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REPORT

**THE 5TH TECHNICAL COMMITTEE MEETING
ESCWA TECHNOLOGY CENTRE (ETC)**

BEIRUT, LEBANON, 23 - 24 MAY 2017

Summary

ESCWA Technology Centre (ETC) organized its 5th Technical Committee Meeting in Beirut during 23 - 24 May 2017. This meeting was held in accordance with the ETC Statute to give guidance to the Centre on its future work plan, and to identify member countries' priorities and challenges in harnessing national capabilities in science, technology, and innovation in the implementation of the sustainable development goals. Meeting participants thus included 31 representatives from academia, research institutions, ministries, industry, NGOs and other UN Agencies. The participants were from 14 ESCWA Member countries and deliberated on the role of ETC in serving its objectives.

The meeting derived Key messages for ETC to develop its 2018-2019 draft work program that will be further reviewed and discussed by ETC Board of Governors (BOG) and then approval in its next regular meeting.

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Introduction

1. Since its establishment in 2010, ESCWA Technology Centre (ETC) has been assisting the member countries to harness science and technology for enhancing their socio-economic development, and establishing their national technology development and transfer systems. In 2016, in support of addressing the challenges of the Agenda 2030 Sustainable Development which was launched in late 2015, ETC developed a responsive work plan targeted towards assisting the member countries in implementing the Sustainable Development Goals (SDGs).
2. ESCWA Technology Centre (ETC) organized its 5th Technical Committee Meeting in the UN-House, Beirut during the period 23 - 24 May 2017.
3. This meeting was held in accordance with the ETC Statute to give guidance to the Centre on its future work plan and related technical issues, and to identify member countries' priorities and challenges in harnessing national capabilities in science, technology, and innovation towards the implementation of the sustainable development goals.
4. The 31 Meeting participants were representatives from academia, research institutions, ministries, industry, civil society and other UN Agencies. The participants gathered from 14 ESCWA Member countries and deliberated on the role of ETC in serving its objectives.
5. The meeting derived key messages for ETC to develop its 2018-2019 draft work program that will be further reviewed and discussed by ETC Board of Governors (BOG) and then approval in its next regular meeting.

I. CONCLUSIONS AND WAY FORWARD

6. Participants highlighted the important role in the technology field that ETC has been playing in the region and the need for further promoting and enhancing the impact of science, technology, and innovation in the region.
7. Three main pillars or areas of work for ETC have been identified as concept areas to be further developed with relevant regional and national partners and they are; **Policies and Governance, Cultural and Outreach, Projects Scaling Up and Opportunities.**

II. SUMMARY OF DISCUSSIONS

A. OPENING SESSION

8. *Ms. Roula Majdalani*, Director, Sustainable Development Policies Division at ESCWA welcomed the presence of the Executive Secretary of ESCWA to this important meeting, which gathered experts and representatives from important Science, Technology and Innovation (STI) institutions in the Arab countries. She highlighted the expected outcome and themes of this meeting as being focused on emerging technologies, green technologies, and technology transfer systems, which are critical tools for achieving the sustainable development goals (SDGs). She stressed on the vital and entrepreneur role that this committee plays, especially when it comes to enhancing STI and networking in the implementation pillars for localizing technology, technology transfer and development. Ms. Majdalani ended her speech by highlighting the fact that the region has some of the most promising human capabilities and work should focus on how to bring about our countries to invest in such resources.

9. *Mr. Mohamed Ali Alhakim*, the Executive Secretary of ESCWA stressed on the role and importance of technology as a tool for development to follow the international pace in order not to be left behind, he also mentioned that ESCWA will not save any efforts in assisting ESCWA Member States and is looking forward to working with all on the urgent and important matters. He thanked the audience and organizers, and expressed his wishes for a successful and a fruitful meeting.

B. MANDATE OF TECHNICAL COMMITTEE

10. *Mr. Nael Al Mulki*, National Officer at ETC presented a brief about the Centre mission, objectives, and, the mandate of the Technical Committee as stated in the ETC Statute. He stated that the composition of the technical committee is proposed by ETC Executive Director in consultation with the Executive Secretary of ESCWA or representative. The responsibilities of the technical committee are mainly advising the ETC's Executive Director on the formulation of the program of work and on other technical matters concerning the centre's operation. Mr. Al Mulki explained that the report of the technical committee meeting in addition to the Executive Director's observations thereon will be submitted to ETC Board of Governors in its next session.

C. ELECTION OF TECHNICAL COMMITTEE CHAIR

11. *Mr. Alaa-Eldin M. Adris*, Professor of Energy at the American University of Cairo, and Chairman of Board of Trustees at the Egyptian Centre for the Advancement of Science, Technology & Innovation was elected Chair of the 5th ETC Technical Committee.

D. BACKGROUND: ETC ACTIVITIES FROM 2011 THROUGH 2017

12. *Mr. Fouad Mrad*, Executive Director, ESCWA Technology Centre, presented an overview on activities and projects undertaken by ETC from 2011 through 2017. He mentioned in his presentation that the deliberations of this committee will lay the ground for the committee suggestions and recommendations on ETC's future work given that the Center's Board of Governors (BOG) is the ultimate approval entity for future work or activities. He also stressed on the importance of anchoring ETC's work with different sections of ESCWA in general and in the Sustainable Development Policies Division (SDPD) in particular given the global and regional priorities converging towards serving directly the sustainable development priorities. He indicated that the proposed program of ETC for 2017 is focused on 3 main themes; national technology development and transfer systems, adequate emerging technologies, and green technologies, and is coinciding with the overall strategic framework of ESCWA for 2018-2019. Through this strategic framework there are many areas to serve the countries priorities, which can be identified in this meeting. Mr. Mrad also highlighted the issue of the priorities for transition to more advanced and adequate green technologies seeking to become "Producers" rather than "Users" of such technologies through innovation. He mentioned that the climate change is affecting not only the environment but the economy, energy, water, food, and most of our resources, and the importance of f technology as a mean for adaptation and mitigation of the climate change impacts. Business opportunities in consuming the scientific research outputs to resolve challenges facing the implementation of sustainable development in the Arab countries are one of the main activities at ETC. Mr. Mrad also highlighted that ETC is a convening platform for regional cooperation through the BOG and technical committee members, and is responsible to convey the regional priorities to the international channels and platforms as well as disseminate lessons and benefits to the region from the international STI development tracks and programs.

