and education was observed, which often resulted in overlapping programs. The report recommended that big challenges facing the region, such as water scarcity, desertification, drought, marine pollution and dangers of sea-level rise due to climate change, have to become a central part of the curricula.

Education is a major driver for a shift to a more sustainable lifestyle that ensures harmony with nature and a balanced use of resources. It also equips those entrusted with executing change with the necessary working tools and appropriate knowledge. Education has the power to nurture empowered, engaged and skilled citizens who can map the way towards a balanced, greener and safer planet.

Human behavior has led to environmental crises with various outcomes, including overpopulation, unsustainable lifestyles that consume more resources than what can be replenished, and individual behavior that harms the environment such as using polluting forms of energy or producing excessive waste. Environmental education has a key role in addressing those environmental challenges. It can be used to mitigate specific environmental issues and respond to their impact, but also to address the behavior that causes them. It can influence individual and collective environmental behavior, it enhances people's resilience to climate-related risks, and it also encourages their support for and involvement in mitigation actions. However, Environmental Education not only increases knowledge and awareness but also improves skills and enables individuals to make better, more environmentally informed decisions and devise solutions based on solid science.

AFED wishes to thank all institutional partners who made this report possible, by sharing their experiences and work in the domain of Environmental Education. Our academic partners included the University of Bahrain, Institute of Environmental Studies and Research at Ain Shams University, American University of Beirut, Arabian Gulf University and University of Petra. Chemonics Egypt joined as main research partners. Other institutions contributed case studies and papers, including the United Nations Environment Programme (UNEP), the Organization for Economic Cooperation and Development (OECD), the Union for the Mediterranean (UfM), the Mediterranean Action Plan (UNEP-MAP) and the Lebanese Center for Educational Research and Development

Special thanks go to the sponsors who supported the production of the report and the annual conference, mainly the Islamic Development Bank (IsDB), the Kuwait Foundation for the Advancement of Sciences (KFAS), the Food and Agriculture Organization (FAO), the Kuwait Fund, and Bank Audi, alongside media partners.

This report uses science-based evidence to trigger a needed policy debate on the urgency of reforming the Arab education systems in order to mainstream environmental issues in their curricula. It is thus hoped that it will assist in enhancing the role of education as a driver for better environmental management, as well as for advancing sustainable development in the Arab region.

Beirut, 14 November 2019

Najib Saab
Secretary General
Arab Forum for Environment and Development (AFED)

INTRODUCTION

ENVIRONMENTAL EDUCATION FOR SUSTAINABLE DEVELOPMENT IN ARAB COUNTRIES

2019 Report of the Arab Forum for Environment and Development (AFED)

I. OVERVIEW

When discussing environmental changes and challenges, and their relation to sustainable development, the role of education cannot be underestimated. This report on Environmental Education for Sustainable Development in the Arab Countries aims at encompassing both Environmental Education (EE) and Education for Sustainable Development (ESD), by increasing knowledge and awareness about the environment and its interconnectedness with social and economic factors. Beyond enhancing the level of scientific knowledge, it serves as a catalyser for participation and positive action. There are signs that the Arab world has begun to appreciate the key role that the environment should claim in its education systems. The next step is its effective and region-wide implementation into school and university curricula.

Although a strong trend can be seen in the inclusion of environmental topics in curricula, progress remains uneven across Arab countries and educational institutions. More so, it is evident that there is a clear gap between the Arab region and other parts of the world when it comes to environmental education. This report notes that many of the plans announced by various countries to include environmental education in the curricula have not been implemented. In part this is due to the ongoing unrest and conflict in some Arab countries, besides not considering environment a high priority area. Another problem is the lack of funding for national and regional initiatives to promote sustainable development topics at schools and universities. As most initiatives are dependent on international donors, they are largely not sustainable.

There has been a rapid increase in programs and plans related to environment and sustainable development in the Arab region over the last ten years. This momentum should now be used to trigger a much needed policy debate on the urgency of further reforming education systems in order to mainstream environmental issues in Arab curricula. Moreover, funds should be raised independently of international donors in order to enhance both the quality and evidence base of environmental topics.

II. FROM ENVIRONMENTAL EDUCATION TO EDUCATION FOR SUSTAINABLE DEVELOPMENT

Environmental Education (EE) has several definitions, perhaps the most comprehensive of which was adopted by UNESCO: "A learning process that increases people's knowledge and awareness about the environment and associated

challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action." It is a multidisciplinary field of learning that includes biology, chemistry, physics, ecology, earth and atmospheric science, mathematics, and geography. With the current global environmental challenges and the emergence in 2015 of the 2030 Sustainable Development Goals (SDGs), Environmental Education has gained prominence. It now fulfills the important role of delivering the necessary knowledge, skills, values, and attitudes in order to adapt to, or mitigate, environmental changes. The foundations of EE begin with awareness, knowledge, attitudes, and skills and end with participation.

