

Environmental Education

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I. INTRODUCTION

Arab countries have begun individual processes for educational reform. Environmental education is naturally a part of the larger educational reform process that is taking place in many parts of the Arab world. This has coincided with international awareness, treaties, actions, and initiatives towards the environment and, in particular, towards environmental education and research on environmental issues.

Since the Tbilisi Declaration of 1977, the countries of the Arab world have reacted positively towards the increasing concern over environmental issues. This chapter will review some of the endeavours undertaken by different countries of the Arab world to introduce environmental concepts and education into their basic educational systems, higher education, and research institutes, in addition to pan Arab cooperation for environmental education and research.

It discusses the international initiatives to promote environmental education through the declarations and directives of international organizations, and Arab endeavours to participate in and benefit from these initiatives in dealing with their national and regional environmental concerns.

This chapter also includes initiatives in the Arab world that promote national and regional environmental education and learning such as teacher training programmes for the environment and scientific publications on environmental issues.

Because the study of environmental education has yet to be institutionalized in the Arab world, numerous factors contribute to the lack of accessibility to data and current information on the environment. In many areas of the region, consistent environmental monitoring and data collection is absent and there has been little attempt to standardize data formats and reporting. The reports that are made are kept in numerous different government or private sector locations, which often results in duplication of information or gaps in data. These factors make a comprehensive study more difficult and impede the development of a formal environmental policy and its implementation.

The interest in environmental education has been witnessed at both the basic level and the

level of higher education, where an increasing number of universities have introduced Environmental Studies as a major at the Bachelor's, Master's, and Ph.D. levels. Data and statistics are not easily available, as environmental education has yet to be institutionalized throughout the Arab world. In regard to higher education, the access to information is essential to its accountability and continual development, as information is the primary fuel for improving accuracy and availability.

Basic education has not yet developed specific courses for environmental studies, although issues of environmental concern have been incorporated into other required courses, such as numerous science classes. There are, however, several universities in which specialized programmes and degrees in various fields of environmental education have been developed. There are also a number research centres that have tackled environmental issues of concern to the Arab world.

In the Arab world, education information systems tend to still be largely inaccessible. There are many gaps in basic educational data available to the public and the information is often outdated and overly broad. Without standard information on education inputs and outputs, there are no avenues of verification, analysis, and correction. Additionally, if accurate, credible, regularly updated, and detailed information systems do not exist, it will remain challenging to effectively use incentives to improve educational outcomes or to ensure public accountability.

II. ENVIRONMENT IN EDUCATION THROUGH THE DECLARATIONS AND DIRECTIVES OF INTERNATIONAL ORGANIZATIONS

In December of 2002, in UNGA Resolution 57/254, the UN General Assembly declared the years 2005-2014 to be the "Decade of Education for Sustainable Development" (UNDESD). In the declaration, the role of education was recognized as being essential for achieving sustainable development, in accordance with international recommendations from sources such as the Earth Summit of 1992 in Rio de Janeiro and the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002 (Hopkins and McKeown,

2002; Johannesburg Declaration). The aim of the declaration of the UNDESD was to encourage the worldwide incorporation of the values, principles, and practices of sustainable development into all levels of basic and higher education.

At the 59th session of the UN General Assembly in October 2004, and again at the 171st and 172nd sessions of the UNESCO Executive Board in April and September 2005, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) presented a framework for its worldwide International Implementation Scheme (ILS), developed through consultations with various UN agencies, national governments, nongovernmental organizations, and specialists in various fields (UNESCO 2002, 2006). The ILS discussed the key role of partnerships and how these partnerships could contribute to the achievement of the objectives of the UNDESD on the local, national, regional, and international levels.

With the launch of the UNDESD in March 2005, the United Nations Environmental Programme (UNEP) assumed a leading role in the development of programmes and various projects designed to achieve the UNDESD objectives. It relied upon collaboration with UNESCO and the development of an Environmental Education and Training (EET) strategy for the decade to promote environmentally ethical behaviour through values that enable people to become informed citizens actively participating in sustainable environmental development.

The First International Conference on Environmental Education (ICEE) organized by UNEP was held in Tbilisi, Georgia in 1977. The Fourth ICEE was held in Ahmedabad, India in 2007 with the objective of understanding the changes and developments that have taken place in Environmental Education (EE) since the 1977 conference and the role of Environmental Education in Education for Sustainable Development (ESD).