13. During the open discussions the following points were raised:

- (a) Need for transferring regional and international successful stories to other Arab countries.
- (b) Blue economy needs to be promoted as green economy.
- (c) Governments to consider Best practices of Technology Transfer mechanisms and handling complex technology transactions.
- (d) Transfer of the output of R&D from laboratories to the industry.
- (e) Need for Enabling environment and adequate infrastructure for proper localization and transfer of technology.
- (f) Adoption of Policies and legislations related to technology and innovation by the decision makers.
- (g) Enhancing R&D and innovation culture in the Arab countries
- (h) Need for operational sustainability of successful projects and programs and a process for sharing best practices and impactful activities
- (i) Taking into account the cost of no action when proposing concepts to stakeholders that usually only include the impact foreseen, also.

E. SESSION 1: WHAT ARE THE PRIORITIES FOR NATIONAL TECHNOLOGY TRANSFER SYSTEMS?

14. *Mr. Mohamad Saidam*, Chief Scientist, Royal Scientific Society, Jordan moderated the session and addressed the need for adaptation of existing technologies in the Arab region with the requirements for the implementation of the SDGs and the agenda 2030. There is an opportunity of reforming the STI ecosystems in the Arab countries in order to get the technical and financial support from the international community. He noted that the panellists in this session form a very interesting partnership that consists of academic, private sector, experts in sustainable development as well as UN agency representative. He also questioned whether the R&D in the Arab countries represents sufficient critical mass to be commercialized. At the end of his presentation he briefed the participants on the proposed session topics, and introduced the main speaker and the panellists.

15. *Mr. Fouad Mrad*, presented the Development Account project being implemented by ETC on “Establishing National Technology Development and Transfer Systems in (Alpha ORDER) Lebanon, Tunis, Egypt, Oman, Morocco, and Mauritania”. He explained that this project is funded from the UN Development Account, and aims to enhance national innovation system capacity through updating related policies and the establishment of National Technology Transfer Offices (NTTO) linked to universities and research institutions facilitating the partnership between the research community and economic development sector, the industry and relevant governmental and nongovernment actors. The expected accomplishments of this project are to enhance capacity of those Arab countries in order to identify and address innovation and technology transfer policy gaps, and to guide the policy environment for research and development, and the commercialization of research results. During this project, ETC conducted many workshops with governmental related bodies to address the gaps and recommendations identified by the studies prepared in each country. These studies included the status of the current system of innovation and technological development, the effective science and technology policies, the legislative environment that stimulates innovation and development, and legal frameworks to integrate technology transfer activities into national legislation, as well as technology transfer policies and intellectual property in universities and research centres. He also provided examples of such identified gaps, and recommendations to support the national research, development and innovation ecosystem at the national level, and lessons drawn from analytical efforts in these Arab countries. Mr. Mrad ended by a horizontal comparative review of national studies across 4 countries and identified common issues.

16. *Mr. Alaa-Eldin M. Adris*, commended work done in this field and then mentioned that the introduced legislation and policies regarding technology development and transfer to the universities and research centres will be submitted to the Higher Council for Universities through its Scientific Research Committee in the coming days. He pointed to the random work and isolation in the research centers and whereby scientific centers are not aware of the work of others. He also pointed to the need to harmonize national strategic plans with the proposed STI plans and the need for concerted efforts in terms of utilizing the human resources and available resources. He stressed on issue of improving the culture of scientific research and the public understanding of science. Conflict of interests as well as separate responsibilities and concerns, must be taken into consideration, he said, and he provided an example of the Egypt STI observatory that plan, execute and measure at the same time, leading to biased results. Finally he stressed on the importance of basic education for researchers and the need to include technology development and innovation within the education system in Egypt. In responding to a question about the real starter to improve the STI system in Egypt, he replied that the adoption of the suggested STI legislation and policies is the real starter, since the decision makers are always changed.

17. *Mr. Mondher Khanfir*, **Tunisian** Expert, Policy Advisor & Strategist, presented the Tunis case and mentioned that the present local economy is not able to adapt or absorb the new innovative technology as the technology development in Tunis is based on market push rather than market demand, beside the fact that IP protection process is not mastered. Mr. Khanfir shed the light on major problems in Tunisian STI system; namely the lack of innovations in the local industrial sector, low integration in the global chain, low impact of research outcomes, in addition to lack of cooperation between researchers and universities. He stressed on the need to establish an enabling environment for R&D and technology development. Hence, in order to enhance the STI system, issues like lack of mobility, low competencies, roles and regulations, and STI governance must be improved. In responding to the question about the real starting point to improve the STI system in Tunis, he indicated that the Government should rely on civil society & professional organizations to craft an enabling policy to STI. Of course, the priorities should be fixed by Government, and should be limited to few focused areas or domains, and this is the role of the civil society and the NGOs, with support from the government in establishing the enabling environment.

18. *Mr. Hassan Charif*, **Lebanese** Consultant, National Council for Scientific Research presented the Lebanese case in establishing Technology development and Transfer system. He described the initiative of “Lebanese Industrial Research Achievement Program - LIRA” that was conducted by the National Council for Scientific Research in cooperation with the Universities and the Association of Lebanese Industrialists and lately the Central Bank of Lebanon became a partner in this project. A related recent study concluded that most of the SMEs in Lebanon are not interested in the innovation and development and depend on imported technology solutions. Mr. Charif stressed on the importance of the new Higher Education Law in Lebanon which declared that 5% of the Universities budgets are to be invested in the scientific research. One of the most important initiatives launched by the universities is the “Entrepreneur University” that is enhancing creative innovation, Mr. Charif added. The gap between research institutions and industry is one of the major obstacles in Lebanon in addition to the commercialization of scientific research outputs. He requested assistance of ETC to bridge such gaps and establish networks between the different parties. The scattered legislations and lack of IP polices are also hindering the technological development and innovation. He mentioned that the Central Bank of Lebanon is now supporting and financing the technology transfer process. The issue of adopting new legislations and polices is more difficult in Lebanon than amending existing related legislations and polices.

19. *Mr. Ghaith Fariz*, Director, UNESCO, Cairo Office explained that despite all the educational systems and expenditures, Arab countries have not been able to find the critical mass or the so-called knowledge and technology workers to carry out the process of technology transfer. He added that qualifying such critical mass is needed in local communities, in addition to creating the enabling environment. Mr. Fariz mentioned that most of technology development is based on community’s

needs. He stressed on creating the societal culture for such development, as well as creating awareness among local communities in this regard. He pointed out for the need of local education systems to be social rehabilitation systems as well.