Environmental Education predates Education for Sustainable Development (ESD), which started to gain prominence after the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. The aim of ESD was to modify education to create a better understanding of the complex and interrelated economic, social and environmental dimensions of sustainable development and their ecological footprint on Earth's biocapacity to regenerate its services for human well-being, by encouraging positive change in knowledge, skills, values and attitudes. There is no single definition of ESD, but most definitions today encompass integrating sustainable development in interdisciplinary learning pedagogy, covering social, economic and environmental aspects of formal, informal and non-formal curricula in order to safeguard the wellbeing of present and future generations.

Initial inspiration for Environmental Education came in the 18th century, when philosophers and educators such as Jean-Jacques Rousseau and Louis Agassiz respectively wrote on nature and the importance of learning about nature and the environment. But it was not until 1948 that the term 'environmental education' was first used publicly. From the 1960s until 1989, the concept of EE gained popularity through policies, conferences held by the United Nations, and national responses to suggested paths. This includes major events such as the UN's first major international conference on "Human Environment" in 1972, which culminated in the Stockholm Declaration in the right to healthy environment, and the birth of the United Nations Environment Programme (UNEP).

It was in Agenda 21, which emerged from the Earth Summit in Rio in 1992, that a path for implementing sustainable development through education was suggested. Moreover, it was then that Environmental Education first began to be viewed as being contained within sustainable development. Today, ESD is seen as a key enabler for sustainable development and an integral element of quality education. According to UNESCO, the purpose of ESD in the long run is an ultimate transformation of the educational systems in such a way as to reorient societies in the direction of sustainable development. In line with this goal, the UN declared the Decade of Education for Sustainable Development (DESD) from 2005 to 2014. By the end of the decade, a deeper and richer understanding of ESD was attained, and incorporating sustainable development in all learning became the new goal, rather than treating it as a stand-alone subject.

The complexity of environmental sustainability and its strong correlation to society and economy has led to Environmental Education evolving to become an integral part of ESD. Higher education has begun offering academic programs that not only relate to the environment as a function and a process, but also programs that deal with the complexity of environmental sustainability such as renewable

energy, environmental health, environmental economics, environmental law and environmental policies. These specialties can allow new generations to develop alternative ways of sustainable living.

Despite the global responsiveness towards ESD since the 1960s, Arab countries only started taking note of it in the early 1980s, and started to be introduced slowly over the past ten years. In many Arab countries, the emergence of ESD has provided a stimulus to reform Environmental Education, and in some countries where there was no tradition of EE yet, or where it was marginally present, the ESD movement provided an opportunity for a jumpstart.

While significant progress in implementing ESD has been reported from the Arab region, the range of implementation activities varies greatly among countries. For example, ESD is now integrated into early childhood care and education in Kuwait and Oman, and Kuwait also reports a full integration of ESD in government education programming. Promising progress has also been reported in Jordan, Lebanon, Egypt, Qatar and Oman, including training on integrating ESD themes into curricula, incorporating ESD in university courses, and funding ESD-related scholarships and programs. On the other hand, ESD is only included in selected courses in Qatar and is rarely mentioned explicitly in education curriculums in Morocco.

Overall, despite promising achievements in ESD activities in the Arab countries on both the national and regional levels, the region seems to be lagging behind other parts of the world when it comes to the implementation of ESD. This is in part due to the dependence on international donors for the vast majority of the national and regional ESD initiatives and projects, rendering them unsustainable. A lack in regional and sub-regional cooperation and collaboration between Arab states on ESD is also evident. Addressing these challenges should be a priority for Arab countries aiming to move forward with transformative and impactful ESD, incorporating EE as a strong component.

In a report on issues and trends pertaining to ESD, published by UNESCO in 2018, six key themes were chosen to be discussed in detail, namely climate change, biodiversity, disaster risk reduction, poverty reduction, sustainable production and consumption and global justice. While climate change and biodiversity are significant environmental issues, certainly there are many more which cannot be neglected, such as water, energy, land-use and air quality. To avoid burying environment under other issues, it is necessary to treat the environmental contents of ESD in their own right, by preserving EE as a full-fledged component of ESD and not eliminating any reference to it.