Given that ESD should be a lifelong strategy in which education takes place in both formal and informal settings, the conference provided a number of recommendations to be adopted in order to achieve education for sustainable development. These recommendations called for changes in formal educational approaches and for



further informal education through the workplace, local civic societies and other community-based organizations.

In order to promote and implement ESD during the Decade of Education for Sustainable Development, seven interlinking strategies were proposed incorporating advocacy and vision building, consultation and ownership, partnership and networks, capacity building and training, research and innovation, information and communication technologies, and monitoring and evaluation.

III. ENVIRONMENTAL ISSUES IN EDUCATION IN THE ARAB WORLD

In view of the general crisis of education in the Arab world, it is not surprising that its level of environmental education and awareness is fairly low in comparison to international levels in other areas of the world. However, efforts are continuing to be made to combat this problem.

Environmental Issues in Basic Education

The objectives of environmental education at this level are to establish a relationship between the individual and his or her natural and social environment, aiming for children and youth to gain skills, direction, and values that are related to the environmental problems and responsibilities that face the individual, and to align behaviour in a positive and interactive way towards his environment. No one discipline can or should claim ownership of ESD. In fact, ESD poses such

TABLE 1 DEGREES OFFERED IN ENVIRONMENTAL STUDIES IN DIFFERENT ARAB UNIVERSITIES

Country	University	Field	Degree	Website
Bahrain	Bahrain University	Environment and Sustainable Development	Master's	http://www.uob.edu.bh/scientific-research/unesco/ENV/project.html
Egypt	Alexandria University	General Degree in Biochemistry & Environmental Science	Bachelor's	http://www.alex.edu.eg/
		Special Degree in Environmental Sciences	Bachelor's	http://www.alex.edu.eg/
		General Degree in Environmental Sciences & Chemistry	Bachelor's	http://www.alex.edu.eg/
		General Degree in Environmental Sciences & Biochemistry	Bachelor's	http://www.alex.edu.eg/
		Environmental Sciences	Master's	http://www.alex.edu.eg/
		Environmental Sciences	PhD	http://www.alex.edu.eg/
	American University in Cairo	Environmental Science Minor	Bachelor's	http://catalog.aucegypt.edu/preview_program.php?catoid=4&poid=323
		Environmental Engineering (M.S.)	Master's	http://catalog.aucegypt.edu/preview_program.php?catoid=4&poid=369
		Environmental Systems Design (M.Eng.)	Master's	http://catalog.aucegypt.edu/preview_program.php?catoid=4&poid=370
	Mansoura University	Environmental Management, Engineering and Technology	Master's	http://mudb.mans.edu.eg/enmed/intro.swf
Mansoura University (Damietta Faculty of Science)	Environmental Sciences	Bachelor's	http://www.mans.edu.eg/facscid/english/Envir/Environmanetal.htm	
Jordan	Al al-Bayt University	Applied Geology and Environmental Sciences	Bachelor's	http://www.aabu.edu.jo/earth/bs.htm
		Water Resources and Environment	Master's	http://www.aabu.edu.jo/earth/ms.htm
	Al-Hussein Bin Talal University	Environmental Engineering	Bachelor's	http://www.ahu.edu.jo/index.php?mod=department&id=26
	Hashemite University	Land Management and Environment	Bachelor's	http://www.hu.edu.jo/fac/dept/undergraduate_Programs.aspx
		Water Management and Environment	Bachelor's	http://www.hu.edu.jo/fac/dept/undergraduate_Programs.aspx
		Geology and Environmental Sciences	Bachelor's	http://www.hu.edu.jo/fac/dept/undergraduate_Programs.aspx
	Yarmouk University	Environmental Sciences	Master's	http://portal.yu.edu.jo/Default.aspx?tabid=231

broad and encompassing challenges that it requires contributions from many disciplines. For example, consider these inter-disciplinary contributions to ESD (UNESCO 2006):

- Mathematics helps students understand extremely small numbers (e.g., parts per hun-

dred, thousand, or million), which allows them to interpret pollution data.

- Language Arts, especially media literacy, creates knowledgeable consumers who can analyze the messages of corporate advertisers and see beyond “green wash.”