20. In the open discussions the following points were raised:

- (a) The chronic need to bridging the gap between industrial sector and the universities and research institutions
- (b) Benefits of involving youth in the future meetings and discussions
- (c) Cultural aspects needed for the effective productive role aspired from STI within the national economy and society: awareness, media, science policy interface, and RDI governance.
- (d) Stimulation and amplification of the local absorption capacity of RDI outcomes with local production cycle partners from existing industry and emerging new sectors hence bridging the quadrature based pillars of universities, industry, government and civil society.
- (e) Development programs with regional relevant partners and local stakeholders to support educational curricula and programs which are more connected to local societal needs, more relevant to economic challenges and opportunities especially preparing diverse skills to support adequate professional preparation of all required cadre not only researchers.

F. SESSION 2: WHICH EMERGING TECHNOLOGIES ARE ADEQUATE FOR SUSTAINABLE DEVELOPMENT IN THE ARAB COUNTRIES?

21. *Carol Chouchani Cherfane*, Chief Water Section SDPD, ESCWA moderated this session and mentioned that this session's focus is on instrumental ways and practical tools that can facilitate the integration of Emerging Technologies (ET) with the local Sustainable Development. She welcomed and introduced the main speaker of the session.

22. *Mr. Khaled Saoud*, Associate Professor of Physics, Virginia Commonwealth University (Qatar Campus) presented a brief history of the development of Nano Technology in the world, Nanomaterials and their potential applications in different fields potentially solving many pressing problems. He pointed out to the exponential growth of this technology since Nanomaterials offer new possibilities and engineering solutions for the development of sustainable designs with high social and economic benefits. He identified different investment opportunities in Nanomaterials and Nano systems that can open new jobs and support the transformation of the economy in the Arab world into knowledge based one. Mr. Saoud highlighted the potential of Nanomaterials to open new opportunities in green technologies.

23. *Mr. Awni Al-Otoom*, Vice Dean of Graduate Studies and Professor of Chemical Engineering, Jordan University of Science and Technology started his intervention by addressing the means to accelerate the transformation of experimental research from local labs to local society and economy. He highlighted the fact that the fragmented research in the Arab region lacks development and piloting that might attract the investors. Mr. Otoom claimed that no ET has been successfully rooted in the Arab countries. He stressed on the renewable energy development in the region as an opportunity since it proved successful results. He added that water also represents another crucial sector that needs much development and investments.

24. *Ms. Latifa Alhajji*, Associate Research Scientist at Energy and Building Research Center, Kuwait Institute for Scientific Research highlighted the need to identify national priorities in order to accelerate the transformation of experimental research from local labs to local society and economy.

Accordingly it is important to facilitate the enhancement of legal and legislative frameworks that help technology push and market pull, as well as related capacity building through education and training. In addition, she called for installing effective enablers that promote functional private/public partnerships to exploit the R&D outcomes. Ms. Alhaji mentioned that Nanotech, biotech, ICT, artificial intelligence, and robotics are the most ET's that have been successfully rooted in Arab countries. She also reminded of existing knowledge platforms, open innovation, and co-funding mechanisms as examples of building critical mass from existing islands of excellence in addition to learning from other experiences.

25. *Mr. Ahmed Al Busaidi*, The manager of the Renewable Energy Research Program, The Research Council, Oman, also stressed on the need to accelerate the transformation of research from local labs to local society and economy which could be achieved through development of emerging technologies in addition to establishing the proper and clear strategies. He mentioned that there exist major gaps between industrial sector and academia due to the different perception of R&D of both parties, and provided a comparison between academia and industry in this regard. He believes that intellectual property rights is a very crucial issue and needs more consideration. Mr. Al Busaidi referred to the Japanese experience in linking academia with industry, through sending the researchers to work in industry and explore their problems and needs.

26. *Ms. Hanan Malkawi*, Vice President for Science Engagement, Royal Scientific Society in Jordan explained how emerging technologies have become multidisciplinary by nature addressing effectively challenges in all areas globally. The priorities of sustainable development challenges in the Arab countries offer unique opportunities to leapfrog into applying emerging technologies in the era of open science, education, research and tools. She added that despite abundance of proven local capacity and open access to knowledge, the challenge remains how to determine the most adequate emerging technologies that can contribute to social wellbeing, economic growth and job creation, while safeguarding the sustainable management of natural resources. She presented her personal experience in conducting a project with a multidisciplinary team on water treatment using nanoparticles of ferrous oxide. She also indicated that Nanotechnology, Biotechnology, Internet of Things, Data Mining, Personalized Medicine, and Smart Cities are the most Emerging Technologies that have been successfully rooted in Arab countries. Ms. Malkawi proposed building critical mass from existing islands of excellence through establishing Centres of Excellence to: stimulate technological innovation, creation of funding mechanisms, support innovative initiatives (Patents, science parks, spin-offs and start-ups ...), and train researchers conducting applied research.

27. During the open discussions the following points were raised:

- (a) To promote and facilitate the “early engagement” of industrial partners with RDI local activities
- (b) To develop effective platforms to encourage and complement existing research programs with the other needed phases: development, piloting and prototyping, scaling up, and diffusion
- (c) To explore the potential development of “cost sharing” RDI programs in the multidisciplinary projects based on Emerging Technologies for SD with regional partners.
- (d) To support the governance of RDI especially with ET based innovation and related ethical dilemma.

G. SESSION 3: WHAT IS ETC POTENTIAL ROLE IN PROMOTING GREEN TECHNOLOGIES

28. *Ms. Roula Majdalani*, Director, Sustainable Development Policies Division at ESCWA was the moderator for this session. She reviewed with the participants the different facets of Green Technology, and asked if GT is the technology that addresses the concerns of natural resources or the

technology that will lead to inclusive development which is one area that comes under the SDGs “Technology for Sustainable Development”, or is it the technology that ensures the means of implementation under Paris climate agreement. She also questioned the classification criteria for appropriate green technology. She ended by mentioning that the Arab region is affected by climate change and the need for green technology is crucial. Later on Ms. Majdalani introduced the main speaker as well as the session panellists.

