SCP National Action Plan – ANNEX

NATIONAL ACTION PLAN FOR SUSTAINABLE CONSUMPTION AND PRODUCTION (SCP) IN EGYPT | 2015

ANNEX

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SwitchMed Programme is implemented by the United Nations Industrial Development Organisation (UNIDO) and the United Nations Environment Programme (UNEP), through the Mediterranean Action Plan (MAP) and its Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC) and the Division of Technology, Industry and Economics (DTIE).
For details on the SwitchMed Programme please contact **btuncer@scprac.org**

FOREWORD

Envisioning a more sustainable Egypt is no longer a dream nor an unrealistic endeavor. This realization in itself is a great achievement to behold, given that state officials at all levels spearheaded by the president, have made it very clear that sustainable development is a key objective for Egypt. It is now perceived as a strategic instrumental policy framework for a more prosperous future Egypt.

The panacea of all public and official lobbying efforts for adopting a national agenda for sustainable development, have resulted in a widely declared endorsement during the proceedings of the 'Egypt the Future' the Egypt Economic Development Conference (EEDC). The conference convened in Sharm El-Sheikh on the 13-15th March 2015, is a key milestone of the government's medium-term economic development plan. Thus reflecting a national consensus designed to overcome current economic challenges and bring prosperity and improved social services to the people of Egypt.

At this international gathering attended by several global leaders and the Chief Executive Officers of major international companies, Egypt announced its launching of its Sustainable Development strategy for 2030. The new vision aims to strategically position Egypt among the world's emerging economies. The main objective of the strategy is to integrate sustainable development principles across sectors.

The process of development of the strategy involved the participation of different ministries and stakeholders. The Ministry of Environment played a leading role in collaboration with the Ministry of Planning in this context of a strong partnership with the Ministry of Planning.

Against this backdrop, it is clear that the national policy development process has been set forth to endorse more actionable activities to both expedite a transition towards green economy, and achieve sustainable development. This is particularly important since the global development community is dynamically discussing 'Post 2015 Development Agenda' and the sustainable development goals (SDGs) to replace last decade's millennium development goals (MDGs); yet another important consideration underlying Egypt's new sustainability outlook.

In this respect, Egypt's Ministry of Environment has been working in recent years with the support of international partners, especially the United Nations Environment Programme (UNEP) to pave the way for mainstreaming green economy and sustainable consumption and production related policies as tools to achieve sustainable development. Towards this end a 'Green Economy Scoping Study' for Egypt was developed and later launched in collaboration with the Center for Environment and Development for the Arab Region and Europe (CEDARE) and UNEP.

This publication at hand addressing 'Sustainable Consumption and Production National Action Plan for Egypt' is considered another significant stepping stone contributing to a continuum of knowledge accumulation for nationally integrating sustainability in Egypt's key economic sectors. The national action plan addresses four priority sectors including: Energy, Agriculture, Municipal Solid Waste and Water.

More importantly this publication is a blueprint for actionable activities that could be translated into operational projects accompanied with policy interventions required for the actual implementation of Egypt's sustainable development goals and economic priorities. This national action plan when implemented, will mainstream the newly introduced concepts and tools of sustainable consumption and production into Egypt's overall sustainable development policy framework and gradually alter unsustainable consumption and production patterns by introducing policies and projects that could provide better informed decision making processes and success stories that can be replicated and up-scaled on the national level in different geographic regions.

It is therefore my pleasure to thank on behalf of the Ministry of Environment our partners at the European Commission for funding the project and our partners at UNEP and CEDARE for leading and facilitating the development process of the action plan with the support of the ministry's team and focal points. I would like to underscore the importance of the consultation process and the participatory approach that has been endorsed to develop the national action plan and to ensure its realistic reflection of Egypt's actual socio-economic and environmental needs and aspirations

This national action plan is the beginning of a long journey ahead, towards having future generations of Egyptians living in sustainable communities and cities.

Dr. Khaled Fahmy

Minister of Environment

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In partnership with The Egyptian Environmental Affairs Agency (EEAA) and Ministry of Environment (MoE).

Authored by Centre for Environment and Development for the Arab Region and Europe (CEDARE).

The National Sustainable Consumption and Production Action Plan for Egypt was commissioned by the United Nations Environment Programme (UNEP). It was prepared and coordinated by the Centre for Environment and Development for the Arab Region and Europe (CEDARE) on behalf of the Egyptian Environmental Affairs Agency (EEAA), and Ministry of Environment (MoE).

The development process leading to the drafting of the action plan and including the facilitation of the stakeholder consultation has been led by the Sustainable Growth Programme (SGP), CEDARE.

Special thanks are due to **Dr. Hussein M. Abaza**, lead author, **Ms. Sina Hbous**, principal investigator and Economist and **Mr. Ramy Lotfy Hanna**, sustainability consultant and senior research specialist for their substantive contribution and valuable input in addition to the guidance they have provided during the course of preparing the action plan.
The overall development process for the action plan has been coordinated by **Dr. Hossam Allam**, Regional Programme Manager of SGP.

However, successfully completing the process of developing an action plan would have never been possible without the effort of a well harmonized consorted team that comprises members from different ministries and representatives of different institutions including the Egyptian Ministry of Environment and UNEP.

We are deeply indebted to Mrs. Yasmine Fouad, first assistant to the Minister of Environment, Dr. Mohamed Abdel Monem, advisor to the Minister of Environment and his team members, Mrs. Fatma EL Zaharaa. We would also like to thank Mr. Luc Reuter, the action plan's focal point on behalf of UNEP.

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With deep gratitude, we wish to thank the four-sector experts that have successfully facilitated their respective working groups and that have enriched the final action plan through their technical expertise. These include:

Agriculture: H.E. Dr. Ayman Abou Hadid, Former Minister of Agriculture.

Water: Dr. Khaled Abuzeid, Regional Director of Water Management Department, CEDARE.

Energy: Dr. Anhar Hegazi, Senior Expert

Waste Management: Mr. Tawfik Elkheshen, Economic and Financial Advisor, National Solid Waste Management Programme, Ministry of Environment

We gratefully acknowledge the feedback and proposed projects by the esteemed members of the action plan steering committee and the four technical groups towards the finalization of the action plan.

Supervision and coordination

Luc Reuter, SwitchMed Coordinator, UNEP-DTIE

Support

UNEP would further like to thank:

Arab Hoballah	Chief Sustainable Lifestyles Cities and Industry Branch, UNEP-DTIE,
Elisa Tonda	Head Responsible Industry and Value Chain Unit, UNEP-DTIE
Charles Arden-Clarke	Head 10YFP Secretariat
Fareed Bushehri	UNEP-Regional Office for West Asia
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About SwitchMed

The EU funded SwitchMed project is implemented jointly by the project countries (Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine and Tunisia) and the institutional partners UNEP, UNIDO and SCP-RAC. SwitchMed is divided into 3 components addressing different parts of the transition process to Sustainable Consumption and Production (SCP) - SDG12:

(i) A policy component, built around the Barcelona convention (for the Protection of the Mediterranean Sea and Coastal Regions) and SCP national action plans;

(ii) Demonstration activities linked both to the policy component and the private sector;

(iii) Networking function to allow for exchange, joint learning and further scaling up;

UNEP-DTIE is coordinating the national policy component – Reinforcing circular economy in the Mediterranean governance framework and mainstreaming SCP in national policies. Under the national policy component the project countries will develop Sustainable Consumption and Production National Action Plans (SCP-NAP).

The implementation methodology used under the SwitchMed national policy component has been adapted to each countries' specific needs and requests. To assure coherence between ongoing and previous national work, the activities at country level build on already existing work and projects (Green Economy, SCP assessments, sustainable development assessment and strategies, SCP projects, etc). In this process UNEP works with national consultants in the project countries to allow a transfer of knowledge and reinforcement of national capacity. The SCP-NAP methodology assures that a large and diverse group of national stakeholders are involved in the national process (government, civil society, private sector, media, academia, bi- and multilateral partners, UNCTs, etc). Furthermore collaborations with UN institutions and other bi-lateral partners have been established at country level.

Main objectives:

- Leapfrogging to socially inclusive Sustainable Consumption and Production practices preserving the environment;
- Integrating the natural capital and the environment in the core business of Mediterranean companies
- Creating a critical mass of citizens for SCP;

The successful development of eight SCP-NAPs demonstrates that:

(i) in-country activities have to be nationally owned and nationally driven to be successful;

(ii) the involvement of a large and diverse group of national stakeholders from the beginning of the planning process is crucial;

(iii) linkages and synergies have to be established with already existing projects and initiatives and collaboration with other partners should be encouraged and fostered.

Each country has chosen to follow its own path to develop an SCP-NAP and this series of publications clearly shows the diversity of processes as well as outputs. In some countries the SCP-NAPs are based on SCP national assessments, while in other national partners decided to build upon already existing national SCP information and knowledge.

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LIST OF PROJECTS – SCP National Action Plan for Egypt

The list of Projects presented in this document is a key milestone in the process of developing a National Sustainable Consumption and Production (SCP) Action Plan for Egypt. Within the larger framework of achieving "Sustainable Integrated Communities" the presented projects constitute a main element of the SCP Action Plan guided by Egypt's Green Economy Strategy and 2030 Sustainable Development Framework. The presented projects are guided by the SCP Action Plan, which diagnoses policies, and practices causing unsustainable consumption and production patterns, and proposes measures to SWITCH to SCP. These strategic directions and proposed activities covering the 4 different sectors are translated into 28 projects presented by 13 different entities. The following list of projects have been identified through an open and transparent process, including specialized experts, government representatives and a wide range of stakeholders who actively participated different in working groups meetings addressing the 4 priority sectors: Water, Agriculture, Energy, and Municipal Solid Waste. The proposed projects by different institutions and ministries were subject to evaluation and a filtering process to ensure their relevance to the overall theme of the action plan and the sectors. These 28 projects are grouped under 6 SCP components whereby programs 1 and 2 are "cross-cutting thematic programs" addressing SCP Policy Tools and Sustainable Integrated Community Development, while programs 3 to 6 address SCP through sector specific interventions for each of the 4 targeted sectors as follows;

1. Policy Instruments for SCP
2. Integrated Community Development
3. Sustainable Agriculture
4. Sustainable Water Management
5. Sustainable and Renewable Energy Applications
6. Integrated Solid Waste Management

	Project title	Relevant Sectors/ Resources Nexus	Explaining its contribution towards Integrated Sustainable Communities through SCP policies	Primary Program Focus
1: Policy Instruments Component for Sustainable Consumption and Production (SCP) This component presents a crosscutting package of policy instruments perceived as essential for integrating SCP on a national level. The component brings together various initiatives and projects presented by working group members and public institutions to catalyze action and highlight possible synergies during the implementation phase. The presented projects present some policy instruments identified during the consultation process, however, the government may endorse other possible policies to further integrate SCP in different priority sectors				
1	Facilitating Access to Finance for Green Growth & SCP practices	Agriculture, Trade, Industry, Water & Energy	The Green Growth project supports the creation of sustainable communities and cities by improving access to finance for priority investments in infrastructure and new clean technologies. The project aims to support the private sector through the provision of financial packages that promote different SCP industrial applications to be implemented in support of creating green industry applications including waste to energy, waste management, water savings, and energy savings.	Enabling Policies & access to finance
2	Policy Tools towards Transition to Green Economy: National Green Economy Reviews (NGER) in Egypt	Agriculture, Trade, Industry, Water & Energy	The project primarily targets the need for policy tools to measure progress towards a green economy and towards the creation of sustainable communities by exploring cross-sector linkages. This project aims to build on several national studies to assess Egypt's potential for a green economy transformation with detailed and focused sector specific interventions. A form of reality check to continuously monitor progress to reach this goal in light of Egypt's Sustainable Development Strategy taking into consideration international experience in different sectors.	Cross-Sectoral Enabling Policies

