

Environmental Engineering Department Initiative and Declaration of Principles to Activate Vision 2030

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Abstract

The paper introduces the initiative and declaration of principles set forth by the Department of Environmental Engineering's Faculty at the Imam Abdulrahman bin Faisal University, its vision, and optimal ways for its development and maximization of its potential scientific, technical, academic, research and service to achieve the objectives of the Kingdom's Vision 2030. This is as part of an upgrade of individuals, training of students, human development and capacity building in its area of approved specialization. It is hoped that the department would lead within its surroundings locally, regionally and globally, according to smart coordination, partnerships, and cooperation with peer counterparts for undergraduate and expected graduate and postgraduate studies. This agrees well with what vision 2030 desires and calls for together with SDG 17 of the United Nations to strengthen the means of implementation and stimulate global partnership for sustainable development. Departmental outreach spectrums address research-oriented initiatives intended to serve development of local industrial issues (in pursuit of achieving SDG 9 of the United Nations to establish infrastructure able to withstand, and stimulate overall sustainable industrialization for all, and to encourage innovation), community service, promotion and participation. This is especially poignant given Vision 2030's call for development of the department, which requires an increase of its resources and an upgrade of its interests towards promotion of a transformation into an incubator for civil and environmental engineering Studies in the future.

Keywords: *Vision 2030, Imam Abdulrahman bin Faisal University, Environmental Engineering Department, Sustainability, Sustainable development.*

1. Introduction

Vision 2030 of the KSA is based on three pillars: building a dynamic society, a booming economy and a country of ambition. These themes integrate in a manner that achieves objectives and optimizes the development goals set forth in Vision 2030. As the pillars take hold throughout the Kingdom they will improve upon Arabian and Islamic

depth, the power of investment and the importance of a strategic geographical location to warmly welcome public, private, nonprofit and charity sectors. This will encourage economic growth, increase prosperity through employment of citizens, and improve the welfare of all through cooperation, partnership and shouldering responsibility (Vision 2030 and Khan, 2016).

The Imam Abdulrahman bin Faisal University's Environmental Engineering Department, aims to graduate specialized cadre in the field for boosting service issues related to: drinking water, sanitation, waste water treatment, cleaning up coasts and beaches, prevention of marine, continental and environmental pollution, reduction of soil pollution, prevention of noise pollution, minimization of air pollution, ensuring occupational-environmental health as part of greening the environment, and upgrading shelter to maximize health outcomes in given work environments.

1.1 Department positive initiatives and their expected role to achieve Vision 2030

In pursuit of its objectives to teach sustainable engineering, the department sought to meet students' present needs, considering the need for future generations to meet their own needs. This is in line with the Human Development Report (2011) of the United Nations Development Program which points to a linkage of sustainability with basic fairness issues of equality, social justice and increasing opportunities for better a quality of life (United Nations, 2016). Likewise, SDG 12 of the United Nations focused on ensuring sustainable patterns of consumption and production to enhance resources, energy efficiency, sustainable infrastructure, provision of opportunities for access to basic services, green and decent jobs and to improve the quality of life for all. In addition to this mandate of sustainability, SDG12 calls for the

development of a good standard of living for the present generation without compromising future generations any risk or a lack of well-being (United Nations, 2016). Implementation of these objectives helps achieve overall development plans, reduce future economic, environmental and social costs, promote economic competitiveness, and poverty reduction (United Nations, 2016a). Sustainable consumption and production aims to make more and better products and services while using fewer resources to increase net social gains from economic activities while decreasing degradation and pollution throughout the life cycle and raising the quality of life (United Nations, 2008). This effort requires input and cooperation from various stakeholders such as businessmen and women, consumers, policy-makers, decision-makers, researchers, scientists, retailers, media, and development cooperation agencies. A coherent approach and cooperation is required between actors in the supply chain, from the producer to the final consumer (Searcy, 2009). Consumers are to be engaged through awareness and education in the fields of sustainable consumption and sustainable patterns of life. This is to provide consumers with adequate information through standards and labels and their engagement in sustainable public procurement (Low, 2012).