III. ENVIRONMENT AND SUSTAINABILITY IN ARAB UNIVERSITIES

Universities in Arab countries are playing an increasingly important role in achieving the Sustainable Development Goals (SDGs) through their academic programs and research activities. Recently, several Arab universities ranked among the top 500 universities globally for their contributions towards the SDGs. During the last decade, Arab universities witnessed a rapid increase in programs related to environment and sustainable development. However, universities can further accelerate their contribution to sustainability by integrating all of the SDGs into their learning and teaching activities, research, and community initiatives.

In order to identify strengths and weaknesses of academic education on topics relating to the environment and sustainable development, a survey was conducted by AFED in the first half of 2019 to track environment-oriented university programs in the Arab region. The survey has covered the top-ranked universities at the national level in each of the 22 Arab countries, and included undergraduate, postgraduate, and other technical programs. It revealed that most Arab universities offer undergraduate and postgraduate environmental programs. Collectively, the 57 universities surveyed offer 221 degree programs on environmental topics.

In order to determine the distribution of the academic programs throughout the region, results were grouped into the five Arab sub-regions. This revealed that the highest number of environment-related programs (55) are found in the Levant (Iraq, Jordan, Lebanon, Palestine, Syria), followed by 42 programs in the GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE) and Yemen, 39 programs in North Africa (Algeria, Libya, Mauritania, Morocco, Tunisia), 26 programs in the Nile Valley (Egypt, Sudan), and 3 programs in the African Horn (Comoros, Djibouti, Somalia).

Academic programs related to the environment at Arab universities are distributed among various disciplines, ranging from Environmental Engineering and Water Resources Management to more policy-related disciplines such as Environmental Education, Environmental Law, and Environmental Policy. There are more scientific and technical degrees than degrees related to economics, education and policy. Most degrees were grouped under Environmental Sciences (34 degrees), followed by Environmental Engineering (30 degrees), Water Resources (29 degrees), and Renewable Energies (19 degrees).

At the bachelor's degree level, there is a general shift from classic Environmental Science that focuses on physics, chemistry, biology and math to a multidisciplinary approach that integrates engineering and health sciences. Only 23 percent of bachelor's programs fall under general Environmental Sciences. Other courses are titled with more specialized majors such as Environmental Engineering, Water, Energy, Agriculture and Geology.

Postgraduate programs are typically research-oriented. At higher levels of education, research becomes the tool to gain the skills as well as the deep knowledge necessary for Environmental Education and Sustainable Development. This reflects an emerging understanding that it is essential to promote scientific research to solve national and regional environmental problems. Arab universities are involved in sustainable development through a variety of postgraduate programs related to environment and sustainable development, most of which are offered by universities in Egypt, Lebanon, Jordan, Syria and the UAE.

The research output of Arab universities and research centers on environmental sciences makes up around 7 percent of the total output. Saudi Arabia and Egypt have been found to be the most active, both witnessing an increase in research output. In Saudi Arabia, published studies in environmental science have increased from 3.8 percent for the period 1999-2008 to 6 percent for the period 2009-2018. In Egypt, an increase was observed from 5.4 percent to 6.4 percent in the same period.

The environmental, social, and economic dimensions of sustainable development are all interconnected. It is important to integrate these three pillars of sustainable

development in the university programs. There is also a need to strengthen topics such as Environmental Law in law schools, and Green Economy in faculties of economics. Additionally, Ecological Footprint and Natural Capital Accounting could be included in economics studies. Such topics would enable graduates to increase their understanding of environmental management and policies.

Despite the increase in programs related to environment and sustainable development at Arab universities, more inter-academic and multi-disciplinary cooperation between different faculties of the same university and among different universities can further strengthen their roles in addressing environmental challenges. Student exchanges and more scientific collaboration programs between universities and research institutions could, for example, be initiated. Cooperation between educational institutes and other sectors, such as industry and business, is also needed, in order to effectively contribute to the Sustainable Development Goals.

In order to offer general information to fresh university students, and provide those who consider selecting a specific specialization related to the environment with adequate knowledge which might inform their choice, AFED report incorporates a syllabus for an introductory course on Environment and Sustainability. The syllabus, designed for first year students of all faculties, has been developed in cooperation with universities from across the Arab region.

IV. ENVIRONMENTAL EDUCATION IN ARAB SCHOOLS

Environment is quickly becoming an integral part of education in schools across the Arab region, with varying success in different countries. The emergence of new environmental challenges at an unprecedented rate in recent years has also led to the inclusion of new concepts and approaches in the curricula of Arab schools. Based on a survey carried out by AFED on school textbooks and curricula, it can be said that the role of education in protecting the environment and preserving natural resources is being more recognized. Pollution and waste gained more prominence, for example, and the management of dwindling natural resources led to the introduction of new concepts such as ecological footprint, at limited scale.