3	Mainstreaming Green & Sustainable Public Procurement in Egypt	Agriculture, Trade, Industry, Water & Energy	This project aims to introduce policy instruments that could influence regulating and creating demand for green products and clean technologies in public and government institutions. The project supports the gradual adoption of sustainable public procurement practices including tendering procedures and the required law amendments. A form of encouraging sustainable consumption and production on a national level through push strategies, sustainable public procurement is a significant catalyst that could accelerate the formation and the continuation of integrated sustainable communities.	Enabling Policies
4	Setting-Up a Renewable Energy & Energy Efficiency Fund	Industry& Energy	The project's objective is to set up a Fund with the objective of reducing Egypt's energy deficit through the promotion of Renewable Energy applications in local manufacturing. The project proposed by Ministry of Industry builds on the successful model of the Egyptian Pollution Abatement Project - Second Phase (EPAP II), implemented by the Egyptian Environmental Affairs Agency and the Ministry of State for Environment with the support of the World Bank. Not only will the fund expedite the integration of SCP policies, but it will also support an accelerated transformation of industry to clean production methods and procedures, a much-needed determinant of sustainable communities and cities.	Sustainable Energy Applications for Industries
5	Land Allocation for Renewable Energy Projects: Strategic Environmental and Social Assessments	Renewable Energy & Environment	This project aims to undertake Strategic Environmental Assessment (SEA) as an essential policy requirement for appropriate decision making to evaluate the potential environmental and social (E&S) impacts of wind and solar energy developments on the natural, environmental resources, resident people, their lives and their well-being.	Renewable Energy
6	Eco-innovation in Small and Medium-sized Enterprises in Egypt	Agriculture, Industry, & Energy	Eco-innovation is the development and application of a new significantly improved product (good/service) or process, a new organizational development method or a new business practice that can lead to improved economic and environmental performance. Introducing Eco-innovation to the Egyptian industrial sector translates to the creation of green industries a component of sustainable communities.	Eco-Innovation for sustainable industries

2: SCP Component for Integrated Community Development

With the overarching national strategy and objectives of gradually creating sustainable integrated communities through SCP policies and applications, one project is presented under this component to demonstrate a form of prototype on how integrated communities could be developed and how they can be sustainably operational on the ground interacting with the water, energy, waste, and agriculture sectors

7	Productive Low cost Environmentally Friendly Village (PLEV)	Water, Waste, Energy, Construction, Transportation, Agriculture, & Industry	The purpose of this project is to establish a pilot model of a sustainable community based on existing site-specific locations in Fayoum and Minya. The pilot will be implemented in 2000 feddan as an experimental & research hub to spread out the know-how in cultivation, water management, recycling & renewable energy technology including five main zones; Green Techno-Centre Hub (including Renewable Energy Techno-Centre, Agro Techno Centre (Agriculture), Aqua Techno Centre (Water)), Productive Park (including Organic Farms, Green Industry, Green Business, Recycling units), Knowledge Park (R&D including an Eco-Learning Training Centre), Sustainable Residential Neighborhoods (20 Neighborhood), Green Services zone. This pilot model can be replicated to sites for 400 new communities in desert remote villages as well as the communities to be established around the 1.5 million feddan National Project.	Pilot for a sustainable community

3: SCP Component for Sustainable Agriculture

This third component is especially important as it tackles both of Egypt's food and water security challenges and it also represent the life-line of agriculture, which could be the building block for many new sustainable agrarian and rural communities. This is particularly relevant in light of on-going national planning for mega agricultural projects.

8	Renewable Energy Applications for Improving on-farm Irrigation systems	Agriculture, Water & Energy	Typical irrigation systems consume a great amount of conventional energy through the use of electric motors. Sustainable energy can find many applications in agriculture to empower rural sustainable communities directly engaged in agricultural activities. One application of clean energy is in water pumping for agricultural irrigation purposes. The combination of PVWP technology with water saving irrigation techniques and sustainable management of groundwater resources can lead to several benefits. This includes the enhancing land productivity, halting erosion, providing higher incomes and better living conditions for farmers, thus promoting sustainable communities.	Sustainable Agriculture & Clean Energy Applications

9	Promoting Sustainable Agricultural Production by Optimizing Water and Fertilizers use in Desert Lands	Water & Agriculture	This project aims to introduce sustainable agriculture practices in newly reclaimed lands. As envisioned by the government around this newly reclaimed land rural sustainable communities will gradually form.	Integrated water Management and sustainable agriculture
10	Utilizing Solar Energy for Drying Agriculture Products in Egyptian Rural Areas	Energy & Agriculture	The project aims to use clean technology applications to support sustainable agricultural production techniques. Alternative drying techniques replacing fossil fuel energy using solar or biomass energy have proven successful and can be therefore developed in order to reduce energy use and its associated cost, while improving product quality.	Sustainable Agriculture & Clean Energy Applications
11	Promoting Agricultural Waste Recycling in Egypt's Governorates	Waste, Energy & Agriculture	The project aims to address the negative environmental aspects of agricultural waste by using them as input for bio-energy production. This approach represents another source of clean energy generation by using agricultural waste for biogas production as well as production of agriculture compost, fertilizers and animal fodder.	Agricultural Waste / Recycling

4: SCP Component for Sustainable Water Management

This component demonstrates the importance and necessity of adopting integrated water resources management and directly linking such approach to SCP applications and policies. The component presents wastewater reuse as an important application that could provide a solution to the limitations of Egypt's conventional water supply. The component also presents different projects to promote the need of water efficiency strategies, which goes hand in hand with the use of non-conventional water resources.

12	A Modified Wastewater Reuse Code	Water	The project supports the modification wastewater reuse code as an essential element in sustainable water resources production. Wastewater reuse schemes including codes are essential to achieve economic, environmental and health-related benefits. Wastewater reuse codes are also essential policy tools to promote, sustain and enforce wastewater treatment and its re-use applications especially in agriculture.	Integrated water Management and sustainable agriculture

13	Integrated Waste Water Reuse Pilot Project	Water & Agriculture	The project aims at promoting sustainable agriculture production using the potential secondary treated wastewater to reclaim land for cultivation, while using non-conventional generation methods for water supply needed for irrigation purposes.	Integrated water Management / Sustainable Agriculture
14	Sustainable Water Production and Consumption Model for Sustainable Communities	Water, Industry, & Agriculture, Energy	The project is intended as an optimal model for the allocation and use of conventional and non-conventional water resources in a sustainable desert community. It could be used as a guiding project to be up scaled and endorsed by relevant public and private institutions for Agricultural, Industrial, and Urban Development in the Western Desert.	Integrated Water Management for Sustainable communities
15	Siwa Sustainable Consumption and Production Water Strategy	Water	Area specific SCP water strategies are byproducts of well-organized public planning and institutional governance, a needed planning tool to manage sustainable communities.	Integrated water Management
16	Development of Water Strategy to Raise Water Use Efficiency in Fayoum Governorate	Agriculture & Water	The proposed project aims to develop a water strategy for Fayoum governorate that shall work on raising the water use efficiency in the governorate taking into account the local conditions, and using participatory approach. The approach and the methodology used can be applied and replicated in other areas in the country and in the Arab region, making use of lessons learned and experience gained.	Integrated water Management and water efficiency
17	Improving Water Quality in Lake Manzala Engineered Wetland (LMEW)	Water & Agriculture	The proposed project to treat drainage water applying low-cost techniques in constructed wetlands to be carried out in Lake Manzala Engineered Wetland (LMEW) located in the Eastern Delta. The objectives of the project are: to demonstrate the effectiveness of wetland technology in wastewater treatment; to present alternative uses of treated water (irrigated agric. & fish farming), to conserve Manzala Lake environment, and to investigate the impact of water treatment on the community of farmers and fishermen in the project area.	Sustainable Agriculture, Water Saving & Food Security

18	Supporting Best Practices in Decision support system is for Sustainable Water Resources Planning Strategies	Water Resources & Climate Change	This projects aims at supporting the Ministry of Water Resources and Irrigation to develop its research capacity to identify and adopt informed decision making for sustainable water resources management. The project comes in line with Egypt's National Water Resources Strategy with a specific focus on Framework 2: Protection of Agricultural Land, and Framework 4: Providing an appropriate environment for implementation of the NWRP.	Water Resources

5: SCP Component for Sustainable and Renewable Energy Applications

What is being proposed now is a strategic action component to develop Egypt's sustainable and renewable energy applications for the use of different economic sectors, particularly for industrial application or reducing the need for fuels to power generation needed for production. One key element of this component will be the willingness to adopt technologies and develop local innovations. Another element will be the development by the Government of appropriate policies and frameworks that would encourage and guide the private sector to adopt these applications in different economic sectors.

19	Biogas Digesters to generate energy to commercial establishments	Waste & Energy	Part and parcel of a sustainable community is to adopt waste to energy applications. Once generated and stored, biogas is primarily used for cooking and heating at the home scale, but it also has many other important applications both domestically and industrially. It is used as fuel to power electric generators and could be used to fuel transportation as well. Using organic, agricultural waste the production of gas results from a natural anaerobic decomposition of organic material. Hence it promotes an efficient zero waste strategy.	Integrated waste management, Zero Waste Policy, Sustainable Energy application
20	Biogas Production from Sewage Sludge	Water, Waste, & Energy	Promotes the safe treatment and disposal of municipal sewage water which could be consistent with the rapid growth of sustainable communities. However, facilities for municipal sludge are needed. Biogas production through sewage sludge reduces the associated health problems and optimization of sewage sludge treatment. It is another process linked to zero waste policy and the production of clean energy.	Integrated water& waste management, t Zero Waste Policy, Sustainable Energy application
21	Utilizing Solar Energy for Heating purposes in Egyptian hotels & hospitals sectors	Energy, Health, Tourism	The use of clean energy in the tourism and health sectors would lead to significant energy saving and if successful would represent a successful model that could be replicated in other similar sectors such as schools.	Energy Efficiency

22	Utilizing Solar Energy Cooking & Heating in Egypt's Rural Areas	Energy	Promoting sustainable lifestyle, clean energy and consumption behavioral change, especially in rural areas, where poverty incidence is high could lead to a significant improvement of quality of life and contribute to integrating new patterns sustainable consumption.	Energy Efficiency
23	Industrial Electrical Motor Driven Systems (EMDS) Efficiency Program in Egypt	Industry & Energy	The theme of the project contributes to energy saving applications and efforts in the industrial sector as an integral step for promoting cleaner production processes. This is especially valid since electric motors and the systems they drive are the single largest electrical end use, consuming more than twice as much as lighting.	Sustainable Energy Applications for Industries
24	Promoting Energy Efficiency for Boilers & Utilizing Solar Energy for Industrial Process Heat in Food, Chemicals and Textiles Sectors	Industry & Energy	Demonstrating the potential use of clean energy, renewable energy specifically, to power industrial heating processes to improve the energy efficiency and promotion of solar thermal technologies manufacturing in Egypt. A significant share of the heat consumed in the industrial sector is in the low and medium temperature range. This makes the industrial sector a promising and suitable application for solar thermal energy.	Sustainable Applications for Industries

6: SCP Component for Solid Waste Management

The volume of waste generated continues to increase at a faster rate than the expansion of solid waste management measures and the ability of the municipal authorities to improve the financial and technical resources needed to parallel this growth. This component presents a variety of projects to address different sides of one of Egypt's perpetual challenges, namely solid waste management to be addressed using a combination of activities in a way that best protects community and the local environment including; waste prevention, recycling, composting, controlled burning, or landfilling.