29. *Mr. Nizar Al-Halasa*, Innovation Advisor, ESCWA Technology Centre - Jordan addressed the role of ETC in promoting the Green Technology. He indicated that technology is related directly or indirectly to 14 goals of the 17 SDG, and presented a brief on the Global innovation Index whereby Arab countries were the low ranking of in this index. He also provided some consumption figures on water, energy, solid wastes and transport in the Arab countries, and therefore the importance of adopting the green technology on the economic, social sectors as well as the GT potential to lower the cost of production, lower the energy bill, preserving the natural resources, and enhancing the energy and water security. He cited examples of green technology projects that SDPD/ESCWA conducted in the last 5 years, and informed the participants that t ETC will be preparing a Typology of Green Technology for Sustainable development, and a landscape for the implementation of GT.

30. *Mr. Mohammed Hosni Ghedira*, Director, Research Center for Renewable Energy Mapping and Assessment, Masdar Institute, UAE shared his experience in promoting Technology Transfer towards renewable energy and water resources. He stressed on the importance of the water-energy nexus and mentioned that most of the water resources in the GCC countries come from desalination, which is expensive. He highlighted that the water-energy-food nexus was of the main reasons to consider the renewable energy since solar can be utilized to produce electricity for desalination, and water would be used for irrigation and produce food. He mentioned that after 10 years of research on solar energy at Masdar, the engineers and workers gained a lot of experience in this field, and in particular Nano Technology used for water is part of Masdar activities in coating and Nano particles for cloud seeding and precipitation. He also referred to the news on towing an iceberg from the South Pole as an idea from a Masdar researcher, and there are related negotiations with government of Dubai to finance this project He added that the UAE government supports the national researchers and engineers to complete their studies and involve them in the manufacturing process of any high tech machines or devices. He also mentioned that Masdar has more than 20 Patents filed in the US and more than 120 filed locally..

31. *Ms. Hanadi Awadalla* Manager, Forests National Corporation (FNC), Ministry of Agriculture and Forests, Sudan mentioned that the most important benefit of GT is being an environment friendly technology contributing to achieving most of the SDGS. Ms. Awadallah believes that Arab countries are among the least polluting countries but bear the cost of reducing emissions like polluting countries according to the Paris agreement. She provided examples of replacing polluting technology with green alternatives. She stressed on the need for directing the local scientific research efforts towards development of green technology and seeking partnerships with developed countries in transferring such technology for mitigating the climate change and reducing emissions. She hoped that Arab gulf economies invest in establishing renewable energy and green technology in the less fortunate countries. She further explained the availability of affordable and simple technologies of great impact on reducing the pollution and need to be promoted.

32. *Mr. Hakam Al Alami*, Advisor to HRH Prince El Hassan bin Talal, Majlis El Hassan-Royal Court, Jordan pointed that GT or GE is different from one country to another, and asked countries to adopt one common understanding of this concept in the Arab, in order to derive common regional objectives for the localization of this technology. Mr. Al Alami mentioned that in Jordan, the ministry of Environment recently launched a new plan “National Green Growth Plan” to unify all related policies on the national level. He also indicated that the success criteria of GT initiatives are through five outputs; namely: sustainable economic development, social development, environmental development, building local resilience, and greenhouse emissions reduction. In Jordan many obstacles face the implementation of green technology, such as scarcity of water, and demographic changes due

to migration and refugees, even though Jordan has had many attempts and successes in exploring energy alternatives the likes of nuclear, shale oil, biogas, wind and solar. He indicated that the Ministry of Energy in Jordan developed a long term strategy to use the renewable energy; it started by 1% in 2007, reached 6.5% in 2015, and is aiming to reach more than 10% in 2020. He ended his intervention by stating that there is a need for building capacity of human resources in the green technology as well as related brain gain, and he asked for allocating dedicated Fund for such initiatives and projects in the Arab region.

33. *Mr. Fareed Bushehri*, Regional Resource Efficiency Officer, UNEP- Regional Office for West Asia provided an example on green economy from Jordan based on stakeholder approach. He referred to a later national strategy and assessment over the sustainability and consumption patterns that used the priorities of green economy identified by the existing Green Economy Scoping Study. Mr. Bushehri mentioned that all elements of green economy; Social, Economic, and Environmental should be considered, and the integration approach is recommended in seeking innovative solutions to problems in the region involving the local communities.

34. During the open discussions the following points were raised:

- (a) Identify and promote indigenous knowledge relevant to green economy and technology
- (b) Propose “visionary regional projects” that promote a leapfrog approach for green tech applications
- (c) Promote local suitable RDI programs supporting the WEF nexus GT solutions for the multiplier impactful effects across the SDGs
- (d) Develop with local partners adequate national technology needs assessment and related implementation action plans
- (e) Explore possible GT fund in Arab countries connected with the international versions
- (f) Promote the effectiveness of the holistic integration of resources efficiency, green policies, national systems and green technologies

H. SESSION 4: WHERE ARE THE BUSINESS OPPORTUNITIES IN SOLVING THE SUSTAINABLE DEVELOPMENT CHALLENGES?

35. *Mr. Haidar Fraihat*, Director, Technology for Development Division at ESCWA moderated this session and explained the main focus of this session which is business opportunities and targeted partnerships with the private sector. He mentioned that the biggest global challenge is the high population growth with depleted natural resources. Technology can address such challenges. It can increase the resource pool and economize the resource utilization. He then introduced the main speaker of the session and the facilitators.

36. *Mr. George Nasr*, Associate Professor, Lebanese University presented an overview of “Business Opportunities in Sustainable Development” and related technology and business opportunities to the context of sustainable development. He introduced the concept of SD lucrative opportunities in the Arab region, and related means of implementation. Whereby he mentioned that those opportunities can be approached either on sector-by-sector basis (water tech, renewable energy, waste recycling, food, others), or as enabling tools across sectors. Mr. Nasr referred to Addis Ababa Action Agenda (AAAA) to highlight a clear path for deploying science, technology and innovation towards achieving the Sustainable Development Goals (SDGs). He wondered on possible schemes to attract and mobilize Arab funding towards promoting local entrepreneurship, partnerships with MNC,

innovation start-ups, and business incubators. Mr. Nasr stressed on the role of youth and relevant regulatory changes to facilitate such investments.