TABLE 1

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Country	University	Field	Degree	Website
Kuwait	Kuwait University	Environmental Geology	Bachelor's	http://www.science.kuniv.edu.kw/Courses.xphp?Language=En&UnitID=U046000
Lebanon	American University	Environmental Health	Bachelor's	http://fhs-lb.aub.edu.lb/degree_programs/undergraduate_studies.html#eh
		Environmental Sciences	Master's	http://fhs-lb.aub.edu.lb/degree_programs/master_science.html
		Aquatic and Environmental Sciences	Diploma	http://wwwlb.aub.edu.lb/~webbiol/programs.htm
		Environmental and Water Resource Engineering	Master's	http://webfea-lb.fea.aub.edu.lb/fea/cee/programs/ewre_general.aspx
		Environmental and Water Resource Engineering	PhD	http://webfea-lb.fea.aub.edu.lb/fea/cee/programs/phd_general.aspx
		Environmental Technology	Master's	http://webfea-lb.fea.aub.edu.lb/fea/cee/programs/et_general.aspx
	Beirut Arab University	Biological and Environmental Science	Bachelor's	http://www.bau.edu.lb/science.htm
	Beirut University Online	Environmental Studies	Master's	http://www.buonline.edu.lb/bu/envstudies.htm#offer
University of Balamand	Environmental Science	Bachelor's	http://www.balamand.edu.lb/english/Sciences.asp?id=1437&fid=164	
Notre Dame University	Environmental Science	Bachelor's	http://www.science.nd.edu/science_undergrad/bios/bios_ES_major.htm	
Libya	Academy of Graduate Studies	Environmental Science and Engineering	Bachelor's	http://www.alacademia.org/english/Eng1.htm#
Mauritania	University of Nouakchott	-	-	http://www.univ-nkc.mr/
Morocco	Al Akhawayn University	-	-	http://www.aui.ma/
	International Institute for Higher Education in Morocco	-	-	http://www.iihem.ac.ma/fr/src/home.php
	Université Hassan Ier - Settat	-	-	http://www.uh1.ac.ma/uh1/
Oman	Nizwa University	Environmental Engineering	Diploma, Bachelor's	http://www.unizwa.edu.om/e-index.php

- History teaches the concept of global change, while helping students to recognize that change has occurred for centuries.
- Reading develops the ability to distinguish between fact and opinion and helps students become critical readers of political campaign literature.
- Social Studies helps students to understand ethnocentrism, racism, and gender inequity as well as to recognize how these are expressed in the surrounding community and nations worldwide.

TABLE 1 CONTINUED

Country	University	Field	Degree	Website
Palestine	Al-Quds University (The Arab University in Jerusalem)	Applied Earth and Environmental Sciences	Bachelor's	http://www.alquds.edu/faculties/science/index.php?page=aees
		Environmental Studies	Master's	http://www.alquds.edu/faculties/science/index.php?page=aees_msc
	Birzeit University	Water and Environmental Engineering	Master's	http://www.birzeit.edu/institutes/water_std/
		Water and Environmental Sciences	Master's	http://www.birzeit.edu/institutes/water_std/
Qatar	Qatar University	Biological Sciences	Bachelor's	http://www.qu.edu.qa/qu/colleges/arts_sciences/cas_bio_intro.html
		Agricultural Sciences	Bachelor's	http://www.qu.edu.qa/qu/colleges/arts_sciences/cas_bio_intro.html
	College of the North Atlantic, Qatar	Environmental Health Technology	Diploma	http://www.cna-qatar.com/cnaqatar/futurestudents/Programdetailsnew.asp?eht
Saudi Arabia	King Saud University	Environmental Sciences	Master's	http://www.ksu.edu.sa/sites/Colleges/CollegeofScinces/MSCPES/Pages/default.aspx
	King Fahd University of Petroleum and minerals	Environmental Sciences	Master's	http://www.kfupm.edu.sa/cs/
Sudan	University of Khartoum	Public and Environmental Health	Master's	http://www.uofk.edu/index.php?id=279
		Environmental Studies	Diploma	http://www.uofk.edu/index.php?id=164
		Environmental Studies	Master's	http://www.uofk.edu/index.php?id=164
		Environmental Studies	PhD	http://www.uofk.edu/index.php?id=164
	Sudan University of Science and Technology	Water and Environmental Engineering	Bachelor's	http://www.sustech.edu/
UAE	UAE University	Environmental Science	Master's	http://www.fsc.uaeu.ac.ae/Postgraduate_Prog.htm
	University of Sharjah	Environmental Health Technology	Bachelor's	https://www.sharjah.ac.ae/English/Academics/Colleges/Health_Sciences/DepartmentsPrograms/EnvironmentalHealth/Pages/default.aspx
	American University of Sharjah	Environmental Sciences	Bachelor's	http://www.aus.edu/cas/env/index.php
	Higher Colleges of Technology	Environmental Health Program	Diploma	http://www.hct.ac.ae/catalogue07_08/asp/cms_program_offerings.aspx
	The British University in Dubai	Sustainable Design of the Built Environment	Master's	http://www.buid.ac.ae/buid/html/article.asp?cid=273
Yemen	Hadhramout University of Science and Technology	Environmental Sciences	Master's	http://www.hust.edu.ye/prochure.pdf