25	Reducing Plastic bag consumption	Municipal Solid Waste	This project stresses the importance of effective government policy in shaping consumer behavior. Placing a value on single use plastic bags could dramatically reduce plastic bags consumption and protect the environment from their adverse effects.. If successful similar models could be promoted to support other changes in unsustainable consumption trends through policy instruments and regulation.	Integrated Waste Management
26	Egypt's Marine Litter Extraction Project	Municipal Solid Waste	Plastic litter has been a major polluting source for open sea and coastal cities, which has impacted tourism. This has a health and economic adverse impact on surrounding communities. There is an urgent need for raising awareness of the public and other stakeholders on the importance of combating marine litter in Egypt.	Integrated Waste Management
27	Extended Producer Responsibility Pilot- E-Hub Project	Waste	Producers of electronic goods need to assume full responsibility for the lifecycle of their products, including the post consumption phase. Engaging producers (importers and manufacturers) of electronic goods in Egypt to ensure environmentally sound collection and recycling of their products could be a game changer that would signal the application of EPR for other sectors.	E-Waste
28	Green Growth: Industrial Waste Management and SME Entrepreneurship Hub in Egypt	Industry & Waste	Being able to use industrial waste in support of a zero waste policy and support a flourishing recycling market is directly linked to the promotion of both sustainable consumption and production. This process is envisioned to contribute towards the formation of sustainable communities and juxtaposed to the current prevailing industrial production procedures.	Integrated Waste Management

1: SCP Policy Instruments Component

The working groups proposed 6 Projects under this component

PROJECT # 1:
Facilitating Access to Finance for Green Growth & SCP practices

Presented by:

Ministry of Environment - Egyptian Environmental Affairs Agency (EEAA)

Cross Cutting Sectors:

Energy - Environment – Banking - Industry

Project Rationale/Background

The rapid population growth coupled with ambitious development and industrialization policies have put a heavy pressure on Egypt's natural resources in the form of severe air, water, and soil pollution. The economic costs of environmental degradation were estimated by the World Bank in 2002 to in the order of 4.8% of GDP (LE14.5 billion), with an add on damage costs on global environment in the order of 0.6% of the GDP (LE 1.9 billion). The scope and magnitude of these social costs are likely to offset some of the economic growth gains over time, and undermine economic reform programs. These unhealthy patterns would also hamper efforts to create sustainable cities and communities and to integrate clean production practices in industry. However, government policies and related instruments could have a countering effect. On the environmental management side, significant improvements have been achieved since the establishment and strengthening of the institutional and legal framework during 1992-1994.

The government through its budget and concessionary funding from international donors, has established funding mechanisms so that polluting enterprises would not be able to plead lack of information, resources or incentives to curtail pollution. EPAP I (1998-2005), EPAP II (2007-2013), FACE (1998-2005), PSI (1995-2004) and PPSI (2008-2013) are such funding mechanisms that assisted the government in establishing market based instruments that resulted in reduced pollution load at the plant level. They have also created greater awareness among banks regarding the benefits of lending for pollution abatement investments. As a result of these government initiated funding mechanisms, the National Bank of Egypt has now formally implemented an Environmental Policy and Environmental Management Framework in its loan program.

The creation of sustainable communities and cities require clean and green industries, consequently there is a need to provide access to finance to invest in much-needed infrastructure and new clean technologies. The government with the help of international cooperation could support the private sector through the provision of financial packages that support different SCP industrial applications. Such as cleaner (Green) production,

process modifications, energy conservation, wastewater treatment, zero liquid discharge etc. This model could be used to introduce different SCP applications to be implemented to support the creation of a green industry. Such applications could include waste to energy, different waste management approaches, water savings, and energy savings.

Project Components:
Description:

- Provide well-tailored and subsidized financial packages to help industries integrate SCP applications. The model includes the provision of long term credit loans with subsidized interest rates in addition to the provision of free technical assistance to install and use new clean technologies.
- Depending on the projects detailed feasibility study and funding availability, tax deduction/ or cash grants could be given to loan applicants as additional incentives to introduce SCP applications
- Link the provision of loans to the development of clear environmental and economic indicators to measure the financial and social benefits of the introduced SCP application/project.
- A special focus of the targeted SCP applications could be on:
- Energy efficiency projects
- Renewable energy for industry - use of agricultural and municipal waste (and other wastes) as alternative fuels in industry. Target sectors likely to be energy intensive
- Industrial waste recycling - treatment/reuse of industrial waste including hazardous (e.g. lead battery recycling, e-waste etc) and non-hazardous (e.g. recycling of packaging materials). Should be based in existing facility and not a greenfield start-up

Project Lead & Participating Stakeholders/Partners:

Ministry of Environment/ Egyptian Environmental Affairs Agency/Egyptian Federation of Industries/ Ministry of Industry/ National Banks/Business associations.

Possible Funding Model:

Based on percentage contributions of the government, international donors, national banks, regional and international development banks.

Estimated Budget:

20 Million Euros

Management Structure:

Create a project management unit based at the Ministry of Environment and the EEAA and a focal point / representatives at partner banks.

Project Objectives:

- Support a cleaner industry needed for the creation of sustainable communities and cities
- Consolidate the application of market based instruments and the role of banks in financing energy efficiency, BAT & apply the concept of green growth and SCP in the industrial sector
- Improve the competitiveness & cleaner growth of the industries
- Increase the awareness of civil society by improving the quality of the environment and increase employment in the field of environment
- Develop a clear environmental and social indicators to measure the success of the project
- Provide preferential treatment and focus on SMEs to encourage them to invest in EE & BAT in order to sustain and grow their operations & linking to job creation
- Encourage the use of alternate fuels in industry by using agricultural and municipal waste as a substitute for fossil fuels
- Engage community action through industrial performance ratings and public disclosure

Policy Enablers:

- Research and background work by relevant institutions including needs assessment, mapping and identification of key stakeholders
- Informed policy makers and public sector champion to support the project
- Technical capacity building and provision of international expertise to support the design and implementation of the project.
- Enforcing and compliance with national environmental regulations
- Setting standards and codes to support the efficient operationalization of SCP applications
- Provide access to information on the importance of SCP applications to relevant stakeholders including banks and industrialists

Expected Results:

Outcomes

- Industries become compliant with green technologies
- Banks are more capable of funding green investments with a consolidation/ expansion of environmental screening in their lending programmes.
- Company productivity improvements, competiveness and growth prospects.
- At least 750,000 tons per year of agricultural, municipal or industrial waste are used as an alternate fuel in the industrial sector.
- Communities are engaged through the public disclosure of performance ratings for polluting industries.

Impact

- Increase the awareness of civil society by improving the quality of the environment
- Facilitate the creation of sustainable communities and cities
- Increase employment in the field of environment services projects
- Halt environmental degradation
- Create new niche markets for clean technologies
- Encourage local R&D

PROJECT # 2:

Policy Tools towards Transition to Green Economy in Egypt: National Green Economy Reviews (NGER)

Presented by:

Ministry of Industry, Trade& SMEs

Cross Cutting Sectors:

Trade – Manufacturing - Environment

Project Rationale/Background

A transition to a green economy is expected to make increasing contributions to economic diversification, employment creation, export earnings, and to environmental protection and social equity. Egypt has already introduced different policies to support an agenda of sustainable development, due to pressing environmental degradation, water poverty and the energy crisis. The government is in the process of designing a Sustainable Development vision 2030 in addition to the existence of several strategies to encourage green policies.

Importantly, a dynamic green economy can make significant contributions towards the achievement national development objectives relating to economic diversification, investment, poverty reduction, employment generation and an overall improvement of social welfare. As such, it can also make significant contributions to the achievement of Sustainable Development Goals (SDGs).

However, the lack of coordination and harmonization has led to an apparent lack of a unified and integrated policy framework to direct the country's transition towards a green economy. Moreover, there is a lack of monitoring mechanisms to measure updates and developments of the rate of integrating SCP and green policies into the national policy agenda. Similarly there is no database or a compilation effort to map and identify efforts of introducing cleaner production and SCP by the private sector including manufacturing, importing and exporting of green goods. There is a need of tools to measure progress towards a green economy in different sectors and benchmark it to international experience, especially that of developing economies. These tools have an additional objective that can also measure the progress towards the creation of sustainable communities, since it measures and identifies crosscutting and sector specific issues.

Project Components:
Description:

- Conducting national comprehensive assessment studies to scope developments, map initiatives and policies:

  By sector

  By categorizing green goods (manufacturing, importing, and exporting)

- Analyze the potential of expanding existing initiatives and activities to generate employment, economic growth and export opportunities.

Project Lead & Participating Stakeholders/Partners:

Ministry of Environment – Egyptian Environmental Affairs Agency

Federation of Egyptian industries

Representatives of Industrial Chambers & Export Councils

Ministry of International cooperation

Ministry of Foreign Affairs

UNCTAD

Estimated Budget

81,500 Euros

Possible Funding Model:

International donors, international green funding mechanisms, regional and international development banks.

Management Structure:

The project will be managed by a PMU in the ministry of industry, which will coordinate closely with focal points& the key relevant stakeholders.

Project Objectives:

- Raise awareness of the commercial and developmental gains offered by a green economy;
- Analyze the relationships between a green economy, trade, environment and development;
- Assess the regulatory and institutional requirements for supporting a green economy transition;
- Assess the impacts of national green economy policies on trade and development;
- Enhance consensus on approaches to advance a green economy with national stakeholders;
- Solicit national stakeholder recommendations and agree on an action plan and timetable to roll-out a national green economy transition.

Policy Enablers:

- Research and background work by relevant institutions including needs assessment, mapping and identification of key stakeholders
- Informed policy makers and public sector champion to support the project
- Technical capacity building and provision of international expertise to support the design and implementation of the project.
- Enforcing and compliance with national environmental regulations
- Setting standards and codes to support the efficient operationalization of SCP applications
- Provide access to information on the importance of SCP applications to relevant stakeholders including banks and industrialists

Expected Results:

Impact

- Stimulate economic diversification,
- Seize new green export opportunities,
- Generate employment for the poor,
- Increase access of the poor to basic services such as energy, water, housing, education, communications and transport.

Outcomes

- Enhanced capacity of trade and environment decision-makers in beneficiary countries;
- Enhanced communication between trade and environment officials improving policy co-ordination at the national level;
- Formulation of strategic approaches to advance a green economy leading to the design of policy packages that promote sustainable development;
- Effective participation of national delegations in multilateral deliberations green economy issues in UN, WTO and other forums;
- Integration of trade-environment-development considerations into national and regional policymaking.

Indicators:

Execution Indicators

- Two National Stakeholders Workshops
- NGER project report published by UNCTAD
- Report recommendations are adopted by stakeholders and submitted to the Government for action.
- Participation of one Egyptian expert in the Intergovernmental Meeting in Geneva

Impact Indicators

- Implementation of the set of NGER project Recommendations in Egypt which will lead to advancing the development of national green sectors to generate new employment and export opportunities while promoting sustainable development.

PROJECT # 3:

Mainstreaming Green & Sustainable Public Procurement in Egypt

Presented by:

Ministry of Environment & Center for Environment and Development in Arab Region and Europe (CEDARE)

Cross Cutting Sectors:

Agriculture – Energy – Water – Industrial

Project Rationale/Background

Egypt's 2015-2030 national strategy for population and development aims to face increased population and its negative impacts on the country's ability to meet citizens' needs. Statistics show that country's population has tripled from 1950 to 2000 representing an increased pressure on natural resources and the environment. Ministries in Egypt spend large amount of funds each year on public procurement, including, goods and services. Thus, there is a compelling business case to re-direct public spending towards a more "sustainable" path and create demand for green goods and services.

Public spending, which generally represents between 15% and 30% of GDP in a given country if strategically designed can help drive markets towards innovation and sustainability, thereby promoting sustainable economic development. It has thus become increasingly clear among policymakers that public procurement can play a significant role in cutting public spending and releasing funds to support social services and economic activities. Moreover, it can specifically contribute to achieving sustainable development goals. Through SPP, governments can lead by example and deliver key policy objectives in the environmental, social and economic fields. With respect to the environment, sustainable procurement can allow governments to reduce greenhouse gas emissions, improve energy and water efficiency and support recycling. Positive social results include poverty reduction, improved equity and respect for core labor standards. From an economic perspective, SPP can generate income, reduce costs and support capacity, skills and technology development.

The project helps the promotion of sustainable consumption and production on a national level through introducing the concept of SPP. The government will create the necessary pull demand needed to encourage local eco-innovation, clean production approaches, green businesses, and entrepreneurs. This model is intended to be replicated in other sectors and by consumers in general. The government will set a successful example in responsible consumption while providing efficient consumption as a necessary solution to face the current energy and water crisis that the country is facing among other challenges in a time of fiscal austerity. Created demand can translate into economies of scale for local producers as well as result in budgetary public savings. SPP can also support an increased role of the private sector in infrastructure and environmental compliance related investments through the introduction of an eco-related tendering systems, standards and eco-labeling among others.