37. *Ms. Najiba El Idrissi El Amrani*, Higher Education Reform Expert, Faculty of Science and Technology, Sidi Mohamed Ben Abdellah University, Morocco addressed the most important topics her country tackled to achieve sustainable development. Morocco established a community project based on principles of SD in 2011, and in 2014 adopted a national legal framework to ratify the national strategy for SD. In this regard, Ms. El Amrani described how Morocco decided to set up the green economy as a target of its own sustainable development policy, and how it involved all stakeholders and enhanced public private partnerships to attract investment in that respect to protect the environment, create added value and jobs especially for youth. She mentioned that Morocco decided to increase the use of RE to 42% and decrease the total consumption of electricity 12% in 2020. She also mentioned her country introduced investment opportunities in other promising sectors such as water resources, recycling of solid and liquid wastes, and marine life. One success story in solid waste management in Morocco is Al Jesser Corporation “The Bridge”, which is dedicated to collecting and recycling computer devices by students. She ended her intervention by requesting more investigation and research regarding the problem of olive oil mill wastewater.

38. *Mr. Emad Kashgari*, Manager, Badir Program for Incubators & Accelerators, King Abdulaziz City for Science & Technology, Saudi Arabia highlighted the increase in the innovation investment in 2016 in the MENA region compared to previous years as mentioned in the Arabnet report. He mentioned that most of investments were made in Dubai, and 38% of investments were in the Transactional Business Models such e-trade and 23 % in Software as Service (SAS model) such as media, and 14% in combined technologies. Major problems in the relation between the investors and the startup are the underestimates or evaluation of the business in addition to the lack of knowledge of the innovative idea. Mr. Kashgari mentioned that in KSA there is a deficiency in talents, whereby he proposed to integrate the Arab resources to overcome such challenges. When reviewing recent development in KSA related to adopting the national agendas 2020, and 2030, the need to align investors and startups or entrepreneurs with priorities of national planners and regulators emerged as an important factor.

39. *Mr. Omar Hamarneh*, Director of iPARK and Advisor for Technology Development Royal Scientific Society, Jordan provided a background review on iPARK which was established in 2003 as a business incubator specialized in accelerating the startups for promoting job creation and economic development. The achieved success rate was about 82% from incubated close to 100 companies mostly specialized in Technology. Mr. Hamarneh explained that Jordan is spending a lot in importing energy and hence this area represents a great opportunity for entrepreneurs. The challenges of iPARK have been difficulty in attracting startups outside of Amman for few reasons. He proposed the establishment of economic free zones in rural remote regions with incentives, tax exemptions, and essential services for guiding investors to overcome these business challenges and threats.

40. *Mr. Ali Alhesabi*, Manager, Environment and Safety Department, Foulath Holding Company, Bahrain illustrated 2 case studies of green technology concepts and related drivers. He mentioned that the decision makers need to see positive figures as evidence knowledge in order to enable green favourite decisions. He stressed on the importance of measurements to be able to manage effectively what you cannot measure you cannot manage and achieve the SD. He referred to a local case study on Aluminium Extrusion Manufacturing in Bahrain where the industrial water discharged to the sea had a negative impact on the marine life and fisheries and whereby this issue was solved by installing wastewater treatment plant. The other case study was on the Pottery Industry where a new technology of burning was introduced to reduce the gaseous emission; afterwards the manufacturing area became an attracting area for tourists.

41. During the open discussions the following points were raised:

- (a) Importance of attracting the private sector to invest in the GT and to become a real partner in achieving the SDGs, and support the corporate social responsibilities (CSR).
- (b) Crucial Role of government and its policies, strategies, and legislations for promoting and applying green technologies
- (c) Establishment of an Arab fund to finance local entrepreneurs and innovators in technologies especially in the marginalized communities.

I. SESSION 5: GENERAL DISCUSSION

42. This session was co-chaired by *Mr. Alaa-Eldin M. Adris, Ms. Roula Majdalni, and Mr. Fouad Mrad.*

43. *Mr. Fouad Mrad* introduced a brief summary of all the deliberations of the two days meetings including ideas, suggestions, and recommendations throughout the 4 sessions of the meeting:

- (a) The need for comprehensive regulatory frameworks that seamlessly bridge gaps between research and private sectors
- (b) Support the “Applicable strategic planning” of STI national programs aligned with the national agendas of Sustainable Development with the importance of productive STI national ecosystems and coherent policies and legislations.
- (c) Support the cultural aspects needed for the effective role aspired from STI within the national economy and society: awareness, media, science policy interface, and RDI governance
- (d) Stimulate and amplify the local absorption capacity of RDI outcomes with local production cycle partners from existing industry and emerging new sectors hence bridging the quadrature based pillars of universities, industry, government and civil society
- (e) Develop with regional relevant partners and local stakeholders programs that support educational curricula and programs which are more connected to local societal needs, more relevant to economic challenges and opportunities especially preparing diverse skills to support adequate professional preparation of all required cadre not only researchers
- (f) ETC outreach and suitable partnership programs with the youth and marginalized communities (including rural areas) in the region to capture the potentials and supports the relevant solutions
- (g) ETC with relevant partners to develop effective platforms to encourage and complement existing research programs with the other required phases: Development, piloting and prototyping, scaling up, and diffusion
- (h) ETC to explore with regional partners the potential development of “cost sharing” RDI programs in the multidisciplinary projects based on Emerging Technologies for SD.
- (i) Need to support the governance of RDI especially with Emerging Technologies based innovation and related ethical dilemma
- (j) Identify and promote indigenous knowledge relevant to green economy and technology and propose “visionary regional projects” that promotes a leapfrog approach for green tech applications addressing local challenges
- (k) Promote local suitable RDI programs supporting the Water, Energy, Food (WEF) nexus Green Technology (GT) solutions for the multiplier impactful effects across the SDGs
- (l) Develop with local partners adequate national technology needs assessment and related implementation action plans and explore possible GT fund in Arab countries connected with the international versions
- (m) Need to promote the effectiveness of the holistic integration of resources efficiency, green policies, national systems and green technologies

- (n) Identify and explore with partners the business opportunities in identified green industry (e.g. ICT recycling, Olive oil waste processing) and promote the impact on multiple areas
- (o) The importance to promote the benefits of regional integration and complementarity in the STI related areas (investment, talent, markets, resources, opportunities, capacity, knowledge lighthouses)
- (p) Need for operational sustainability of successful projects and a process for sharing best practices and impactful activities.
- (q) Promote the promising benefits of coupling the local Innovation and Entrepreneurship initiatives with public procurement, FDI related projects like Economic Free Zones, and MNC large projects.
- (r) Explore with related partners the possibility of a “Sustainable development Impact Fund” beyond CSR and towards Production Shared Values.

