Political Declaration" and "Plan of Implementation of the World Summit on Sustainable Development" was adopted. (19)(20)
2002/9	Ubuntu Declaration	The Declaration was issued at the World Summit on Sustainable Development by 11 of the world's foremost global educational organisations and scientific academies. It calls for greater global emphasis on education for sustainable development, and international partnerships to accomplish these goals. (21) (22) (23)
2002/12	57th UN General Assembly	The UN General Assembly adopted a resolution to put in place a UN Decade of Education for Sustainable Development, lasting from 2005 to 2014. UNESCO was asked to lead the Decade and develop a draft International Implementation Scheme (24)
2003/6/23-25	World Conference on Higher Education + 5 (WCHE + 5)	Five years after the WCHE, this Conference was held to assess the progress achieved in the implementation of WCHE orientations. (25)
2004/10	DESD Draft International Implementation Scheme	UNESCO submitted a draft International Implementation Scheme for United Nations Decade of Education for Sustainable Development (DESD) to UN General Assembly. (26)
2005/3	Launch of DESD	On 1 March 2005, UNESCO Director General Koïchiro Matsuura officially launched the DESD in New York.

- (1) <http://www.unep.org/Documents/Default.asp?DocumentID=97&ArticleID=1503>
- (2) http://portal.unesco.org/education/en/ev.php-URL_ID=33037&URL_DO=DO_TOPIC&URL_SECTION=201.html
- (3) <http://www.gdrc.org/uem/ee/tbilisi.html>
- (4) <http://brundtland-commission.wikiverse.org/>
- (5) http://www.copernicus-campus.org/sites/conferences_index.html
- (6) http://www.unesco.org/education/efa/ed_for_all/background/world_conference_jomtien.shtml
- (7) <http://www.bsu.edu/provost/ceres/g2/0main/#declare>
- (8) http://www.unesco.org/iau/sd/sd_declarations.html
- (9) <http://www.ciesin.org/TG/PI/TREATY/unced.html>
- (10) <http://www.un.org/esa/sustdev/documents/agenda21/index.htm>
- (11) http://www.unesco.org/iau/sd/sd_dkyoto.html
- (12) http://www.unesco.org/iau/sd/sd_declarations.html
- (13) http://portal.unesco.org/education/en/ev.php-URL_ID=1935&URL_DO=DO_TOPIC&URL_SECTION=201.html
- (14) http://www.unesco.org/education/efa/ed_for_all/framework.shtml

- (15) <http://www.un.org/millennium/>
- (16) <http://www.fco.gov.uk/servlet/Front?pagename=OpenMarket/Xcelerate/ShowPage&c=Page&cid=1007029394122>
- (17) <http://www.un.org/millenniumgoals/>
- (18) <http://www.developmentgoals.org/>
- (19) <http://www.un.org/events/wssd/>
- (20) <http://www.johannesburgsummit.org/>
- (21) <http://www.ias.unu.edu/research/ubuntu.cfm>
- (22) http://www.ulsf.org/pub_declaration_othvol61.htm
- (23) http://www.unesco.org/iau/sd/sd_declarations.html
- (24) http://portal.unesco.org/education/en/ev.php-URL_ID=27234&URL_DO=DO_TOPIC&URL_SECTION=201.html
- (25) http://portal.unesco.org/education/en/ev.php-URL_ID=21803&URL_DO=DO_TOPIC&URL_SECTION=201.html
- (26) http://portal.unesco.org/education/en/ev.php-URL_ID=36026&URL_DO=DO_TOPIC&URL_SECTION=201.html

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UNU Institute of Advanced Studies (UNU-IAS), Yokohama, Japan

Focus: strategic approaches to sustainable development
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UNU World Institute for Development Economics Research (UNU-WIDER), Helsinki, Finland

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UNU Institute for New Technologies (UNU-INTECH), Maastricht, The Netherlands

Focus: socio-economic impacts of new technologies
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UNU Institute for Natural Resources in Africa (UNU-INRA), Accra, Ghana

Focus: natural resources management
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UNU International Institute for Software Technology (UNU-IIST), Macau, China

Focus: software technologies for development
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UNU Programme for Biotechnology in Latin America and the Caribbean (UNU-BIOLAC), Caracas, Venezuela

Focus: biotechnology and society
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UNU International Leadership Institute (UNU-ILI), Amman, Jordan

Focus: leadership development
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UNU International Network on Water, Environment and Health (UNU-INWEH), Hamilton, Canada

Focus: water, environment and human health
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UNU Programme on Comparative Regional Integration Studies (UNU-CRIS), Bruges, Belgium

Focus: local/global governance and regional integration
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UNU Food and Nutrition Programme for Human and Social Development, Cornell University, USA

Focus: food and nutrition capacity building
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UNU Institute for Environment and Human Security (UNU-EHS), Bonn, Germany

Focus: environment and human security
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UNU Iceland-based Training Programmes: Reykjavik, Iceland

UNU Geothermal Training Programme (UNU-GTP)
Focus: geothermal research, exploration and development
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