Based on Egypt's current experience with regard to green economy and existing SCP trends on a policy level, economic, regulatory and social intervention tools should be perceived as a multi-faceted yet integrated policy solution package necessary to be adopted by the government if greening the economy is a serious endeavor. The project includes a specific activity to produce policy briefs to explore the best suitable policy interventions based on a performed comprehensive SPP needs assessment exercise. Possible policy tools will include regulatory reform, targeted green subsidies for sustainable goods and services, tax exemptions, access to finance, removal of tariffs, and non-trade barriers if deemed suitable. Project activities will recommend an integrated approach in support the mainstreaming SPP in the different sectors.

In addition, environmental public purchasing contributes to the promotion of trade in environmental goods and technologies, regionally and internationally. The project is expected to have a national wide cross cutting focus rather than a sectoral one as a directive to influence SCP at a national level. The project by the virtue of its focus will adopt a life cycle approach on both the consumption and production sides as a necessary standard and requirement to consider any product or service as sustainable. This will necessarily mean the provision of capacity building activities to re-enforce and prepare relevant decision makers and public procurement officers to implement SPP practices and guidelines in the context of procurement procedures. The capacity building component of the project will reinforce and complement the role of the SDU by upgrading existing skills and expertise of procurement officers and other relevant public servants. Provided activities related to training of trainers and on the job training will enable responsible public servants to implement project policy recommendations and required related interventions. The specific objectives of the training package should include the following:

- Applying the designed SPP Tool Kit
- To ensure proper development and implementation of the SPP Approach
- Training and contracting of procurement staff prior to the implementation of SPP
- Transfer of on the Job knowledge and experience exchange

Description:

Project Objective:

Encourage the mainstreaming of Green and sustainable public procurement systems in the public sector.

Specific Objectives:

The project "Mainstreaming Sustainable Public Procurement in Egypt" has two main objectives; policy and operational oriented respectively.

- **Policy Objective:** sustain the ongoing momentum of encouraging and integrating green economy policies into the local policy agenda while supporting the capacity building of relevant decision makers through provision of trainings,

- policy strategies and action plans. It directly builds on the current existing policy initiatives by past and ongoing projects including Egypt's green economy scoping study and the national action plan for sustainable consumption and production. Sustainable Public procurement (SPP) has been mentioned as a crucial policy enabling tool to support Egypt's transition to a green Economy (UNEP, 2013).

- **Operational objective:** would respond to Egypt's priority on green growth, and specifically, in the development of an environmental goods and services (EGS) market, fundamental for sustainable public procurement, and to promote trade and investment in EGS.

Project Components:

The project aims to introduce and mainstream sustainable Public Procurement to support national efforts towards adopting a green economy and supporting sustainable consumption and production efforts through the provision of policy analysis to decision makers and the creation of a market for sustainable goods and services. The project has two main components: Policy analysis and capacity building.

The policy component consists:

- SPP Assessment Study
- SPP Enabling Conditions Policy Brief
- SPP Interactive Tool Kit for Practitioners: Digital Platform/Program

(Guidelines, Ethical Criteria, determining technical requirements, assessing needs, selecting suppliers, exclusion and evaluation methods, Eco-Labels, Awarding criteria, Rules governing contract clauses, contract performance clauses, monitoring contract compliance, conflict resolution etc..)

While the capacity building component includes:

- Stakeholder Consultation Workshop
- Validation Workshop
- SPP Good Practices International Roundtable
- Life Cycle assessment related training of trainers
- On Job Training to apply the SPP interactive Tool Kit at the Ministry of Environment as a pilot phase

The first phase or the pilot will target the Ministry of Environment, then project activities could be replicated in other public institutions and ministries.

Targeted Beneficiaries:

- Ministry of Environment and partner ministries (includes but not limited to Ministry of finance, Ministry of Investment, Ministry of Planning and Ministry of Foreign Trade and Industry)

- Any interested public authority and/or governorates
- Policy makers and practitioners who need tools for decision making on green public Procurement.
- Public servants and professionals (includes but not limited to: Procurement officers -Finance staff, Legal and contracting staff and Project management teams).
- Business sector, in particular, small and medium enterprises. This is highly relevant for SMEs enterprises because they need specific information and training about new Government Public Procurement requirements.
- Other organizations: NGO´s, academics, consumer associations, suppliers and trade unions among others.

Project Activities and Outputs	
A.1 Policy Component	
A.1.1 SPP Assessment Study (2 Months)	This activity targets the mapping and the existing needs for SPP in the context of adopted SCP policies and existing patterns. The report will address public banking and holding companies in its analysis
A.1.2 SPP Enabling Conditions Policy Brief (2 Months)	This activity aims to capitalize on the gaps analysis of existing policy landscape to identify possible enabling conditions and policy instruments necessary to activate SPP
A.1.3 SPP International Best Practices and Case Studies Report (2 Months)	This activity is intended to enhance 'knowledge transfer' of success stories and good practices from the region and around the globe to encourage national policy makers and provide them with necessary background to develop a national adaptable GPP system.
A.1.4 Interactive SPP Toolkit/ Guidelines for Practitioners (8 Months)	This activity will result in a publication and an interactive online tool that will be designed based on the GPP national assessment exercise. It addresses policy makers and procurement practitioners in public institutions and help decision makers to finalize an action plan and a strategy for SPP

A.2 Capacity Building	
A.2.1 Stakeholder Consultation Workshop (1 Month Preparation and Planning)	This workshop will aim to identify and invite relevant stakeholders that can contribute to understanding the status of SPP in Egypt and provide feedback for the development of the SPP Tool kit
A.2.2 Validation Workshop (1 Month Preparation and Planning)	This workshop will provide necessary feedback to amend the developed SPP Tool Kit as a necessary step towards finalizing it.
A.2.4 SPP Good Practices International Roundtable (1 Month Preparation and Planning)	This seminar is both a capacity building and information dissemination activity based on presenting and discussing the SPP Best Practices and Case Studies Report (A.1.2). The seminar will be delivered to 20-50 relevant public official, businesses, NGOs and SMES.
A.2.5 Life Cycle assessment related training of trainers (2 Months Preparation and Planning)	A life cycle training of trainers will be provided to 15-20 procurement practitioner working in public authorities.
A.2.5 On Job Training to apply the SPP interactive Tool Kit at the Ministry of Environment (3-5 Months)	The assigned Technical expert in developing the SPP Tool Kit will design and implement an on the job training that enables staff responsible for delivering and influencing SPP to understand the principles on which SPP is based and ensures they are clear about the potential benefits and the consequences if they do not deliver.

Project Lead & Participating Stakeholders/Partners:

CEDARE will be the executing agency for implementing and facilitating proposed project activities under the supervision of the main beneficiary of the pilot phase of the project in this case: the ministry of environment and any other declared partners.

To ensure the endorsement and efficient implementation of project activities, a task force will be created including members of CEDARE, experts and the Sustainable Development Unit (SDU) recently established in the Ministry of Environment to be the lead coordinating platform working closely with CEDARE on this project.

This organizational setup is particularly important, since this Unit is assigned to lead national efforts on propagating the national agenda of sustainable development. The Unit

has the occupational and legislative capacity to liaise and connect with all relevant public stakeholders and will utilize the output of activities to replicate it in other institutions in Egypt and incentivize similar activities, thus building a knowledge hub related to SPP.

Possible Funding Model:

International donors, international green funding mechanisms, regional and international development banks.

Estimated Budget:

167,000 Euros

Co-Funding in Kind: CEDARE will provide 1000 USD in consultation and experience
Co-Funding in Kind: Ministry of Environment shall match CEDARE's amount of in-kind contribution towards consultation experience in implementing the outputs of project activities.

Management Structure:

The project will be managed by a PMU at the Ministry and a Regional Environmental organization as the technical and implementation partner to coordinate closely with focal points& the key relevant stakeholders.

Policy Enablers:

- Amend the national procurement law under the umbrella of the Ministry of Finance and public contracts regulations.
- Capacity Building and provision of access to information on SPP to decision makers and officials.
- Enhance dialogue with stakeholders to promote growth in demand for goods supplied by local markets and by making sustainable products purchased by the public sector.
- Provide technical assistance and access to finance to local business and encourage sustainable entrepreneurship.
- Enforce standards, labeling, codes and information of product performance.
- Provide the infrastructure needed to create an operational public procurement system.
- Conduct awareness campaigns and workshops to raise awareness.
- Training and engaging the private sector, including suppliers.

Expected Results:

Outputs

- SPP assessment study to be presented to the Ministry of Environment and designated partners to be distributed to all relevant ministries and authorities.
- SPP Policy Brief to provide decision makers with necessary information and analysis concerning suitable policy interventions customizable to local conditions and unique socio-economic conditions.

- SPP Tool Kit for Practitioners publication to be presented to the Ministry of Environment and designated partners to be distributed to all relevant public ministries and authorities. It will deal with how to integrate elements of sustainability into each step of procurements procedures including tendering, supplier pre-qualifications, specifications, evaluation and scoring framework and finally contracting standards.
- Identify and Map relevant national stakeholders representing different public authorities, ministries and governorates that are responsible and or utilizing public procurement.
- Provide policy briefs and plans to gradually build a credible and up-to date background policy information database for decision makers to ensure continuation and synergies of efforts to support a transition to a green economy in Egypt.
- Procuring goods and services that are more efficient to operate and thereby reduce operating costs (including consumables, energy, water and time);
- Capital procurement that achieves reduced through-life costs, e.g. through reduced annual
- Operating and maintenance costs;
- Re-examining requirements, and where appropriate challenging demand at source, so as to avoid procurement in excess of needs;
- Reducing end of life disposal costs and impacts; and
- Driving supply chain efficiency and developing market competitiveness, innovation and capacity.
- Training of about 70 procurement practitioners, policy makers and stakeholders in life cycle assessment at the ministry of environment and other relevant ministries

- Improving procurement practice and achieve sustainable operations targets, pending the development of a new procurement framework
- Providing initial support through workshops to professional in each implementation stage of the project
- Consulting on proposals for a center of sustainable procurement excellence to provide coherent quality support, guidance and advice and establishing a sustainable products unit to develop evidence on the life cycle impacts of products
- Extending and updating the existing “quick-wins” standards to an increase range of products and consulting on standards for a wider range of products and services.

Outcomes

- Introduce and mainstream SPP as a tool into local sustainable development policy agenda to be practiced by public authorities, since SPP has yet to be a focus of the government and or public policies.
- Increased resources efficiency and reduction of the carbon footprint.
- Support the development of a National Strategy to adopt SPP.
- Encourage the government to amend existing legal frameworks and legislation to adopt an integrated sustainable public procurement system.
- Reinforce existing SCP policies and support their enhanced scalability.
- Develop and implement national SPP related procedures and standards.
- Provide technical capacity building to public sector related professionals.
- Provide decision makers with studies, analysis and reports to be utilized for adopting SCP and green policies
- Encourage the creation of Green and Eco enterprises.
- Support the adaptation efforts of existing private sector towards SCP and clean technologies.

Impact

- Stimulate economic diversification,
- Seize new green export opportunities,
- Generate employment for the poor,
- Increase access of the poor to basic services such as energy, water, housing, education, communications and transport.

Indicators:

- The use of a continuous participatory approach (multi-stakeholder consultation) and validation when conducting the SPP assessment and the tool Kit.
- Prepare an evaluation survey for project stakeholders and participants.
- Direct interviews with stakeholders and partners.
- Prepare a lessons learnt report to compile the experience and challenges that have faced the project to be disseminated to all relevant stakeholders.
- The rate of applying and utilizing the SPP tool Kit at the Ministry of Environment and related partners and stakeholders.
- The number of participants in the designated capacity building activities.
- The rate of sharing and distributing the SPP tool kit to other authorities to replicate.

PROJECT # 4

Setting-Up a Renewable Energy & Energy Efficiency Fund

Presented by:

Ministry of Trade, Industry & SMEs

Cross Cutting Sectors:

Environment, Industry, Energy, SMEs

Project Rationale/Background

Egypt is currently facing a major energy problem. Egypt's deficit in electricity supply is more than 3,000 MW and the country is paying subsidies for energy of more than 110 Billion EGP. The scarcity of energy resources is limiting industrial growth and development and there is a major need for energy conservation and for promoting the application of renewable energy sources in the industrial sector.