44. *Ms. Roula Majdalani* reiterated on the mandate of this technical committee that was presented in the beginning of this meeting. She added that all presented suggestions and recommendations will be developed into crisp activities and submitted to the BOG in its next meeting to approve the ETC work plan for the next year. She stressed on the importance of Technology for rebuilding the war torn communities in the region. She explained that the chairperson will be working voluntarily with ETC to follow up on these recommendations and suggestions, and she opened the floor for any member to join as well. At that time the following participants volunteered to support ETC in the follow up during the coming year: Mr. Khaled Saoud; Ms. Najiba El Idrissi El Amrani; Mr. Awni Al-Otoom; Mr. Ahmed Al Busaidi; Mr. Emad Kashgari; Ms. Hanadi Awadalla

45. Mr. Fouad Mrad mentioned that ETC will follow up with the representatives of this committee to establish an actionable work program to suggest to the BOG for approval and financing. In this regard, Ms. Majdalani mentioned that there might be another meeting for representatives of this committee to establish such program before conducting the BOG meeting by the end of this year.

46. At the end of this session, Mr. Mrad thanked all participants for their contributions and staff for the efforts in the organization of this successful meeting.

III. ORGANIZATION

A. DATE AND VENUE

47. The meeting was held at ESCWA premises in Beirut from 23 – 24 May 2017.

B. AGENDA

48. The meeting was organized in 5 main sessions in addition to the opening session. The detailed agenda is included in Annex I.

C. PARTICIPANTS

49. The meeting was attended by thirty-one participants from fourteen countries in the Arab region, including experts from governments, non-government and private organizations with experience in the areas of scientific research, technology development, business enterprise, education systems and policy making. The full list of participants is provided in Annex II.

D. EVALUATION OF THE MEETING

50. An evaluation questionnaire was distributed to assess the substantive and logistical aspects of the meeting. Twenty-two participants responded to the questionnaire. 100% of respondents said the overall quality of the meeting was good to excellent, 85% said it had clear objectives, while 15% said that the latter were fair. 85% said it was successful in reaching its intended objectives, 75% said the quality of presentations was good and 25% said it was excellent. In addition, 95% of the participants expressed the need for follow up actions. Many submitted comments expressing satisfaction with the clarity of information and openness in managing the meeting. In addition, it was mentioned that more time is desired for the presentations, and also for the discussions to focus on the sessions thematic topics.

E. DOCUMENTS

51. Presentations delivered during the meeting may be accessed through the following meeting webpage: <https://www.unescwa.org/events/5th-ETC-technical-committee-meeting>

Annex I. Agenda

AGENDA

Day 1: 23 May 2017

- 09:00 – 09:30 **Welcome and opening statement**
Roula Majdalni, Director, Sustainable Development Policies Division
Mohamed Ali Alhakim, Executive Secretary of ESCWA
Tour de table
- 09:30 – 10:00 **Mandate of the Technical Committee (TC) and TC Chairperson Election**
Nael Al Mulki, National Officer, ESCWA Technology Centre
- 10:00 – 10:45 **Overview of ETC Activities from 2011 through 2017**, Fouad Mrad, Executive Director
ESCWA Technology Centre
- 10:45 – 11:15 **Coffee Break**
- 11:15 – 13:00 **Session 1: What are the priorities for National Technology Transfer Systems?**
Moderator: Mohamad Saidam, Royal Scientific Society, Jordan
Main Speaker: Fouad Mrad , Executive Director, ETC
Panel:
- Alaa-Eldin Adris – American University of Cairo, Egypt
 - Mondher Khanfir – Columbus Consulting, Tunis
 - Hassan Charif – National Council for Scientific Research, Lebanon
 - Ghaith Fariz – UNESCO, Egypt
- In most Arab countries major efforts have been implemented towards harnessing science and technology for local sustainable development. However, the return has been below expectations, and missing links are blocking the productive system at national levels. The situation is different from one country to another even though we find similarities among clusters of countries. The aim of the session is to identify major gaps and discuss opportunities for bridging these gaps for scaling up the role of STI in facilitating sustainable development.
- This session will address the following questions:
- ✓ What are the major hurdles blocking commercialization of research outcomes in Arab countries? (policies, funding, human resources, infrastructure, ...)
 - ✓ Where are the relevant legislative gaps and which corrective measures can bring more coherence to the legislative system?
 - ✓ How can the private sector be more effectively engaged in local R&D? (university-industry relations, tech transfer offices, incentives, ...)
- 13:00 – 14:00 **Coffee Break**
- 14:00 – 15:00 **Session 2: Which Emerging Technologies are Adequate for Sustainable Development in the Arab Countries?**
Facilitator: Carol Cherfane, Chief Water Section SDPD, ESCWA
Main Speaker: Khaled Saoud – Virginia Commonwealth University, Qatar

Panel:

- Awni Otoom - Jordan University for Science and Technology, Jordan
- Latifa A. Alhajji – Kuwait Institute for Scientific Research, Kuwait
- Ahmad Al-Busaidi – The Research Council, Oman
- Hanan Malkawi – Royal Scientific Society, Jordan

The emerging technologies have become multidisciplinary by nature addressing effectively challenges in all areas globally. The priorities of sustainable development challenges in the Arab countries offer unique opportunities to leapfrog into applying emerging technologies in the era of open science, education, research and tools. Despite abundance of proven local capacity and open access to knowledge, the challenge remains how to determine the most adequate emerging technologies that can contribute to social wellbeing, economic growth and job creation, while safeguarding the sustainable management of natural resources.

Specifically, this session will address the following questions::

- How can we accelerate the transformation of experimental research from local labs to local society and economy? (MNC, partnerships, ...)
- Which ET has been successfully rooted in Arab countries? (Nanotech, biotech, ICT, artificial intelligence, robotics, ...)
- How can we build critical mass from existing islands of excellence? (knowledge platform, open innovation, co-funding mechanisms,..)

15:00 – 16:00

Session 3: What is ETC Potential Role in Promoting Green Technologies?