When considering the best ways to incorporate sustainability into the curriculum, two alternatives emerge, either embedding sustainability into new and existing course content, or developing stand-alone sustainability courses. Thus, the environmental engineering program at the College of Engineering, UoD, is provided with a unique opportunity to promote sustainability into departmental curricula, training programs, workshops, discussion sessions, laboratory experiments, final year graduation project and classroom and extra-curricular activities. According to this orientation the program urges students to practice their profession in the field of environmental engineering, urban planning, engineering design, management of sustainable systems and infrastructure besides modernization, maintenance and operation (Abdel-Magid et al., 2015).

1.2 Achieving main and specific departmental objectives according to Vision 2030

The goal is to:

- Prepare reputable and qualified graduates (in conformity with SDG 4 of the United Nations, and Vision 2030) to work as environmental, sanitary, water and site engineers, project managers, program leaders, consultants and environmental researchers

- Enable the ability to deal with aspects of environmental monitoring, assessing and controlling organizations in-situ, overcoming wastage problems, clean water, personal hygiene, and other environmental issues
- Developing networking systems and encouraging contribution to jobs, environmental functions, and social services
- Increase social equity of products to maximize systems' lifecycle economic value and increase added value to services
- Expand expertise and knowledge of the environmental, social and economic aspects of sustainable engineering

Sustainability is advanced through collective efforts in education, research, partnerships and joint operations with others from the public, private, nonprofit and charity sectors with the aim of integrating professional and cultural diversity to inspire creative thought processes. Accordingly, the department visualizes the importance of exploring sustainability and progress by applying its understanding and values to find creative solutions that meet environmental, economic and social challenges in the current era. This trend falls in line with SDG 11 of the United Nations to make cities and human settlements all-inclusive, safe, sustainable and able to stand alone (United Nations, 2016). Such a perception led the department to pursue a provision of establishing an exceptional learning environment that advances a civil and sustainable society. Accordingly, the department integrates students' energy and enthusiasm with the faculty's intellectual capacity, research experience, and commitment to advance sustainability and unite operations and academics to find collaborative solutions to real-life sustainability issues.

The environmental engineering program explores more than seventy (70) courses through ten (10) main streams (Table 1) which, at the undergraduate level, address environmental, social and techno-economic aspects of sustainability.

Sustainability courses focus on sustainability either by concentrating on the concept of sustainability, including its environmental, social and economic dimensions (overlap of the 3 pillars), or examining an issue or topic using sustainability as a lens. On the other hand, a course that includes sustainability falls within one or more of the three pillars (Environment, Society, and Techno-economic) and incorporates one or more aspects of sustainability as a distinct course component, unit, module, challenge or activity.

Proposals that establish principles of sustainability in courses, curriculum or cohorts within the Environmental Engineering Department which are also inclusive of the department's faculty so as to build solidarity amongst students and staff include the following:

- 1) Establishing Student Environmental Sustainability Groups to carry out sustainable environmental research, field visits, raising community awareness, maximizing community awareness work amid concerned authorities of companies, agencies, organizations, unions, civil society organizations, non-governmental organizations and community based organizations
- 2) Creating a Monthly Sustainability Forum in the department to give lectures, conduct seminars, and organize conferences aimed towards promoting environmental sustainability
- 3) Creation of a Website or page for sustainability that brings together student organizations, teaching staff, trainers, employees within the department and partners for critical thinking about issues and matters of environmental sustainability
- 4) Publishing a wall newspaper in the department. Specialists and leaders in environmental domain are to be invited from within the Kingdom and abroad to contribute
- 5) Editing and dissemination of environmental awareness raising pamphlets, memoranda and posters addressing environmental sustainability issues and concepts through traditional and electronic publishing platforms
- 6) Holding environmental sustainability dialogues and rhetoric
- 7) Conducting outreach through social networks such as: Facebook, Twitter, and Instagram. Furthermore, communities can be engaged with animated telegram posters, intensification of environmental sustainability transmission through Imo, Messenger, Line, WhatsApp and Skype and other tributaries of social networking and digital communities.
- 8) Engage in partnership with stakeholders interested in promoting environmental sustainability
- 9) Opening a media platform with Imam Abdulrahman bin Faisal University forums and other frameworks and aids
- 10) Calling for the establishment of a "Professional Environmental Development Council" that identifies required skills and needed knowledge
- 11) Activating the principle of voluntary professional work so that volunteer work is not just a temporary job, but a permanent one