Within this context the Ministry of Industry, Trade and SMEs is exploring the opportunity for the execution of a project for Setting Up a Renewable Energy Fund. The project builds on the successful model of the Egyptian Pollution Abatement Project - Second Phase (EPAP II), implemented by the Egyptian Environmental Affairs Agency under the Ministry of State for Environmental Affairs with the support of the World Bank. Not only will the fund expedite the integration of SCP policies, but it will contribute an accelerated transformation of industry to clean production methods and procedures, a much needed determinant of sustainable communities and cities.

Project Components:

Description and activities:

Component 1: Technical Support

This component is supported through the project: "Promoting low-Carbon Technologies for Heating in Industrial Applications Project" which is funded by GEF, & started in April 2015. It consists of:

- Development of policy and regulatory framework to support the use of low carbon technologies for heating in industrial applications.
- Support the deployment of low carbon technologies for multipurpose applications in the industrial sector through the transfer of technologies and know-how to local manufacturers.
- Installation of low carbon technologies in selected facilities.
- Building the technical capacity of human resources responsible for designing, developing and servicing renewable energy systems, manufacturing facility managers, etc…

The project will also build on the activities of a number of other ongoing as well as pipeline initiatives and projects led by Egypt National Cleaner Production Center (ENCPC) in cooperation with a number of international partners including:

A) Ongoing Projects:

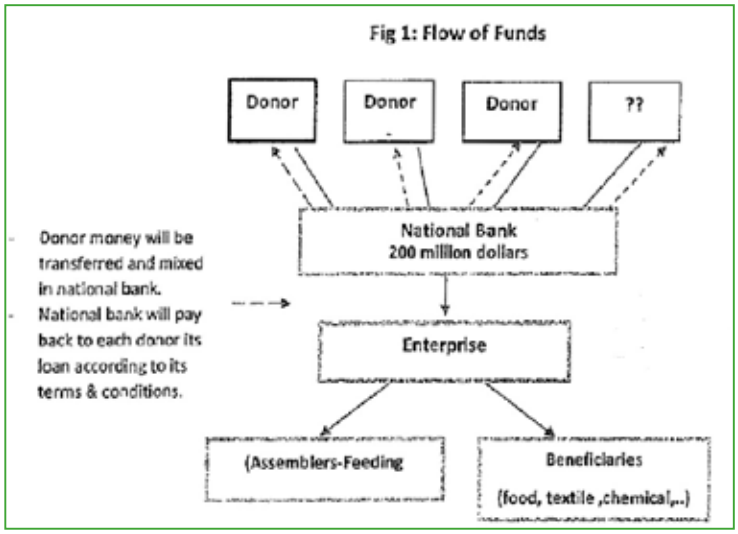
- The Resource Efficiency Component of the Trade Facilitation Program (TFP) in cooperation with USAID.
- The "Low carbon and Climate Resilient Industrial Development" project in Egypt, Kenya, Senegal and South Africa implemented in cooperation with UNIDO and financed by the Government of Japan.
- The project entitled: Fostering Renewable and Sustainable Energy in Africa through R&D "FORWARD" implemented in four countries including Egypt, Tanzania, Uganda and Ethiopia in cooperation with the African Union and financed by the European Union
- The Technical Assistance Programme on Energy Efficiency in Industrial establishments implemented by ENCPC in cooperation with the Industrial Modernizations Center (IMC)

B) Pipeline Projects:

- Industrial Electrical Motor Driven Systems (EMDS) Efficiency Program in Egypt in cooperation with UNIDO and funded through the Global Environmental Facility (GEF).
- The SWITCH Med Programme - Component 1: Med Test Project, implemented in cooperation with UNIDO.

Component 2: Financial Support Fund

This component is concerned with establishing a financial mechanism that will support a number of pilot/demonstration projects for the manufacturing and installation of renewable energy & energy efficiency technologies. The financial mechanism will be established with the participation of different donor entities and will follow the same model of EPAP II project as illustrated below:



Project Lead & Participating Stakeholders/Partners:

The fund will support the following:

Industrial companies in different sectors e.g. food, chemicals and textiles (end users)

Manufacturers of renewable energy technologies and their feeding industries

Possible Funding Model:

The government, International donors, global green funding mechanisms, regional and international development banks.

Estimated Budget:

Component 1- Technical Assistance USD 4.5 million (funded by GEF)

Component 2- Financial Mechanism USD 130 million (of which USD 2 million funded by GEF)

Duration:

5 years after which the fund will continue under the ownership of the Ministry of Industry

Project Objectives:

This Fund aims at contributing to the reduction of Egypt's energy deficit through promoting the local manufacturing and application of Renewable Energy as well Energy Efficiency technologies in the Egyptian Industry, which will support Egyptian manufacturers in raising their competitiveness and boost job creation in this field.

The specific objectives of the project are to:

Provide financial incentives to overcome the high initial investment costs for manufacturers of renewable energy technologies against an existing energy state subsidy.

Help to bridge the gap until adequate policies and regulations are established for the use of renewable energy and for the application of energy efficiency measures.

Policy Enablers:

- Increase the number of energy audits, especially to beneficiaries of the fund
- Establish and apply, based on Commission guidance, minimum cost-effectiveness criteria which are adapted to the projects' circumstances.
- Promote the establishment of a stronger regulatory framework and ensure compliance.
- Provide technical assistance to ensure the cost-effectiveness of undertaken projects under the fund.
- Periodically assess and review the impact of distributed funds on operational, and natural resource savings.
- Put in a place a strong and detailed reporting system for –follow up and conduct periodical impact assessment exercises.

Project Result

- Reduction of energy consumption
- Reduction of greenhouse gas emissions
- Enhancement of the competitiveness of the Egyptian industries and introduction of high value
- added innovative products and services to the Egyptian Industry

- Development of an Innovative financing package to promote the use of renewable energy and energy efficiency technologies in Egyptian Industries
- Creation of new job opportunities and reduction of unemployment rates

Indicators:

Execution & Impact Indicators:

- Number of benefiting projects/industries from the fund
- Establishing an authority or a steering committee to govern the fund
- Set a financial strategy for the self-sustainability of the fund
- Assigning third party audits for review and monitoring

PROJECT # 5:

Land Allocation for Renewable Energy Projects: Strategic Environmental and Social Assessments

Presented by:

Ministry of Energy and Electricity (MoEE)/New and Renewable Energy Agency (NREA), Ministry of Local Development

Cross Cutting Sectors:

Renewable (Solar/Wind) Energy – Land Allocation

Project Rationale/Background

Use of wind and solar generated energy provide direct environmental and social benefits by allowing a reduction in fossil-based energy production leading to a required reduced emission of carbon dioxide. the use of renewable energy can be an important part of the energy-development strategy in Egypt. Notwithstanding the direct environmental benefits, renewable energy facilities can induce negative impacts on other valuable environmental aspects. This can span from noise pollution and visual change of landscapes to substantial impacts on fauna and flora both at the specific project sites, but also for entire flyway populations of migratory birds from vast areas (i.e. species can be breeding across Europe and Central Asia and pass through the Middle East on their migration to wintering areas on the African continent).

To achieve the global benefit in reduction of carbon emission, efficient planning, and if needed, appropriate mitigation measures, can reduce the negative environmental impacts of wind and solar power facilities to acceptable levels.

This project aims to develop Strategic Environmental and Social Assessment (SESA) to evaluate the potential environmental and social (E&S) impact from wind and solar energy developments on the natural, environmental resources, resident people and their lives (in economic and social terms) over an area of 255 km2 Gulf of suez, 9.46 km2 in Zafarana and 37.2 km2 in Benban.

For wind projects for Gulf of Sues area bird migration study is required during Spring and autumn seasons. The definition of SESA is having its focus on natural, environmental, social and economic issues. For proven impacts, the SESA shall identify ways to avoid or reduce these impacts to acceptable levels to be further detailed by associated project-based ESIA. By this, the SESA will help achieve sustainable development of future wind and solar projects in Egypt.

Project Components:

Strategic Environmental and Social Assessment (SESA) for 255 Square km2 in Gulf of Suez, 9.46 km2 in ZAFRANA 37.2km2 in Benban

Phases	Time	Activities per phase
Baseline survey report.	Two weeks	Analysis of existing situation and the baseline for the project
Bird migration first report	one month after finishing of the first field observation period	Report of the first field observation period for the Bird migration. For Area of gulf Of Suez
Bird migration second report	one month after finishing of the second field observation period	Report of the second field observation period for the Bird migration. For Area of Gulf of Suez
Public hearing reports.	after the scoping and the second after final draft	Report for public hearing and stakeholder comments.
Draft report for the ESIA study including Mitigation Program and Monitoring Planning.	No later than 5 months after termination of final fieldwork	Data report on the distribution and abundance of fauna, flora and habitats at risk of being impacted by the development of wind and solar power plants including socio-economic, cultural and historical baseline, and associated mitigation measures and the two sessions of Public hearing reports, first during the scoping and the second after final draft. Non-technical executive summary report in Arabic. Assessment of the potential impact of wind and solar power plants on key environmental and social issues
Draft Report for Ornithological	Two weeks after submission of the Bird migration second report	Includes monitoring programs and measuring of the birds types concentrated in the recommended sites to build the wind power plant also studying the bird migration and associated corridors. For Area of Gulf Of Suez

Final Reports for all the STUDY (Arabic and English copies).	Two weeks after NREA approval on the drafts	Final Data report on the distribution and abundance of fauna, flora and habitats at risk of being impacted by the development of solar and wind power plants including socio-economic, cultural and historical baseline, and associated mitigation measures. Assessment of the potential impact of solar power plants on key environmental and social issues. Final monitoring programs and measuring of the birds types concentrated in the recommended sites to build the wind power plant also studying the bird migration and associated corridors

Project Lead & Participating Stakeholders/Partners:

Egyptian Environmental Affairs Agency (EEAA) – New and Renewable Energy Agency (NREA)

Possible Funding Model:

Design of an innovative financing scheme of up-scaling and promotion of model in whole sector

Estimated Budget:

1,140,000 Euros

Project Objectives:

- Identify the best suitable technique where development of wind and solar power plants will be possible with the least environmental and social impacts.
- Provide a basis for the subsequent development and appraisal of specific investment projects in wind and solar energy facilities. This should not only assist the national and regional authorities in Egypt, but should also be in line with project appraisal E&S performance requirements (PRs) of International Financial Institutions.
- To provide capacity building to New and Renewable Energy Authority (NREA) through on-the-job-training (OJT) on how to manage E&S issues associated with FDIs in RE projects, mainly wind and solar and in compliance with good international E&S practices and PRs.

Policy Enablers:

Maintain and update the legal and regulatory framework which has been enforced through Feed-in Tariff, FiT, for electricity projects produced from renewable energy resources (PV - Wind). A total target is to authorize 4300 MW to be achieved over the first period of applying the FiT. This target includes 300 MW for rooftop PV installations below 500 kW, 2000 MW for utility scale PV installations, the remaining 2000 MW is from wind energy installations with projects capacities ranging from 20 MW up to 50 MW.

Develop similar mechanisms to promote the use of other renewables such as biomass and Concentrated Solar.

Project is a great incentive to promote investment of Solar and wind project in the areas coupled with the above mentioned FiT.

- Enhance electricity security
- Maximize RE share in energy mix
- Create Jobs

Expected Results:

Impact

Support the integration of social and environmental dimensions during the development of wind and solar power plants

Outcomes

- Promotion of Renewable Energy application in Egypt.
- Egypt to become main supplier of solar and wind energy in Europe, Africa & Middle East countries.

Outputs

- Analysis of existing situation and the baseline for the project
- Data report on the distribution and abundance of fauna, flora and habitats at risk of being impacted by the development of wind – solar power plants including socio-economic, cultural and historical baseline, and associated mitigation measures.
- Report of the field observation for the Bird migration.
- Project approval from EEAA.