The Arab world has witnessed remarkable and laudable efforts in creating awareness, spreading information, teaching concepts, developing habits and skills, and encouraging values with regards to environmental issues, all of which have been embedded in its curricular and extracurricular activities.

The following summarizes the methodologies by which environmental initiatives have been implemented:

- The development of extracurricular activities for environmental education and awareness. These activities are usually designed according to the age range of the students. However, the objectives of all are towards the concepts of protecting the environment, preserving our natural resources, and tying them into the environmental issues that concern the world. These activities are usually conducted in an interactive, problem-solving manner and with the use of materials and resources that are of low cost and can be easily obtained by the students. Such activities include recycling of glass, paper, plastics and aluminium, beach clean-ups and trash disposal, active participation in water and electricity conservation, reforestation and the planting of new trees, etc. A comprehensive manual for extracurricular environmental activities in schools, *The Environmental Activities Guide*, has been produced by *Al Bi'a Wal Tanmiya* (Environment & Development) magazine in 1999, and is being used in thousands of schools across the region, with special editions developed for Lebanon, the UAE and Syria (*Al Bi'a Wal Tanmiya*, 1999). Training courses for teachers were carried out in various countries based on the manual, and consequently hundreds of school environment clubs were established.
- Trying to introduce environmental concepts, information, and issues within the different courses whenever appropriate. Such information is often introduced within the scope of the individual courses, such as the study of climate change within courses on geography and chemistry, biodiversity within courses on biology, alternative energy within the study of physics, etc. Reading selections concerning environmental information are also introduced in language courses involving reading comprehension in Arabic and English. One main source for envi-

ronmental contents in textbooks in many countries has been *Al Bi'a Wal Tanmiya* magazine, and the magazine itself has been widely used in schools as extra reading material. It is interesting to note that 5 times between 2001-2007, texts taken from Najib Saab's editorials in this magazine were the subject of high school official final exams in Lebanon, 4 times in civics and one time in Arabic literature (*Al Bi'a Wal Tanmiya*, 2007). The magazine has been organizing annual competitions on environmental themes among Arab students since 1997, attracting over one hundred thousand entries.

- School libraries are being strengthened and enriched with the addition of environmental reference materials, books, and magazines.
- Schools organize activities in celebration of the internationally proclaimed environmental awareness days established by UNEP, such as Earth Day.

Jordan and Egypt have witnessed various remarkable educational reforms that have led to the introduction of environmental concepts in their national education systems, as well as in extracurricular activities within the schools. These activities are carried out usually via different international programmes working with local institutes. The Global Green Communication and Education Programme (GreenCom), consisting of various educational packages, was produced and adopted by Ministries of Education in the Arab world. The Arab media were also encouraged to highlight environmental issues. Pages or corners dedicated to environmental awareness appeared in the national press and regular television programmes addressed environmental issues.

IV. ENVIRONMENTAL ISSUES IN HIGHER EDUCATION

The earliest programme of study of environmental issues in higher education in the Arab world was launched at Alexandria University in Egypt in 1983. The first such programme in the Arabian Gulf region was launched at the United Arab Emirates University in 1991.

As early as the 1980s, the Arabian Gulf University, a regional university situated in

Bahrain and serving the Gulf region, launched an Integrated Water Management Programme as well as a Desert and Arid Land Programme. In 1987, the university established a Biotechnology Programme wherein an Environmental Biotechnology track was introduced. Research by staff and students covers such areas as bioremediation of toxic pollutants and biodesulfurization of crude oil and its derivatives. The Arabian Gulf University also launched the first academic post-graduate programme awarding a graduate degree in Environmental Management in 2004. This programme is delivered through the modular system to suit the work commitments of the enrolled practicing managers, and uses the case study method.