- 12) Creating a health and environmental engineers loop within the system of Saudis Engineers' Council
- 13) Reflecting on the expansion of vocational training, capacity building, human development and management of human resources for advancing economic development in collaboration with "King Salman Program for the Development of Human Resources" in accord with Vision 2030 (Figure 1).
- 14) Directing views and opinion decision makers at the university to focus scholarship opportunities on fields that serve the national economy and in quality disciplines and specializations within the world's prestigious universities in line with Vision 2030.

1.3 Mirroring the Department's strategic plan to Vision 2030 in accordance with incentives and threats to its success and positive mobility with the community

To achieve the desired integration of the department's strategic plan and the second pillar of Vision 2030, a booming economy, the department will focus on a provision of opportunities for all students through continued development of its educational system as associated with labor market needs. This will occur via development of opportunities for graduates through support of the College Alumina Committee to focus on "Entrepreneurship and small enterprises" (Figure 1) as well

Box (1) BOOSTING OUR SMALL BUSINESSES AND PRODUCTIVE FAMILIES (Vision 2030)

Small and medium-sized enterprises (SMEs) are among the most important agents of economic growth; they create jobs, support innovation and boost exports. SMEs in the Kingdom are not yet major contributors to our GDP, especially when compared to advanced economies. Therefore, we will strive to create suitable job opportunities for our citizens by supporting SME entrepreneurship, privatization and investments in new industries. To help us achieve this goal, we have established the SME Authority and we will continue encouraging our young entrepreneurs with business-friendly regulations, easier access to funding, international partnerships and a greater share of national procurement and government bids.

Our productive families now enjoy vast marketing opportunities through social media and digital platforms. We will facilitate access to these channels, enable microfinance and motivate the non-profit sector to build the capabilities of our productive families and fund their initiatives.

as collaboration with others across the "national Portal for work" in collaboration with the "General Authority for small and medium enterprises"(Vision 2030). To achieve the Vision areas, it is proposed that the department carry out the following:

a) To enhance efficiency, transparency and accountability and to promote a "culture of performance" among students and faculty within society as advocated by Vision 2030 in a consensus between SDG goal (16) of the United Nations for peace, justice and institutions where the importance of inclusion of freedom, peace, security and respect for human rights is clear in the new development framework, based on Millennium development goals. In particular, there is a need for societies where justice and democracy prevail to achieve sustainable development. Goal (16) of SDGs is dedicated to promote the existence of comprehensive peaceful communities for everyone to achieve sustainable development, a provision of access to justice for all, and to build, at all levels, effective and accountable institutions (see SDGs 2016).

b) Involvement of parents in the department educational process, and helping them in building their children's talents and personalities to enable them to be active agents in building their society, encouraging families to adopt a "culture of planning" commensurate as related to available potentialities, so that they can provide the needs of their children and take the fullest care of them, as called upon by the Vision, perhaps in cooperation with the "Irtiga upgrade" program.