PROJECT # 6

Eco-innovation approach in Small and Medium-sized Enterprises in Egypt

Presented by:

Egypt National Cleaner Production Centre (ENCPC)

Cross Cutting Sectors:

Agriculture/Agro-food Sector, SMEs development

Project Rationale/Background

The United Nations Environment Programme (UNEP) has partnered with the European Commission (EC) to promote resource efficiency and eco-innovation in an effort to change consumption and production patterns in developing countries and economies in transition. Eco-innovation is the development and application of a new or significantly improved product (good/service) or process, a new organization method or a new business practice that will lead to improved economic and environmental performance.

Against this backdrop, it is necessary for Egypt as part of harmonizing local policies with international trends and new technology discourses to embrace initiatives that promulgate eco innovation to support the creation of green enterprises as viable market players. If creating sustainable communities is gradually becoming a national imperative, it is therefore important to re-direct the private sector, especially small SMEs and enterprises towards eco –innovation. The main objective of the project is to demonstrate and put in place within the Egyptian context the UNEP eco-innovation approach and concept in pilot projects from Egyptian SMEs from the industrial sector.

Project Components:

Description:

The main aim of the project is to create the enabling environment for service providers, technical institutions and other relevant intermediaries to support Small and Medium Sized Enterprises (SMEs) to improve their products and production processes for an enhanced environmental and economic performance. The project targets to have a specific focus on Agriculture/Agro-food sector amongst other industrial sectors.

Project Objectives:

- Raising awareness and capacity building on eco-innovation approach in Egyptian industrial sector is achieved.
- Improvement of knowledge and skills for eco-innovation implementation in the Egyptian SMEs in Agro Agriculture/Agro-food sector as a high priority case study
- 5 successful stories/business cases for demonstration of Eco-innovation in SMEs from the Agriculture/Agro-food sector were developed.

- Dissemination and promotion of eco-innovation concept/approach for up-scaling and replication in the Egyptian industrial sector was achieved.
- Enhance economic competitiveness of enterprises and businesses (SMEs), while reducing their environmental impacts;
- Improvement of the access to finance pilot projects in cleaner & more resource efficient (water, energy, raw materials and waste minimization) , manufacturing technology and green business;
- Contribution to the creation of new business and jobs with an environmental added value.

Activities:

- Preliminary assessment report (market, company and sector level analysis) with the list of outreached companies and corresponding assessment (at least 20),
- Summary report on rationale for selecting the 7 SMEs to be engaged.
- Business Model canvas and Life cycle thinking tool for at least 5 companies.
- Roadmaps for application of eco-innovation for at least 5 companies.
- Case study report from at least 5 companies as outlined in Annex 1A. template to be provided)
- Lessons learned report (template to be provided by UNEP).
- Final National workshop report.
- Final progress report.

Project Lead & Participating Stakeholders/Partners:

- Egypt National Cleaner Production Centre
- Egyptian Environmental Affairs Agency (EEAA).
- Egyptian Chamber of Chemical Industries.
- Egyptian Chamber of Food Industries.
- SWITCH MED -CEDARE.
- Academy of Scientific Research and Technology (ASRT).
- Academia.
- Financial Institution (National Bank,..).

  NGOs (e.g ICE Cairo)

Possible Funding Model:

International donors, international green funding mechanisms, regional and international development banks.

Policy Enablers:

- Forge international agreements to transfer international knowledge and nurture home grown understanding of the eco-innovation concept.
- Provide educational trainings, certifications and experiential learning through international study tours on how to encourage eco-enterprises.
- Support the creation of demand for green products.
- Provide technical assistance and access to finance to local business and encourage sustainable entrepreneurship.
- Conduct awareness campaigns
- Engaging the private sector, including suppliers.

Expected Results:

Outcomes

- Policy measures for promotion of Eco-innovation for SMEs
- Raising awareness and capacity building on Eco-innovation for SMEs is achieved
- Local manufacturing and upgrading of SMEs through its supply chain
- Innovative access to finance for promotion Eco-innovation is in place for Egyptian market

Indicators:

Execution Indicators

- Assessment national report on (market, company and sector level analysis) with the list of outreached companies and corresponding assessment (at least 20),
- Summary report on rationale for selecting the 7 SMEs to be engaged.
- Business Model canvas and Life cycle thinking tool for at least 5 companies.
- Roadmaps for application of eco-innovation for at least 5 companies.
- Case study report from at least 5 companies as outlined in Annex 1A. template to be provided)

Impact Indicators

- Enabling polices for promotion of Eco-innovation for SMEs
- Demonstration of Eco-innovation in specific sectors
- Up-scaling strategies for eco-innovation tools on national level.

2: SCP Component for Integrated Community Development

The working groups under this component proposed 1 Project

PROJECT # 7:

Productive Low cost Environmentally Friendly Village (PLEV) – National Scale Pilot Project

Presented by:

Housing and Building National Research Center

Cross Cutting Sectors:

Environmental Friendly Technologies for sustainable water and energy, agriculture, waste management and green housing- Economic Development – Social Development - Environmental Planning and Design –Sustainable Energy

Project Rationale/Background

The purpose of this project is to establish a pilot model of a sustainable community based on the existing potentials of one specific site (currently in Fayoum governorate which is the poorest and least developed in Egypt and another proposed location in Minya Governorate in upper Egypt where 850.000 Feddan will be cultivated out of the 1.5 million Feddan National Project). Such model can be documented, assessed, evaluated, and then advocated and promoted for replication to cover the current allocated sites for 400 new communities in desert remote villages as well as the communities will be established around the 1.5 million feddan National Project. This sustainable community model will be the first in Egypt and Middle East.

PLEV project is based on principles of sustainable development as stated in the unified building law and environmental laws as well as the Green Pyramid Rating System (GPRS) as essential conditions for sustainable and green development. The project seeks to embrace innovative technologies particularly relevant to agricultural and desert areas development especially in relation to energy, infrastructure, and sustainable resources management. This approach will be reflected in the project's green economy base, the sustainable and green environmental, physical, and infrastructure planning as well as setting a practical Model for smart villages and community development concepts. The project also gives priority to innovations related to social networking and digital communities.

The basic approach for PLEV is to adopt the lesson learned from the experience of the new cities since their occupancy rate is less than 5 % since it provided housing and commercial locations but did not focus on creating sufficient jobs for the inhabitants. PLEV will provide

for each village about 11,500 jobs of which 8,500 for the village inhabitants and 3000 for workers living around the village location. When expanded to the entire desert villages communities it should establish 4.4 Million jobs in total of which 3.2 Million jobs for the PLEV inhabitants and 1.2 Million for tenants of the surrounding areas. The job creation will mean by fact the increase of the production and added value and in turn will lead to increase of the GDP and the decrease of the social dependency on government by increasing tax revenue and decreasing subsidiary for the poor thus lead to major improvement to the general budget balance of Egypt.

PLEV project deals with three main problems in Egypt which are: Unemployment, Housing & Slum Areas, inefficient use of energy, water and natural resources which resulted deterioration of environment.

- **Unemployment Rate:** Within the larger framework of sustainable economic growth, the project addresses special attention to job creation in all economic sectors including agriculture, industry, services, new technology, energy, affordable low cost housing for the youth, establishing belonging to a community base, establishing a working model for sustainable and green communities. The project will focus on youth as well as the poor, women, and marginal citizens in a multi-disciplinary fashion through life cycle approach. According to a 2015 report that was issued by the Central Agency for Public Mobilization and Statistics (CAPMAS), unemployment rate falls to 12.7% in the second quarter (Q2) of 2015 in the 15-64 age range, The number of unemployed individuals reached 3.5 million, marking 12.7% of the total labor force. The same report showed that Egyptian youth represent 23.6% of the total population, around 20.7m, and around 26.6% of those youth suffer unemployment, while 51.2% suffer poverty, Youth close to the poverty line amount to 27.8%, while those under poverty line comprise 24.1% of their total. Regarding youth unemployment, it reached 26.6% among young people aged 15-29 years, of which 23.6% are aged in the 15-19 age groups. Of this figure, 35.6% were aged between 20-24 years, and 18.5% were aged 25-29 years. However, unemployment amidst educated young people marked 38.2% of the total labor force with the same age range, of which 44.6% held a university education or higher. Of this figure, 35.7% had achieved secondary education, and 33.6% held university or higher education. PLEV targeting to create jobs which will mean by fact the increase of the production and added value and in turn will lead to increase of the GDP and the decrease of the social dependency on government by increasing tax revenue and decreasing subsidiary for the poor thus lead to major improvement to the general budget balance of Egypt .For that PLEV project calling for PRODUCTIVE community.

- **Housing & Slum Areas:** with shortage in the affordable housing units resulting in the growth of slum areas. Although accurate figures are hard to come by, the estimated number of slums in Egypt ranges between 1300 and 1750, and

- accommodating as many as 15 million Egyptians. The government-affiliated Information and Decision Support Center found that by February 2013, the area covered by slums accounted for 37.5 percent of the total area of 226 Egyptian cities. Their report also stated that slums are divided into unplanned settlements, accounting for approximately 97 percent of the area, with the remaining 3 percent classified as unsafe areas. For that PLEV project calling for LOW COST housing & Infra structure.

- **Inefficient use of energy and water:** Environment deteriorating rapidly in Egypt combining with the water, energy and resources declination. Egypt is currently facing a serious energy problem with demand far exceeding current supply taking into consideration that the energy production and consumption mix in Egypt relies mainly on conventional resources. More than 90% of total energy needs come from fossil fuel and natural gas, while the contribution of renewable energy is relatively minor. In addition, The main consumer of electricity in Egypt is the residential sector which accounts for 42% of the total consumption, followed by the industrial sector (28%). The consumption of the residential sector has been steadily increasing in the recent years. Water quantity and quality are both negatively impacted. There is acute water scarcity whereby per capita water share is expected to decline from a current level of 900m3 to about 670m3 in 2017. In addition, the lack of connection to the sewerage system remains a serious threat with less than 5 per cent of households connected in rural areas (ILO, 2010). For that PLEV project calling for Environmentally friendly villages and communities.

Description:

PLEV application at experimental model then scaling up will establish real developed sustainable and green communities where community members can live, work, and enjoy a high standard and quality of life. These are in fact very responsive to the popular demands of the youth and Egyptians in jobs (bread), choices (freedom), and social justice. PLEV will be based on better management of natural and man-made resources, optimizing the use of resources through all aspects of supply – use – demand optimal management. PLEV will establish a community that satisfies the current generation demands and maintain the future generation requirements.

This project aims at establishing an integrated community where young people can live by creating a developed, green, and sustainable human settlement. Hence the basic natural environmental resources will be the base for selection of the location. Then the specific geographical features will be the base for suggested solutions. PLEV will cover a wide range of economic activities including agriculture, animal production, fisheries and fish breading, poultry, industrial activities including agro-industry, micro- enterprises, handicraft and small industries, as well as all services activities. It will cover all community services including education, health, cultural, ICT, and social services. The used urban model is to set an ideal

example for the use of low cost economic and environmental friendly patterns that can be expanded to other areas of Egypt. It will reflect the environmental and geographical location characteristics.

Project Objective:

The proposal main objective is to develop a PLEV methodology that can be tested within this first site of 2000 feddan model and upon its evaluation and proof of success replicated to the rest of Egyptian

Specific Objectives:

- Building 5000 low cost green housing units to establishing a realistic model for affordable low cost housing for the youth using low cost buildings techniques and green technologies in water & energy.
- Housing 25,000 persons to deal with population expansion outside the narrow Nile Valley.
- Creation of 11,500 jobs in PLEV village based on the study of local resources to address chronic unemployment problem.
- Cultivating 1000 Fadden of organic crops using green technologies for modern agriculture
- Integrating economical development in all economic branches including agriculture with all its branches, industry, services, and new technology.
- Saving 8750 GW/hr which is 25 % of expected total Energy Consumption by introduction of Renewable Energy solutions to PLEV community
- Establishing a working model and business plan for sustainable and green communities.