Table 1 demonstrates that most of the degrees pertaining to environmental studies offered by universities in the Arab world are at the Bachelor's level, with fewer at the Master's level and even fewer offering a PhD. These statistics reflect the current deficiencies found in providing higher education in environmental issues. However, this finding is to be expected as research for higher level degrees requires additional funding which is already scarce at all levels and for all educational fields.

Examining the titles of the degrees offered, one can note the need for additional specializations in environmental education such as environmental legislation, environmental management, and environmental risk management. Current degree programmes should be expanded to cover all the necessary aspects of environmental education.

Enhancement of these programmes in terms of qualification and accreditation is also required. These programmes should satisfy quality assurance requirements and accreditation. Attempts should also be made to establish stronger links to other stakeholders, such as government agencies and industries in the private sector having a stake in future developments in fields relevant to their industry.

Quality education is a prerequisite for education for sustainable development. Quality education, first and foremost, views each individual as a learner capable of having an impact upon the development of society. The role of quality education is to provide the individual with the tools

necessary to transform society into a more sustainable society, taking into consideration the social, economic, cultural, and environmental elements of the place, as well as its history and traditions. Quality education takes these various factors into account and develops a programme or curriculum that reflects the local conditions, is relevant to the present, and prepares the individual for the future.

Education for sustainable development has four major thrusts: promoting and improving basic education; reorienting existing education programmes at all levels to address sustainable development; developing public awareness and understanding of sustainability; and providing training.

A trend in current educational systems has been to incorporate environmental concepts into the teaching of other subjects, allowing environmental awareness and education to infiltrate the educational process even when specific courses are not offered. It may, in fact, complement other courses or stress the concepts to be communicated. In addition, numerous universities that do not offer specific degrees in environmental sciences often offer individual environmental courses within other specialties. Many of the universities, increasingly in recent years, and sometimes in association with international bodies such as UNEP, provide training courses which cannot be overlooked or neglected, as they help the capability-building of specialists and professionals in these fields.

Since the late 1980s, there has also been an increase in the number of regional research centres in the Arab world dedicated to environmental issues such as marine sciences, energy and water resources. Table 2 lists some of these regional research centres. These centres are primarily funded nationally by each individual country, often with additional international partnerships and alliances for some of their programmes. However, the funding does not by far meet the minimal requirements of funding availability, levels of funding that are available to most international research centres outside the Arab world.

Contributions for research from the private sector from such sources as oil companies and other industries in the Arab world are still relatively



minor. However, there are indications that this is beginning to change, such as the laudable example of ARAMCO funding research in oil pollution and bioremediation in collaboration with King Fahd University for Petroleum and Minerals in Saudi Arabia.

Universities and research centres are continuing to collaborate with regional and international environmental organizations to carry out research seminars and workshops, which provide an outlet for staff members and researchers to interact, attending conferences and meetings, encouraging participants to remain up-to-date and aware of current trends and new developments.

V. REGIONAL INITIATIVES FOR ENVIRONMENTAL EDUCATION IN THE ARAB WORLD

The Arab Network for Environmental Education and Learning (ANEEL)

Environmentalists, scientists, and educators of the Arab region initiated the Arab Network for Environmental Education and Learning (ANEEL). This network will work in conjunction with the Commission on Education and Communication (CEC) and will be linked to the International Union for Conservation of Nature (IUCN). Established in 2007, ANEEL is a non-governmental organization dedicated to providing leadership in areas of environmental education and learning in the Arab world.

The mission of this network is to use education as a form of promoting a deeper knowledge and understanding of environmental issues and concerns, aiming to ultimately reach a sustainable means of living with the conservation of the planet. By means of sharing, exchanging and disseminating innovative educational events, programmes and curriculum development, the network intends to raise awareness, support problem-solving of current environmental issues, and to build the capacity of professionals to meet conservation and sustainable development goals in the Arab world.

ANEEL will distribute information on relevant events (conferences, workshops, forums, etc.) and educational programmes available in the region, initiate change through academic dialogue regarding environmental issues, and create opportunities to exchange visits, promote scholarships and grants, provide links with other networks, and share success stories.

IWRM E-Learning Graduate Programme at the Arabian Gulf University

A regional centre for the Arab region was established in 2007 at the Arabian Gulf University (AGU) offering a distance-based post graduate diploma in Integrated Water Resources Management (IWRM) under the United Nations Water Virtual Learning Centre (UN-WVLC) Project in collaboration with the United Nations University (UNU) International Network on Water, Environment and Health (INWEH) in Canada (AGU – IWRM).