c) Making available courses and educational curriculum to ensure consolidation of positive values in students' personalities through the development of an educational system in all its components. This enables the department to cooperate with the family in strengthening the fabric of society, through sharing knowledge, skills and good behaviors to students in an effort to foster independent personality traits that are characterized by a spirit of initiative, perseverance and leadership. Traits should have enough self, social and cultural awareness, through introduction of a wide range of cultural, social and voluntary activities and sports through the empowerment of educational, cultural and entertainment system as advocated by Vision 2030.

d) Linking the principle of social services provided to the community with subjects offered to students, and motivating faculty members to provide a larger portion of projects and duties in study material to serve the community. Thus, educational subjects are used to develop vital projects of interest to the community. For example graduate students conduct research project for the treatment and reuse of ablution water in mosques, thus saving energy. This encourages universities to act as an advisory platform for a variety of service projects which

increase the university's connection with the community while also acting as a source of revenue.

e) Encouraging Saudi Universities towards economic sustainability with minimal support coming from the Ministry of Education by strengthening partnerships with the private sector making them participate in development of the nation. Projects can include allowing analysis of industrial samples and materials produced from private factories in university laboratories for financial remuneration.

f) Building centers intended to reduce the use of energy by traditional methods and relying on other ways to produce energy, such as energy production by burning solid waste (Waste to Energy Facility).

g) Creation of a specialized center for the management of solid waste to act as a link for environmental research related to the management, reduction and re-use of solid waste, in harmony with what is stated in Vision 2030 of raising efficiency of waste management.

h) Conducting studies related to improvement of services provided to pilgrims within commitment to Vision 2030 and SDG 3 of the United Nations to ensure that everyone enjoys healthy living conditions and personal well-being at all ages.

i) Expansion of the department in the vocational and continuing education training for students, alumni and others in the core competencies of various specialties such as the engineering, professional, technical and technological domains. This could perhaps be achieved by launching the idea of an Environmental Engineering Incubator within the department, thus, implementing the vision's logo "learn to work". This is in addition to the cooperation and coordination of efforts with the "Job Creation and the Fight against Unemployment Organization" (Vision 2030).

j) Carrying out scientific research for the development of recreational centers and Vision 2030 cultural projects, and restoring an ideal environment for exercise that promotes healthy life-styles for individuals as part of a modern environment sought by the Vision, through cooperation with the national program "Daim-Supporter".

k) Participating in designs to complete requirements and needs that create high-quality integrated environments including basic services such as: water, open and green spaces in cities to contribute to the implementation of Vision 2030 to satisfy the needs of each individual and family for picnic and entertainment places to upgrade the quality of life for all (see Vision 2030).

l) Conducting laboratory tests and field studies to reduce pollution in all its forms, raising efficiency of waste management, and contributing to resistance to the

phenomenon of desertification in line with Vision (2030) and SDG (11) of the United Nations to make cities and human settlements all-inclusive, safe and able to survive and be sustainable.

m) Participating in optimum water wealth investment aids by raising public awareness and community outreach to rationalize and renew natural water, protect, reclaim and reuse final effluent from wastewater treatment facilities.

n) Partnership with competent authorities for the establishment of an integrated project to recycle waste and its good management.

o) Working with relevant agencies from government and private sectors to raise community awareness of protection for beaches, parks and islands, to enable everybody enjoy them per the aspirations of Vision (2030), and to achieve perfectly good health aids as is called upon by SDG (3).

p) Proposal for specialized training courses through a partnership with the private sector to provide training opportunities and credentialing that will enable graduates to join the labor market (see Box 2) and upgrade capabilities and skills of the engineer in coping with developments in technology and engineering sciences. This is in addition to the training of trainers.

q) Departmental focus on innovation in advanced technologies issues and in the "entrepreneurship" through graduate and graduation projects issues.

r) Making available specialization training for Saudi woman in accord with Vision (2030) for development of their talent, investing in their energies and enabling them to obtain the necessary opportunities. This is in line with the hopes of SDG (5) of the United Nations to achieve gender equality and the empowerment of all women and girls, and SDG (10) to reduce inequality within and among countries.