Project Components:

The pilot will be established in the allocated land of 2000 feddan as an experimental & research hub of these three major issues. The village will spread out the know-how in cultivation, water management, left over material recycling & renewable energy technology. It will include five main zones:

Green Techno-Centre Hub (R& D)

- Renewable Energy Techno-Centre
- Agro Techno Centre (Agriculture)
- Aqua Techno Centre (Water)

Productive Park

- Organic Farms
- Green Industry
- Green Business
- Recycling units

Knowledge Park (R& D)

- Eco-Learning Training Centre
- Producing Software for Eco-Learning

Sustainable Residential Neighborhoods (20 Neighborhood)

- 1 Energy Plus
- 19 Energy Efficient

Green Services zone

Project Lead & Participating Stakeholders/Partners:

The following partners will play an active role each within its mandate and jurisdiction

- Organization for the reconstruction and Development of Egyptian Villages (ORDEV) of the Ministry of Local Development
- Desert Research Center (DRC) of the Ministry of Agriculture and land reclamation
- The National Research Center (NRC) of the Ministry of scientific Research
- Environmental Planning and Infrastructure Department, Faculty of Urban and Regional Planning(FURP) of Cairo University
- Egyptian Environmental Affairs Agency (EEAA) of the Ministry of Environmental Affairs
- Each governorate will play the role of authority having jurisdiction on PLEV projects established within its assigned boundaries
- Local civil society partners at the specific PLEV project location will play a major role in community mobilization and beneficiary identification

Possible Funding Model:

Based on percentage contributions of the government, international donors, national banks, regional and international development banks.

Estimated Budget:

Phase	Estimated total budget (LE 1000)
Phase (1) Pre-planning and preparation	350
Phase (2) Planning	890
Phase (3) Design	1120
Phase (4) Implementation	Divided to phases according to the master plan and NONE will be funded through other sources
Phase (5) Capacity Building	420
Phase (6) Service (operation, maintenance, and administration)	250
Phase (7) Monitoring and evaluation for scaling up	450
TOTAL	3480

- Phases was divided according to unified building law 119 for development
- Detailed budget of the project overall implementation can be submitted upon preliminary approval of the project
- Budget include similar funding from each partner agency on a matching fund bases
- Detailed budget can be submitted upon preliminary approval of the project

Management Structure:

The project will be managed through the "Housing and Building National Research Center HBRC" belonging to the Ministry of Housing, Utilities, and New Communities.

Policy Enablers:

This project is essentially linked to the declared national projects in its multi-disciplinary context such as:

- The job creation national project through the creation of 4.4 Million jobs in total
- The national 1.5 Million faddan land reclamation project through reclaiming 1 Million Acres
- The Housing units projects including the 1 Million housing units, the social housing project, and build your own house project. These projects target 3 Million housing units and this project within the different approaches of these projects is targeting 2 Million housing units build by the youth
- The national program for promoting new and renewable energy through adapting innovative energy approaches to achieve self sufficient communities through locally made new technological approaches
- The national project for promoting small and micro industries that can be linked with the "Social Development Fund" and the "Arab Banks Union" initiative

These suggested policies and strategies are based on the past experience of the application of PLEV. Some are essential for success and others are intended to improve the conditions and mechanisms for the project implementation and replication; Taking into consideration that the current proposed pilot of this project already succeeded to have a governor decree to be established.

PLEV is in line with the national development plans for Egypt 2052 and 2030 as issued by GOPP, MOHUNC. PLEV reflects the targets put forward in the Ministry of Finance strategic targets for the physical plans which include as per its executive directive and SDGs including the following;

- It is essential to reconfirm the presidential and prime ministers decrees for the sites, locations, boundaries, and assigned area for each PLEV implementation site and the subsequent decree of the National Land Planning Center should be issued prior to Implementation

- The Local Governorates having jurisdiction over the site should issue a clearance decree for the site protecting it from interference with other agencies and local land informal dealers

- The work on the social axis should be coordinated with the Central Cooperative Union and its local branch to expedite the establishment of the Coop union in accordance with law 110. Such aspect will be conducted on two steps: first establishing the coop unit with the pioneers then adding each beneficiary as the project develops

- Although DRC predicts the high potential for using drainage water or fresh water with lower salty quality the site should be coordinated with the Ministry of Water Resources and Irrigation to avoid future hindering

- PLEV site Governorate should establish a decision making committee with representatives of each sector to facilitate and expedite project implementation. This committee should meet at least once a month to address any circumstances that may arise. A budget for such committee should be included in the PLEV project budget

- It is recommended that promotional conferences should be conducted early in the project implementation and should be sponsored by the governorate under its investment attraction effort and budget

- It is essential to direct parts of the national funding allocated to each sector towards PLEV projects

- Considering the housing units 5000 each PLEV for a total of 2 Million units for the 400 PLEV villages in 27 governorates as per the 1 Million units project and the social housing project or built-your-house project

- Consider the land reclamation of 2500 acres per PLEV for a total of 1 Million acres as an initiative to the national project of reclamation of 1 Million acres with the Ministry of Agriculture

- Assign the industrial and technological parks of each PLEV as part of the Industrial Development Agency effort with potential financing from the Industry Renovation Fund The complementary requirements of roads, bridges, etc… should be included in sectors budgets as the case may arise.

Expected Results:

Impact

This project is expected to contribute to national level strategies essentially linked to the declared national projects in a multi-disciplinary context including:

- The job creation national project through the creation of 4.4 Million jobs in total
- The national 1 Million acres land reclamation project through reclaiming 1 Million Acres
- The Housing units projects including the 1 Million housing units, the social housing project, and build your own house project. These projects target 3 Million housing units and this project within the different approaches of these projects is targeting 2 Million housing units build by the youth
- The national program for promoting new and renewable energy through adapting innovative energy approaches to achieve self-sufficient communities through locally made new technological approaches
- The national project for promoting small and micro industries that can be linked with the “Social Development Fund” and the “Arab Banks Union” initiative

Long-term Results

- Establish a solid sustainable economic base focusing on agro-industrial innovations and build around the maximization of the added value and contributing to exportation of made in Egypt products
- Establishing, creating, and promoting the sense of belonging to a community: which is causing so much division in Egypt today and is a fertile ground for extreme deviated attitudes that results in terror and subsequent violence
- Establishing a working model for sustainable and green communities: It is a fact that there are no neither sustainable nor green cities nor villages in Egypt. This is hindering many development efforts and rendering them fruitless. The project will produce sustainable and green communities that houses 12 % of Egyptian
- population and with the proper promotion tools and mechanisms will make Egypt entirely sustainable and green

Expected Project Outputs (expected deliverables of this pilot)	Outcomes	Impact (for the entire 400 rural desert villages)
1. Population 25,000 persons will be housed to deal with population expansion	Attracting 25.000 persons outside the narrow Nile Valley in the pilot.	The whole population of 10.000.000 is able to meet their essential needs of housing and well being in a sustainable manner. Ensure healthy lives and promote well-being for all at all ages
2. Green Housing Units: 5000 green low cost housing units will be constructed	Establishing a realistic model for affordable low cost housing for the 25000 inhabitant's youth.	A total of 2 Million units that will cover the national projects. Including replication the Earth Structures Model developed by HBRC with estimated cost of LE 60,000 for each housing unit which can be made affordable through a rotating fund financing scheme. This will result in affordable housing for the poor and the youth relieving the rapid expansion of slum areas through cutting out its source and decreasing the violence resulting from deprivation of essential services and erosion and sliding of middle class into the low income category
3. Job creation: 11,500 Green Jobs will be created based on local resources & green business	57500 family will have a sustainable income to satisfy their needs	A total of 4.6 Million jobs will be created which establish a productive community
4. Land Reclamation 1000 Fadden of organic crops will be cultivated using green technologies for modern agriculture depends on the analysis of each soil and available water resources.	25,000 households are able to meet their food needs in terms of quality and quantity at all times.	Total of .4 Million faddan for the 400 PLEV villages will be cultivated which will help to end hunger, achieve food security and improved nutrition and promote sustainable agriculture

5. Saving energy by Introduction of Renewable Energy solutions to PLEV 8750 GW/hr will be saved which is 25 % of expected total Energy Consumption by introduction of Renewable Energy solutions to PLEV community	Ensure access to affordable, reliable, sustainable and modern energy for 25000 persons in PLEV Average Energy consumption per capita in Egypt = 1400 kw/hr (Ministry of electricity) Expected total Consumption = 1400 *25000 = 35.000.000Kw/hr = 35000GW/hr 25% * 35000 = 8750 GW/hr Taking into consideration that: *Energy consumption per capita in Minya = 650 kw/hr *Energy consumption per capita in Fayoum = 890 kw/hr	Total of 8750 Gw/hr * 400 = 3500.000 Gw/hr for the 400 PLEV villages And also Ensure access to affordable, reliable, sustainable and modern energy for 10.000.000 inhabitants in all PLEV villages
6. Saving Water by Introduction of sustainable management of water and Eco sanitation to PLEV 812.500 Lit/day will be saved which is 25 % of expected total Energy Consumption will saved by sustainable management of water and Eco sanitation to PLEV According to Egyptian code water consumption in villages 130 lit/day/person	Ensure access sustainable management of water and Eco sanitation for 25000 persons in PLEV According to Egyptian code water consumption in villages 130 lit/day/person Expected total Consumption = 130 *25000 = 3.250.000 Lit/day = 25% * 3.250.000 = 812.500 Lit/day	Total of 812.500 Lit/day * 400 = 325.000.000 lit/day for the 400 PLEV villages Ensure availability and Eco sustainable management of water and sanitation for for 10.000.000 inhabitants in all PLEV villages

Indicators:

Execution Indicators

- Number of jobs created: in comparison to the detailed total number
- Number of jobs created for out of village workers: in comparison to the detailed total number of workers from the surrounding area
- Economic production measure for each sector including:
- 4.1 Area of reclaimed land: in comparison to original plans
- 4.2 Amount of heads for each of animal – poultry – fish – and other life-stock: in comparison to target ones
- 4.3 Number of industrial projects for each of medium and small: in comparison to target

- 4.4 number of micro enterprises projects including local – culture – handicrafts – in-house – projects for persons with special needs: in comparison to targets and community overall ratio
- Number of constructed housing units: in comparison to targeted number
- Average cost of housing unit constructed: in comparison to the national cost for social housing project and build your house national project
- Membership in the Cooperative society: in comparison to the ultimate number related to number of jobs created and number of housing units heads
- Cost and operation performance of infrastructure: in comparison to national figures for new communities established through different agencies in Egypt
- All indicators related to sustainable development in accordance with the unified building law number 119 to the year 2008
- All indicators stated in the green pyramid rating system to ensure at least golden rating to the village
- Indicators related to basic services for community as suggested by UNICEF for children, UNDP for human development index, quality of life indicators, international competitiveness indicator, and progress of the nations indicators as related to reviewed MDGs

Impact Indicators

- Number of attracted population within governorate and outside it: to measure population expansion outside the narrow Nile Valley
- Total number of jobs created and the support ratio: to measure job creation to address chronic unemployment problem
- Total product of the village in comparison to national growth product per capital and the balance of the total consumption by the village as allocated to each sector and category: to measure integrating economical development in all economic branches including agriculture with all its branches, industry, services, new technology
- Total energy production and consumption in the village from new and renewable sources in comparison to total demand and rationalised optimal use of energy in the village: to measure the introduction of self sufficient Energy solutions to new communities
- Total number of housing and services units and their costs in comparison to average national figures: to measure establishing a realistic model for affordable low cost housing for the youth
- Performance indicators for the implemented low cost on site environmental and user friendly infrastructure in comparison to the nationally applied conventional technologies: to measure the potential and availability of such technology to be applied in other ventures in Egypt
- Indicators of the gap filling approach to measure the knowledge, attitude and practice (KAP) of the established community before and after the intervention: to measure the establishing, creating, and promoting the sense of belonging to a community

3: SCP Component for Sustainable Agriculture

The working groups proposed 6 projects under this component

PROJECT # 8:

Renewable Energy Applications for Improving on-farm Irrigation and Water Pumping systems in Olive Farms in Wadi El Natroun and old/reclaimed Lands

Presented by:

ENCPC team and Olive Oil Council

& Ministry of Agriculture

Cross Cutting Sectors:

Agriculture - Sustainable energy applications for improved irrigation

Project Rationale/Background

Egypt is embarking on an ambitious strategy for reclamation and cultivation of around 4 million Feddans in the up-coming ten years. Egypt's demand for electricity is growing rapidly and the need to develop and use sustainable energy resources is becoming ever more urgent. It is estimated that demand is increasing at a rate of 1,500 to 2,000 MW a year, as a result of rapid urbanization and economic growth. The agricultural sector in is one of the largest sectors in Egypt in terms of economic value and employability.