TABLE 2 NATIONAL AND REGIONAL RESEARCH CENTRES IN THE ARAB WORLD FOR DIFFERENT ASPECTS OF ENVIRONMENTAL STUDIES AND RESEARCH

Country	National Research Centers	Division
Bahrain	Environmental Research Center (Bahrain University)	
Egypt	Soil, Water and Environment Research Institute	
	Institute of Environmental Studies and Research, Minufia University, Sadat branch	
	Institute of Environmental Studies and Research, Ain Shams University	
	Agricultural Research Center (ARC)	
	Egyptian Environmental Affairs Agency (EEAA)	
	Mubarak City for Science and Technology	Agriculture Research and Development Institute (ARADI)
	National Water Research Center (NWRC)	
	Desert Research Center (DRC)	
	Desert Development Center (DDC)	
Jordan	Environmental Research Center	
	Water and Environment Research and Study Center	
	Al Urdun Al Jadid Research Center (UJRC)	Jordan Environmental Watch
	Badia Research and Development Center	
Kuwait	Kuwait Institute for Scientific Research (KISR)	Environment and Urban Development
	Marine Science Center (Kuwait University)	
	Environment Public Authority (EPA)	
Lebanon	Water Energy and Environment Research Center	
Libya	Marine Biology Research Centre (MBRC)	
Oman	Center for Environmental Studies and Research (Sultan Qaboos University)	

Academic Chairs for Environmental Issues

Academic chairs devoted to environmental concerns have been established at some universities to further environmental research. One such example is the academic chair carrying the name of the late President of the United Arab Emirates, Shaikh Zayed bin Sultan Al-Nahayan, in Environmental Studies established at the Arabian Gulf University in 1994. Another example is the academic chair at Bahrain University sponsored by the UNESCO – Cousteau Ecotechnie Programme, an international initiative designed to promote interdisciplinary education, research and policy-making in the field of the environment and development (UNESCO – UCEP).

Participation of Some Arab Countries in International Initiatives for Environmental Education

There are many international programmes of which some Arab countries are taking advantage to assist in environmental education and training professionals throughout the Arab world.

UNEP has a vast depository of knowledge products emanating from its work in environmental assessment, policy development and implementation, support to environmental conventions, and technology industry and economics. The Environmental Education and Training Unit at UNEP has taken the lead in producing learning support and resource mate-

TABLE 2

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Country	National Research Centers	Division
Palestine	Palestine Energy and Environment Research Center	
	The Water and Soil Environmental Research Unit (WSERU) (Bethlehem University)	
	Palestinian Environmental Authority (PEnA)	
	House of Water and Environment	
Saudi Arabia	Prince Sultan Research Center for Environment, Water and Desert	
	King Abdullah University for Science and Technology (KAUST)	Resources, Energy and Environment
	King Abdul Aziz City for Science and Technology	Natural Resources and Environment Institute
Sudan	Sudanese Environment Conservation Society (SECS)	
	Institute of Environmental Studies, University of Khartoum	
Syria	Marine Research Center	
	International Center for Agricultural Research in the Dry Areas (ICARDA)	
UAE	Terrestrial Environment Research Center (TERC)	
	The Environment Agency , Abu Dhabi (EAD)	
	Marine Environment Research Center (MERC)	
	Federal Environmental Agency (FEA)	
	Gulf Research Center (GRC) (Dubai)	
Yemen	Water and Environment Center (Sana'a University)	

rials for environmental education that include: training manuals, resource kits, starter packs, theme packs, posters, curriculum manuals, training modules, and newsletters.

The following are examples of such projects in which numerous countries in the Arab world are participating:

Global Environment Outlook (GEO)

The Global Environment Outlook (GEO) project is the implementation of UNEP's mandate to keep the global environment under review. Initiated at the request of the UNEP Governing Council in 1995, GEO is both a process and a series of reports, analyzing envi-

ronmental change, causes, impacts, and policy responses (GEO; UNEP, 1997). It provides information for decision making, supports early warning and builds capacity at the global and sub-global levels. GEO is also a communication process that aims at raising awareness on environmental issues and providing options for action. Several Arab universities are contributors to this project.