Facilitator: Roula Majdalani, Director SDPD, ESCWA

Main Speaker: Nizar Halasah, ESCWA Technology Centre

Panel:

- Hosni Ghedira – Masdar Institute, UAE
- Hanadi Awadallah – Ministry of Agriculture and Forestry, Sudan
- Hakam El Alami – Royal Scientific Society, Jordan
- Fareed Bushehri, UNEP, Bahrain

The concept of green technologies has been widely accepted and promoted globally. However, there is no consensus on the criteria of qualifying technologies as green uniformly. Therefore, in Arab countries there is a need to localize the characteristics of green technologies especially in the region known for water stress, food insecurity, unequal distribution of energy resources, and climate fragility. This session aims to answer the following questions:

- ✓ What are the criteria of green technology in local context? (emissions, efficiency, recycling, consumption patterns, ...)
- ✓ How can green technologies enable the nexus approach towards achieving water, energy, and food security? (tradeoffs vs integrated)
- ✓ How can climate resilient technologies improve the capacity of Arab countries to deliver on their commitments in Paris agreement?

09:00 – 10:30

Session 4: Where are the Business Opportunities in Solving the Sustainable Development Challenges?

Facilitator: Haidar Fraihat, Director, TDD, ESCWA

Main Speaker: George Nasr, ESCWA Consultant

Panel:

- Najiba El idrissi – Sidi Mohamed University, Morocco
- Emad Kashgari – Badir Incubator Network, KACST, Saudi Arabia
- Omar Hamarneh – iPark, Jordan
- Mr. Ali Alhesabi- Foulath Holding Company, Bahrain

Local sustainable development needs may offer lucrative business opportunities with wide markets through applying scientific discoveries and innovative technologies. The Addis Ababa Action Agenda (AAAA) highlighted a clear path for deploying science, technology and innovation towards achieving the SDGs. A major track called for promoting entrepreneurship, partnerships with MNC, innovation funds, and business incubators. These elements constitute the core pillars that can scale up innovative ideas and demonstrative research towards Private Purposeful Enterprises. This session will address the following questions:

- ✓ What are the local obstacles in attracting investments for innovation? (regulations, security and stability, culture and confidence, markets, ...)
- ✓ How can regional integration and complementarity support growth in technology startups?
- ✓ What are the lucrative opportunities in meeting sustainable development challenges in Arab countries? (water tech, renewable energy, waste recycling, food, ...)

10:30 – 11:00

Coffee Break

11:00 – 12:30

Session 5: General Discussions

Chairperson of Technical Committee,

Co Chair: Ms. Roula Majdalni, Director SDPD, ESCWA

Facilitator: Fouad Mrad, Executive Director ETC

This session will distill outcomes from the previous sessions' discussions and offer an open platform for developing proposed forward path for ETC. This concluding session should deliver priority themes for collaborative work among ETC stakeholders in the Arab countries, as well as opportunities for partnerships and resource mobilization.

- **Conclusion and Way forward**

Annex II. List of participants

LIST OF PARTICIPANTS

A. Experts

Bahrain

Mr. Ali Alhesabi

Manager, Environment and Safety Department
Foulath Holding Company
Manama, Bahrain
Mobile: (+973) 38380903 – 39401023
Fax: (+973) 17464133
Email: hesabi@foulath.com.bh

Mr. Mohamed-Dahmani Fathallah

Professor of Biotechnology
Dean, College of Graduate Studies
Life Sciences Department
Arabian Gulf University (AGU)
Manama, Bahrain
Tel.: (+973) 1723 9601
Mobile: (+973) 6633 5457
Fax: (+973) 1723 9664
Email: d.fathallah@agu.edu.bh

Egypt

Mr. Alaa-Eldin Adris

Professor of Energy Engineering at the American
University of Cairo (AUC) &
Chairman of Board of Trustees at the Egyptian
Center for the Advancement of Science, Technology
& Innovation (ECASTI)
Cairo, Egypt
Mobile: (+20100) 1077012
Email: alaa.adris@ecasti.org

Iraq

Mr. Ahmed Al-Dulaimi

Senior Engineer
Sector's Planning/Industrial Planning
Ministry of Planning
Baghdad, Iraq
Mobile: (+964-77) 09835858
Email: ahmed_planning86@yahoo.com

Jordan

Mr. Muhammad Saidam

Chief Scientist
Presidency
Royal Scientific Society (RSS)
Amman, Jordan
Tel.: (+962-6) 534 4701 (Ext. 2840) &
(Ext: 2817)
Mobile: (+962-79) 515 72 67
Fax: (+962-6) 534 8406
E-mail: muhammad.saidam@rss.jo

Ms. Hanan Issa Mohammad Malkawi

Vice President for Science Engagement
Science Engagement Division
Royal Scientific Society (RSS)
Amman, Jordan
Tel.: (+962-6) 5344701
Mobile: (+962-79) 7476644
Fax: (+962-6) 5344806
E-mail: hanan.malkawi@rss.jo

Mr. Hakam Al Alami

Advisor to
HRH Prince El Hassan bin Talal
Majlis El Hassan
Royal Court
Amman, Jordan
Tel.: (+962-6) 464 9185
Mobile: (+962-77) 599 4444
Fax: (+962-6) 463 4755
E-mail: halami@majliselhassan.org

Mr. Omar Hamarneh

Director/iPARK and Advisor for Technology
Development
President Office
Royal Scientific Society (RSS)
Amman, Jordan
Tel.: (+962-6) 5341381
Mobile: (+962-79) 5700400
Fax: (+962-6) 5343761
Email: omar@ehsc.jo

Mr. Awni Al-Otoom

Vice Dean of Graduate Studies and Professor of
Chemical Engineering
Chemical Engineering Department
Jordan University of Science and Technology
Irbid, Jordan

Tel.: (+962-2) -7201000 (Ext: 26697)
Mobile: (+962-79) 0174469
Fax: (+962-2) 7201063
E-mail: awni_otoom@just.edu.jo

Kuwait**Ms. Latifa Alhajji**

Associate Research Scientist
Energy and Building Research Center
Kuwait Institute for Scientific Research (KISR)
Kuwait, State of Kuwait

Tel.: (+965) 24989087
Mobile: (+965) 60037300
Fax: (+965) 24989339
Email: lhajji@kISR.edu.kw

Lebanon**Mr. Hassan Charif****UN-ESCWA Retiree**

Consultant
Sustainable Development Issues
National Council for Scientific Research (CNRS)
Beirut, Lebanon