Box (2) AN EDUCATION THAT CONTRIBUTES TO ECONOMIC GROWTH (Vision 2030)

We will close the gap between the outputs of higher education and the requirements of the job market. We will also help our students make careful career decisions, while at the same time training them and facilitating their transition between different educational pathways.

To this end, we will prepare a modern curriculum focused on rigorous standards in literacy, numeracy, skills and character development. We will enhance role & capacity building of teacher. We will track progress and publish a yearly sophisticated range of education outcomes. We will work closely with the private sector to ensure higher education outcomes are in line with the requirements of job market. We will invest in strategic partnerships with apprenticeship providers, new skills councils from industry, and large private companies. We will also work towards developing the job specifications of every education field. Furthermore, we will also work with concerned to guarantee fitness of higher education outcomes with market needs, and have partnership with bodies that avail national & international training opportunities to graduates.

s) To assist governmental domains and municipalities, which engage in carrying out services to shift from "provider of the service" to "monitor and observer of the sectors" as depicted and stated by the Vision to the role of government (see Vision 2030).

1.4 The role of the Department in community service towards an interaction of various community sectors with objectives and initiatives of Vision 2030

The department has several initiatives in community service that are bolstered by partnerships with many governmental, public, private and charity sectors. These partnerships allow for conduction of studies, applied research, continuous and in-service training, capacity building and human development, raising awareness and transmitting awareness messages for the benefit of surrounding environments, as well as promoting the health of the individual and health of work place. This is besides involvement of a large group of departmental youth and a constellation of enrolled students in charitable projects, community service tonics, university Boy Scouts and Rangers, environmental volunteer teams, cleaner parks and beaches organizations and other similar forums.

1.5 Promotion of the Department's financial resources in line with Vision (2030)

Enhancing departmental resources can be done by conducting remarkable research, carrying out reliable projects, achieve goals and targets and executing operational plans for the department. This may be done by considering the possibility of obtaining additional financing sources and external funds, such as: holding special training courses for an audience of engineers and technicians, training of trainers from engineering and technical sectors, dissemination of environmental culture, spreading culture of sustainable environmental engineering, launching of graduate studies in the field, conduct technical and feasibility studies, shouldering environmental impact assessment studies for civic projects, conducting useful research related to national industries, doing applied and developmental research, partnership with peer institutions for purposes of investment in higher education and scientific research and improving outcomes in order to achieve goals of Vision (2030).

2. Conclusions and Recommendations

The Department of Engineering's vision, mission and objectives aim to integrate with the sustainable development goals of the United Nations to achieve the Kingdom's Vision (2030) in accordance with the expected

time plan. Sustainability as a practice is a viable method of development that industry, municipal services and the public sector can rally around. The end goal of sustainability is the promotion of financial stability, environmental continuity and public health. The Department’s intent on promoting sustainability is guided by targets set by the United Nations but aims to far surpass them in a calculated and impactful manner that aids the Kingdom in achieving its 2030 Vision. Through the three pillars of building a dynamic society, a booming economy and a country of ambition, Vision 2030 hopes to improve upon Arabian and Islamic depth, utilize the power of investment and maximize the strategic geographical location of the Kingdom to warmly welcome public, private, nonprofit and charity sectors. The Department’s role in achieving Vision 2030 will occur using scientific advancements, academics, optimizing logistical efficiencies in technical sectors of the economy, and generating revenue streams for the Kingdom.