Global Learning and Observations to Benefit the Environment (GLOBE)

The Global Learning and Observations to Benefit the Environment (GLOBE) is "a worldwide hands-on primary and secondary school-based science and education programme. GLOBE's vision

promotes and supports students, teachers and scientists to collaborate on inquiry-based investigations of the environment and the earth system, working in close partnership with NASA and NSF Earth System Science Projects (ESSPs) in study and research about the dynamics of Earth's environment" (GLOBE website).

Its mission is to promote the study of science and scientific discovery with scientists and citizens, teachers and students, all working together at local, regional, and international levels to achieve a better understanding of the environment. Assistance from parents as well as other members of the community is encouraged in collecting data and learning more about the Earth and how to sustain its environments and habitats.

Having been announced in 1994, GLOBE celebrated Earth Day 1995 with the launch of its operations. Bilateral agreements between the government of the United States and governments of other nations enable the GLOBE programmes to be implemented internationally.

More than a decade after its launch, the GLOBE network boasts 110 countries participating, including eleven countries from the Arab world. Table 3 indicates the Arab countries that have signed the GLOBE agreements, the year each signed, and the number of schools participating in each country.

Egypt Environmental Education and Outreach Programme

The Egypt Environmental Education and Outreach Programme (E3OP) is a programme designed to promote environmental education in primary and preparatory schools in Egypt, working in conjunction with local schools and communities as well as the government and the private sector to increase awareness and skills pertaining to environmental education in four Egyptian governorates (E3OP website). The two-year initiative, awarded under the Assistance to Basic Education/Basic Education (ABE/BE) Indefinite Quantity Contract, in support of the United States Agency for International Development, is being implemented by the Education Development Center, Inc. in collabo-

ration with the Academy for Educational Development, RTI International, and Wadi Environmental Science Centre.

The E3OP trains teachers to lead their students in various environmental projects and to work with the government, media, and private sector to encourage their communities to participate in such activities. The programme also aids in the assessment of existing environmental education materials, develops new materials as needed, and distributes these materials directly to schools and communities or through an outreach resource centre.

VI. PUBLICATIONS AND THE NEED FOR ENVIRONMENTAL RESEARCH JOURNALS AND PUBLISHED ENVIRONMENTAL LITERATURE

Several publications have tackled the question of the recent scientific contributions of the Arab world in comparison with those of other nations and regions. Scientific and environmental contributions of the Arab world to global knowledge were found to be very low in comparison with other nations and regions. This is hardly surprising due to the desperate need of universities and research centres for further funding and the need to develop more international alliances and partnerships.

Currently, there are no specialized refereed scientific journals published in the Arab world that are specifically dedicated to issues relating to the environment, whether environmental education, management, or sciences, while there exists a strong need for such journals. Currently, publications dedicated to these issues are sprinkled among various other scientific journals. As there is this need for a number of prestigious, internationally recognized journals in the Arab region, each individually dedicated to a separate field such as environmental sciences, environmental management, environmental management legislation, and environmental education and learning, collaborative efforts are needed to bring about the birth of such journals of high standard, with a regional and international scope in terms of both prestige and quality.

However, the Arab world has relatively recently witnessed the emergence of several non-academic magazines and newsletters that are dedicated to environmental issues and concepts. These magazines and newsletters, in addition to their role as tools for raising the public awareness in environment, serve as resource material for educational purposes at the basic educational level. It is fair to say that the only professional environmental Arab periodical which could achieve wide circulation all over the region and affect tangible change is *Al Bi'a Wal Tanmiya* (www.mectat.com.lb)

There is also a great need for the publication of textbooks dealing with environmental issues in the Arab world. Numerous conferences and their proceedings have been produced but have yet to be published in book form, rendering them not easily accessible to other researchers. Attempts should be made to produce and disseminate this information in the more easily accessible book form, and budgets should be set aside within the context of the conference for producing such a text. Such texts would then make the information more readily available, forming a foundation for accumulative knowledge and decreasing the duplication of research and data gathering.

VII. CONCLUSION

The nations of the Arab world have reacted positively towards the increasing concern over environmental issues since the 1977 Tbilisi Declaration. The educational reforms being witnessed in the Arab world have included a review of the need to further include and promote environmental education. Incorporating environmental education in basic and higher education should benefit from the international directions, initiatives, and treaties set forth by the international community in this regard. Although there is an increase in the number of institutes of higher education in the Arab world that provide different academic degrees and training for graduates to participate in the environmental sector for sustainable development of the Arab countries, this survey of such higher educational institutes demonstrates the need for an increase of such degrees and programmes covering a greater number of disciplines within the sphere of environmental education.