While sustainable development has become a standard topic in textbooks of most Arab countries, topics such as green economy and green growth are generally lacking. Still, such concepts have been spotted in certain countries, such as ecological footprint as part of the geography curriculum in Syria, and green economy as part of the new high school programs in Lebanon.

The AFED survey found that the environmental topics most popular in Arab schools are ecosystems, pollution, natural resources and sustainable development. In contrast to the inclusion of the rather new topic of sustainable development, the survey found that climate change was absent or not adequately discussed in 40 percent of the countries covered. Natural disasters, which are impacted by changes in environmental conditions and themselves exert critical impact on the environment, were virtually absent from the curricula of half of the countries, and weak in the other half where the concept was covered. Classes in which environmental concepts were covered most were grade 5 – the last of the elementary level – and grade 11, before the last year at the high school level.

Grade 6, the first intermediate class, was the weakest in coverage of environmental concepts.

Interestingly, across the region, environmental topics are no longer restricted to science, geography and civics books, but have started to become part of other subjects including languages, literature, history and economics. In most cases, curricula covered aspects of personal action to protect the environment and to preserve and enhance natural resources, such as instructions to consume water and electricity in a sensible manner, recycling and tree planting. Fieldwork and nature expeditions have started to be part of environmental education in some Arab countries, and students are encouraged to engage in community work to champion environmental causes.

To conclude the survey on Arab schools' curricula and textbooks, an analysis was prepared to identify the areas of strength and weakness, in view of bridging the gaps and enhancing the system. The analysis covered the status of eight main environmental topics in Arab school curricula, namely: ecosystems, pollution, natural resources, climate change, solid waste, biodiversity, sustainable development and natural resources. All in all, it can be said that environmental concepts have been gaining ground, although big differences exist among countries regarding topics included, the depth of the content covered, and methods of delivery.

The environmental content of school curricula needs to be strengthened in depth and breadth. Environmental aspects in school curricula should be discussed in the context of the Sustainable Development Goals (SDGs), in such a way to relate environment to the social and economic aspects. Sound management of natural resources, to achieve sustainability, should be given priority. This can be achieved through the introduction of the concept of ecological footprint, alongside options for green growth, with a focus on Arab countries. Extracurricular activities and community work should also be enhanced.

V. CONCLUSION AND RECOMMENDATIONS

The Arab region is faced with many environmental challenges including the management of available natural resources, the extraction and production of oil and gas, water shortages, aridity and drought, various types of pollution, as well as climate change and its impacts. Education is a key tool in tackling these environmental issues, by promoting knowledge on environment and sustainable development, which can lead to action. While it is necessary to approach environment in the broader context of sustainable development, the specific topics of Environmental Education should not be lost. After all, concern about the environment was the main factor that triggered the concept of Sustainable Development.

An introductory course on environment and sustainability should be offered to first year university students from all faculties. Interfaculty programs need to be developed to reflect the complexity of environmental challenges in relation to social and economic factors. Evolving issues should be integrated into university studies, such as environmental law in law schools, and green economy, incorporating ecological footprint, in economics. Universities should help in setting criteria to incorporate natural resource accounting in the national accounts and budgets, and introduce the concept in public administration and development economics

studies. Furthermore, academic research on environment and sustainability should connect more to the business and industry.

It is critically important that Arab school curricula are designed to stimulate student discussions about environmental issues and the effects of human behavior on the natural environment and sustainable development. Contents of school curricula need not to be restricted to nature, pollution and health-related issues, but should go beyond to cover resource management in its broader sense, and strongly include cross-cutting issues such as climate change and sustainable consumption. Environmental education needs to be integrated with all topics of sciences, including applied and social sciences, alongside humanities, at all levels, starting from early childhood. It should be designed to adequately prepare students to be responsible citizens, and to provide them with sufficient knowledge to place them on the right path for higher education and professional work situations.

To attain the above goals, the Arab region must encourage Environmental Education with additional funding, research and means of implementation. Academic programs should accelerate scientific research that provides solutions to regional environmental challenges. Moreover, assessments of environmental initiatives should be performed in order to address shortcomings and improve the quality of environmental education programs. Ultimately, Environmental Education should be encouraged in such a way that it will become a core and inherent part of all Arab curricula rather than an optional and rare elective.