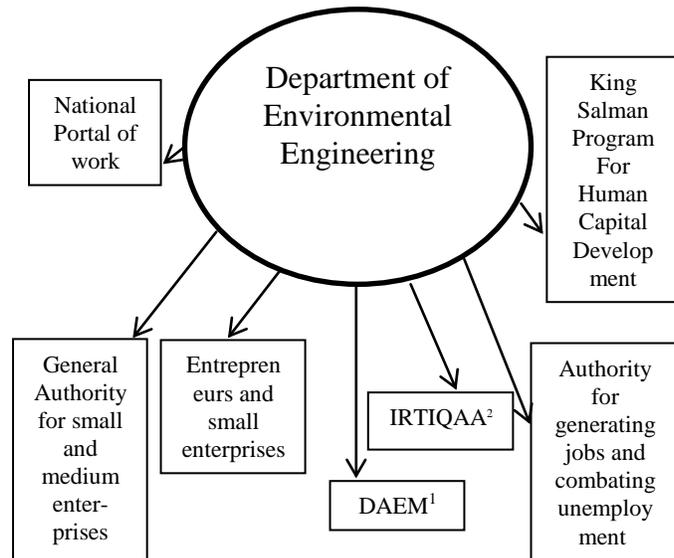


Figure 1. Vision 2030 initiatives to develop and inspire the department.

Table 1. Types of courses per academic stream

Stream	Sustainability course	Course that includes sustainability	Total credit hours	Categories
Islamic studies	-	4	8	T, S ¹
Mathematic studies	-	10	32	T
Social studies	3	9	29	E, S, T, U
Basic sciences studies	2	6	22	E, T, U
Basic engineering studies	5	3	22	E, S, T, U
Air studies	2	-	6	E, S, T, U
Solid wastes studies	5	-	14	E, S, T, U
Wastewater studies	9	-	26	E, S, T, U
Water, hydrology studies	7	-	19	E, S, T, U
Environmental engineering studies	9	-	23	E, S, T, U
Advanced studies	3	-	9	E

¹Sustainability code Course
 E Environmental sustainability
 S Social sustainability
 T Techno-economic sustainability
 U Sustainable course

References

- [1] Abdel Magid, I. M., Jarrah, N. A., Al-Madi, F. A., Al-Otaibi, T, F. and Al-Zahrani, B. S., sustainability is our responsibility: it is no longer an option for us, Unpublished document. (In Arabic), 2015.
- [2] Clifford, K., Zaman, M., Engineering, global health, and inclusive innovation: focus on partnership, system strengthening, and local impact for SDGs, Global Health Action, 9, 2016.
- [3] Jarrah, N. A. and Abdel-Magid, I.M. Sustainability of environmental engineering courses, A presentation for the World Water Day 2015, organized by Environmental Engineering Dept. of the College of Engineering, Dammam University, KSA, On 22 March 2015, under the theme “A day for water and water for sustainable development”, 2015.
- [4] Khan, Mehmood-Ul-Hassan, Saudi Arabia's Vision 2030, Defence Journal, Vol. 19 (11), 2016, pp. 36 - 42.
- [5] Low, Linda., Abu Dhabi's Vision 2030, An On-going Journey of Economic Development, World Scientific Publishing Co., 2012.
- [6] Searcy, C., The Role of Sustainable Development Indicators in Corporate Decision-Making The transformative potential of the Sustainable Development, International Institute for Sustainable Development, 2009.
- [7] Stevens, C. and Kanie, N., The transformative potential of the Sustainable Development Goals (SDGs), International Environmental Agreements: Politics, Law and Economics, Vol.16, Issue 3, 2016, pp. 393–396.

- [8] United Nations, Our Common Future: Report of the World Commission on Environment and Development. New York: United Nations, 1987.
- [9] United Nations, Trends in Sustainable Development 2008-2009. New York: United Nations, 2008.
- [10] United Nations, Sustainable development summit. New York: United Nations, 2015.
- [11] United Nations, 17 goals to transform our world. (In Arabic). New York: United Nations, 2016a.
- [12] United Nations, Transforming our World: The 2030 Agenda for Sustainable Development. New York: United Nations, 2016b.
- [13] United Nations. Sustainable Development Goals. New York: United Nations, 2016c.
- [14] Vision 2030, Kingdom of Saudi Arabia's vision 2030 (In Arabic), 2016.