TABLE 3 ARAB COUNTRIES THAT HAVE SIGNED THE GLOBE AGREEMENTS

Arab Country	Year of Joining	Number of Schools
Bahrain	2001	31
Egypt	1995	13
Jordan	1996	30
Kuwait	1999	5
Lebanon	1998	15
Mauritania	2004	1
Morocco	1996	2
Qatar	2000	26
Saudi Arabia	2002	44
Tunisia	1995	4
United Arab Emirates	1999	1
Total		172

Source: www.globe.gov (Retrieved 29 Feb. 2008)

Because the study of environmental education has yet to be institutionalized in the Arab world, numerous factors contribute to the lack of accessibility of data and current information on the environment. In many areas of the region, consistent environmental monitoring and data collection is absent and there has been little attempt to standardize data formats and reporting. The reports that are made are kept in various different government or private sector locations, which often results in duplication of information or gaps in data. These factors make a comprehensive study more difficult and impede the development of a formal environmental education policy and its implementation.

The positive initiatives witnessed in the Arab world and earlier discussed for basic education need to be maintained, promoted and strengthened. Funding of research for environmental issues and challenges should be addressed by different institutions on the national level and on a pan-Arab level. Integration of data for environmental research and assessment should be expanded in order to allow users and researchers to profit from data collection at all levels.

It is hoped that future reports will contain further outstanding examples that reflect the ongoing and continuous commitment, efforts and initiatives made by the Arab countries to the world environment and their own national sustainable development.

REFERENCES

AGU – IWRM E-Learning Graduate Program at the Arabian Gulf University <http://www.agu.edu.bh/wvlc/> (accessed March 4, 2008).

Al-Bia Wal-Tanmia, Issue 114, September 2007: 14.

Egypt Environmental Education and Outreach Program (E30P) website.
<http://ies.edc.org/news/announcements.php?id=211>
(accessed 29 Feb. 2008).

Global Environment Outlook (GEO) website.
<http://www.unep.org/geo/> (accessed March 3, 2008).

Global Learning and Observations to Benefit the Environment (GLOBE) (<http://www.globe.gov>)
(accessed Feb. 29, 2008).

Hopkins, Charles, and Rosalyn McKeown. "Education for Sustainable Development: An International Perspective" in *Environmental Education for Sustainability: Responding to the Global Challenge*, Eds. D. Tilbury, R B Stevenson, J. Fein, and D. Schreuder. Gland, Switzerland and Cambridge, UK: IUCN Commission on Education and Communication, 2002

Johannesburg Declaration on Sustainable Development http://www.uh.org/esa/sustdev/documents/WSSD_POI_PD/English/POI_PD.htm
(accessed February 28, 2008).

Plan of Implementation of the World Summit on Sustainable Development. Johannesburg, South Africa, September 2002.
(www.johannesburgsummit.org)

The Environment Activities Guide, Beirut: *Al-Bia Wal-Tanmia* and Technical Publications, 1999.

UN. Chapter 36, Agenda 21: Promoting Education, Public Awareness and Training. www.un.org/esa/sustdev/documents/agenda21/english/agenda21chapter36.htm (accessed March 27, 2008).

UNESCO – UCEP website.
<http://www.unesco.org/mab/project/ucep/ucep.shtml>
(accessed March 19, 2008).

UNESCO. "Teaching and Learning for a Sustainable Future." www.unesco.org/education/tlsf/ (accessed March 4, 2008).

UNESCO. Education for Sustainable Development Toolkit, UNESCO, Education for Sustainable Development in Action, Learning & Training Tools N°1, 2006.

UNESCO. Education for Sustainable Development Toolkit, version 2, 2002.

United Nations Decade of Education for Sustainable Development, (http://portal.unesco.org/education/en/ev.php-URL_ID=42332&URL_DO=DO_TOPIC&URL_SECTION=201 .html)

United Nations Environment Program. Global State of the Environment Report 1997.
(<http://www.grida.no/geo1/exsum/ex3.htm>) 1997.

Zayed Prize homepage.
http://www.zayedprize.org.ae/zayedprize/innerenglish.aspx?PageName=the_prize (accessed April 2, 2008).