Mobile: (+961-3) 281601
E-mail: hssn.charif@gmail.com

Mr. George Nasr

Associate Professor
Lebanese University
Beirut, Lebanon

Mobile: (+961-3) 320331
E-mail: george.j.nasr@gmail.com

Ms. Rana Tabcharani

Head of Department & Project Manager
Environment & Energy Department
Association of Lebanese Industrialists (ALI)
Beirut, Lebanon

Tel.: (+961-1) 350280/1/2
Mobile: (+961-3) 940383
Fax: (+961-1) 351167
E-mail: rana_tabcharani@hotmail.com

Morocco**Ms. Najiba El Idrissi El Amrani**

Higher Education Reform Expert
Head of Electrical Engineering Department
Faculty of Science and Technology
Sidi Mohamed Ben Abdellah University
Ministry of National Education, Vocational
Training, Higher Education & Scientific Research
Fes, Morocco

Tel.: (+212) 5356 54017
Mobile: (+212) 6677 00851
Fax: (+212) 5356 08214
E-mail : elamrani.naj@gmail.com

Oman**Mr. Ahmed Al Busaidi**

Manager - Renewable Energy Research Program
The Research Council
Muscat, Oman

Mobile: (+968) 92828303
Fax: (+968) 24509820
Email: ahmed.albusaidi@trc.gov.om

Qatar**Mr. Khaled Saoud**

Associate Professor of Physics
Liberal Arts and Sciences
Virginia Commonwealth University (Qatar
Campus)

Doha, Qatar
Tel.: (+974) 44020617
Mobile: (+974) 66037810
E-mail: s2kmsaou@vcu.edu

Saudi Arabia**Mr. Emad Kashgari**

Western Region Manager
Badir Program for Incubators & Accelerators
King Abdulaziz City for Science & Technology
(KACST)

Jeddah, Saudi Arabia
Mobile: (+966-54) 508 6501
Email: emad.kashgari@badir.com.sa

Sudan

Ms. Hanadi Awadalla

Afforestation and Reforestation Manager
Forests National Corporation (FNC)
Ministry of Agriculture and Forests
Khartoum, Sudan

Tel.: (+249) 183471575
Mobile: (+249) 912385866
Fax: (+249) 91834722659
E-mail: hanadi_awadalla@yahoo.com

Tunis

Mr. Mondher Khanfir

Expert
Policy Advisor & Strategist
Tunis, Tunisia

Tel.: (+216) 71964412
Mobile: (+216) 98350202
E-mail: mondher.khanfir@gmail.com

UAE

Mr. Mohammed Hosni Ghedira

Director
Research Center for Renewable Energy Mapping
and Assessment
Masdar Institute, Abu Dhabi Government
Dubai, UAE

Tel.: (+971-2) 810 9124
Mobile: (+971-55) 600 7657
Fax: (+971-2) 810 9901
E-mail : hghedira@masdar.ac.ae

Yemen

Mr. Ameen Mohamed Qaid Al-Hammadi

General Manager of Monitoring and Evaluation
Development Planning Program
Ministry of Water and Environment
Sana'a, Yemen

Tel.: (+967) 207 817
Mobile: (+967-77) 3747026
Fax: (+967) 207327
Email: alhmadi_albory@yahoo.com

B. United Nations Organizations

United Nations Educational, Scientific and Cultural Organization (UNESCO) – Cairo Office

Mr. Ghaith Fariz

Director
UNESCO, Cairo Office
Cairo, Egypt

Fax: (+202) 38268919
Email: g.fariz@unesco.com

Ms. Elsa Sattout

Programme Specialist
Environment Section
UNESCO Cairo Office
Cairo, Egypt

Tel.: (+202) 38268912-8
Fax: (+202) 38268919
Email: e.sattout@unesco.org

UN Environment

Mr. Fareed Bushehri

Regional Resource Efficiency Officer
UNEP

Regional Office for West Asia
Manama, Bahrain

Tel.: (+973) 3966 1161
Mobile: (+973) 3604 4855
Fax: (+973) 17825110/1
Email: fareed.bushehri@unep.org

United Nations Economic and Social Commission for Western Asia (UN-ESCWA)

Ms. Roula Majdalani

Director
Sustainable Development Policies Division
(SDPD)

Tel.: (+ 961-1) 978502
Email: majdalani@un.org

Mr. Haidar Fraihat

Director, Technology Development Division
(TDD)

Tel.: (+961-1) 978 549

Email: fraihat@un.org

Mr. Fouad Mrad

Executive Director
ESCWA Technology Centre (ETC)
SDPD

Tel.: (+961-1) 978541/+962-6-5343346

E-mail: mrad@un.org

Ms. Carol Chouchani Cherfane

Chief, Water Resources Section (WRS)
SDPD

Tel.: (+961-1) 978518

Email: chouchanicherfane@un.org

Ms. Reem Nejdawi

Chief, Food and Environment Policies Section
(FEPS)/SDPD

Tel.: (+961-1) 978578

Email: nejdawi@un.org

Mr. Mohammad Al-Hamdi

First Economic Affairs Officer (FEAO)
FEPS/SDPD

Tel.: (+961-1) 978524

Email: al-hamdi@un.org

Mr. Nael El Mulki

National Officer
ETC/SDPD

Tel.: (+962-6) 534 3346

Mobile: (+962-79) 5581 123

E-mail: almulki@un.org

Mr. Nizar Al-Halasa

Advisor of Innovation Affairs
ESCWA Technology Centre
Amman, Jordan

Tel.: (+962-6) 5443346

Mobile: (+962-79) 6926800

E-mail: nizar.halasa@rss.jo

Ms. Johanna von Toggenburg

Associate Expert
FEPS/SDPD

Tel.: (+961-1) 978589

Email: vontoggenburg@un.org

Mr. Musa McKee

ESCWA Consultant
FEPS/SDPD

Tel.: (+961-1) 978597

Email: musa.mckee@un.org

musa.mckee@gmail.com

Ms. Julie Abouarab

Programme Assistant
SDPD

Tel.: (+961-1) 978561

Email: abouarab@un.org

Mr. Abdul Halim Maarouf

Administrative Assistant
ESCWA Technology Centre
SDPD

Tel.: (+961-1) 978591

Email: maaroufa@un.org

Mr. Moneem Murrah

Administrative Assistant
Food and Environment Policies Section (FEPS)
SDPD

Tel.: (+961-1) 978525

Email: murrahm@un.org

Mr. Malek Haffar

Internship
SDPD

Tel.: (+961-1) 978577

Email: malek.haffar@un.org