Furthermore, improving surface irrigation system and introducing solar energy to operate irrigation systems on farm level to offer a sustainable, environmentally friendly, and more reliable agricultural production system is becoming a key priority in Egypt's agriculture sector. The old water-lifting and pumping stations depend on petrol and result in a considerable emissions of greenhouse gases. The cost of petrol in ever increasing and in many cases it is not available, which result in increased cost of production and irregular supply of one of the important inputs. Specifically, the rationale of the project is based on the following elements:

- Rationalization of irrigation water through saving water used in surface irrigation system.
- Increased cost and unreliable supply of petrol for operation irrigation pumping
- Improving water distribution on farm level and hence increasing water productivity
- To reduce the greenhouse gases emissions from on farm irrigation systems
- Improving farmers health through reducing the risk of infection from direct contact with water

- Increasing production per unit area of land
- Helping reducing the use of petrol for agriculture sector

In this context, Egypt is targeting to cultivate around 100 million olive tree by 2020 where the actual number reached right now is around 25 million tree in 2012 especially in the Western Desert of Egypt. The using of integrated solar system for pumping and irrigation of olive farms especially in off-grid and remote areas instead of using diesel-powered pumps will contribute to increase the productivity of Egyptian Olive sector.

The project will be implemented for Olive farms in Wadi El Natroun in Western Desert in Egypt with a testing model of an integrated solar PV system for production of electricity (around 122 kw) for irrigation of a pilot farm of 100 Feddan (around 100 water m3/hour).

Project Components:

Description:

The existing conventional technologies for water irrigation in Egypt, are mainly diesel-powered pumping systems which pose an over- burden on the Egyptian agriculture sector especially in the off-grid and remote areas in terms of dramatically increase of cost of diesel fuel in Egypt and significant associated environmental impact. The proposed technology solution under this concept is to test the application of integrated solar Photovoltaic (PV) water pumping system for irrigation of Olive farms in Wadi El Natroun in the Western Desert in Egypt. The innovative system is consisting of two basic components: The first component is the power supply consisting of photovoltaic (PV) panels to produce direct current (DC) electricity when exposed to light. This DC current is collected by the wiring in the panel. It is then supplied either to a DC pump, which in turn pumps water whenever the sun shines, or stored in batteries for later use by the pump. The other major component of this system is the pump. Solar water pumps are specially designed to use solar power efficiently which use DC current from batteries and/or PV panels for pumping and irrigation from nearby water well.

In addition, the project will target setting the technologies needed both for on-farm irrigation systems; water resources development. The project will target field and horticultural crops, conventional and organic farming, in delta, valley and new lands; and renewable energy modules by establishing models for small, medium and large size farms with stakeholders and support the financing of a Mega project using renewable energy for improved on farm irrigation. In this respect, the project will support the application of the proposed irrigation models in two selected governorates; one in old land and one in newly reclaimed lands.

Project Objectives:

Project Objective

To improve surface irrigation system and introducing solar energy to operate modern irrigation systems on farm level to offer a sustainable, environmentally friendly, and more reliable agricultural production system

Specific Objectives

- Reducing cost of diesel powered motor pumps (with compete removal of governmental subsidy)
- Reducing of cost of integrated drip irrigation system in remote areas
- Reducing in carbon intensity
- Boosting Agribusiness incomes with its subsequent socio-economic impact

Project Lead & Participating Stakeholders/Partners:

Solar Water Pumping

- The Egypt National Cleaner production Centre (www.encpc.org)
- The Egypt Olive Council as a NGO gathering all the Olive farms and olive oil producers in Egypt.

On Farm Irrigation using PV

- Climate change information Center, MOALR main project leader
- Water resources Research Center MWRI
- Arid Lands Agriculture Studies and Research institute, Ain Shams University ASU
- Sustainable Agriculture Center, Heliopolis University SAC-HU
- Private sector farms and cooperatives (TBN)

Possible Funding Model:

- Design of an innovative financing scheme of up-scaling and promotion of model in whole sector
- Contributions from the government, international donors, national banks, regional and international development banks.

Estimated Budget:

1 million Euro for solar water pumps

20 Million Euros for Irrigation Systems

Policy Enablers:

- Technical Assistance for Design and Implementation for integrated PV Model for irrigation of olive farms
- Capacity Building and Raising Awareness on Renewable Energy Application in Agricultural Sector
- Demonstration of pilot project in one of olive farm
- Approving continues water supply in branch canals to allow irrigation upon demand.
- Making a credit line available for the farmers to construct the system at no or low interest rate
- Supporting agriculture extension system to offer appropriate advise for the farmers

- Allowing the introduction of tax-free photovoltaic cells to reduce the cost of installing the system
- Improving the agriculture cooperatives to allow one window for farmer's cooperation.

Expected Results:

Impact

Expanding the use of Integrated solar PV system for production of electricity for irrigation purposes in sustainable integrated communities

Outcomes

- Enhancing the local production of modern irrigation systems
- Introducing a strong market demand on solar energy equipment that encourage local industries
- Reduce water consumption for agriculture
- Improve health and wellbeing for farmers
- Increasing the productivity of Egyptian Olive sector.
- Reducing of cost of integrated drip irrigation system in remote areas.
- Possibility to apply the model in other corps.

Outputs

- Reducing water consumption by about 30% on farm level
- Increasing crop productivity by about 10-15%
- Reducing the fossil fuel consumption in agricultural operations
- Reducing the incidence of infectious water-borne diseases
- Technical Assistance for Design and Implementation for integrated PV Model for irrigation of olive farms
- Capacity Building and Raising Awareness on Renewable Energy Application in Agricultural Sector
- Demonstration of pilot project in one of olive farm
- Design of an innovative financing scheme of up-scaling and promotion of model in whole sector
- Implement a testing model of an integrated solar PV system for olive farms in Wadi El Natroun in Western Desert

Indicators:

Execution Indicators

- No of Olive farm owners and stakeholders attending the workshops for raising awareness.
- No. of Trainees for building capacity
- Implementing integrated PV Model for irrigation of olive farms
- No. kilowatts emerging from integrated solar PV system for production of electricity (target 122 kw for irrigation of a pilot farm of 100 Faddans) (around 100 water m3/hour).

Impact Indicators

- Increasing the productivity of olive pilot farm
- Increasing awareness and capacity building on renewable energy application in agricultural sector (through Questionnaire and training tests)
- Reducing of cost of integrated drip irrigation system in remote areas

PROJECT # 9:

Promoting Sustainable Agricultural Production by Optimizing Water and Fertilizers use in Desert Lands

Presented by:

Soils, Water and Environment Research Institute, (SWERI) Agricultural Research Centre & Climate Change Information Centre

Cross Cutting Sectors:

Agriculture - Environment- Water Resources/Extension Services

Project Rationale/Background

The agricultural land base in Egypt is about 3.2 million hectares or 3.5% of the total area. The agricultural land covers three different production zones namely: 1) the old irrigated lands (2.3 million hectares) lying in the Nile Valley and Delta, 2) the newly reclaimed desert lands of sandy and calcareous origin (0.8 million hectares). Although these now represent about 26% of the total cultivated area and consume 16% of the Nile water, they contribute only 7% to the value of agricultural production. Productivity of field crops is only about 50-60% of that of "Old Lands", and 3) the rain fed areas (0.1 million hectares) located in the Northwest Coast and North Sinai.

Water is a vital and limited resource in Egypt. In 1990, the country reached the so-called poverty line with a per capita water share of almost 1000m^3/year. This is expected to fall to less than 500 m^3 by 2030, when the population reaches an estimated 100 million. Because of increasing population, demand for irrigation water will continue to increase. Water availability to the agricultural sector is becoming a major constraint to agricultural production. Abu Zeid (1999) indicated that about 84% of water resources are consumed by agricultural sector. One way to maximize the use of this limited resource is to improve water management techniques and the use of proper and more efficient irrigation systems (i.e. drip and sprinkler systems), especially in the newly reclaimed soils. Drip and sprinkler irrigation systems are considered high efficient methods of delivering water and fertilizer uniformly to most crops. Bucks and Davis (1986) demonstrated that both systems increased the beneficial use of water, enhanced plant growth and yield, reduced salinity hazards, improved application of fertilizer (fertigation) and other chemicals (chemigation), decreased energy required and improved cultural practices.

On the other hand, chemical fertilizers are heavily used in Egypt to maintain soil fertility and to ensure crop productivity under the intensive cropping system followed in Egypt. Badiane et al. (1994) reported that Egypt's consumption of fertilizers is 10 times more than

the average of the whole world. Nitrogen fertilizer consumption was approximately doubled in 1993 as compared to 1980 (IFDC, 1993). With high rates of chemical fertilizers being applied to different crops and due to low N-recovery and low irrigation efficiency (due to over irrigation), a significant amount of applied N-fertilizer is lost (Hammissa et al., 1987 and Abdel Monem et al., 1994).

Due to increasing international concern about the environmental effect of N lost from fertilizer as leached nitrate or as volatile N gases, it is likely that there will be resurgence in the utilization of bio fertilizers to compete or to replace fertilizer inputs (Peoples et al., 1994). In fact biological and organic fertilizers offer an economically attractive and environmentally sound means of reducing inputs of chemical of chemical fertilizers.

Fertigation is the most flexible and efficient method of applying both nutrients and water. Utilization of this technique will help increasing crop production and benefit both the farmers and the environment as well as help ensure food security.

As such, the rationale for this project is:

- Saving irrigation water used
- Decrease chemical fertilization by using bio-fertilizers
- Improve water productivity
- Optimize water use efficiency
- Increase crop productivity special in reclaimed soils
- Produce healthy food for humans
- Decrease the environmental hazards

Project Components:

Description:

Phase 1: Adaptive Research

- Prepare the data base on irrigation systems in newly reclaimed soils.
- Decided the areas under investigation at different newly reclaimed soils.
- Cultivars will be tested, amount of water, types of fertilizers and rates of application.

Phase 2: Pre-module application on a pilot scale

- Test module under surface drip irrigation system
- Test module under solid-set sprinkler irrigation system
- Undertake Soil, water and plant measurements
- Efficiency of the bio-fertilizers in saving chemical NPK fertilizers will be considered:
- Research-managed on-farm and demonstration trials
- Economic assessment and reporting
- Apply the module in reclaimed soils at different sites to confirm the results.

Project Lead & Participating Stakeholders/Partners:

- Soils, Water and Environment Research Institute, Agricultural Research Center
- Climate change information Center and renewable energy, Ministry of Agriculture
- Extension service, MOALR

Possible Funding Model:

International donors, international green funding mechanisms, regional and international development banks.

Management Structure:

Soils, Water and Environment Research Institute, (SWERI) Agricultural Research Centre will be the main coordinator for the project. Climate change information Centre will share the SWERI in carry on the experience on farm trials. Project executive team involved different Departments from SWERI and Water resources .Extension services will transfer the information to farmers and farming communities.

Policy Enablers:

- Increase the capacity building of extension service staff to be informed with the new techniques of fertigation
- Applying the recommendation of output project to achieve the benefice from project
- Disseminate the valuable results of project on concerning organization and beneficences
- Transferring acquired experience to the target farmers in the proposed research area and other areas having similar conditions.

Expected Results:

Impact

Outcomes

- Increase the net come of farmers
- Save water in reclaimed soils to increase the reclamation the desert
- Decrease environmental hazards by reduce the chemicals in agriculture practice
- Production of healthy food for life

Outputs

- Improve crop water management practices (irrigation scheduling, irrigation water requirements and developing crop coefficients for the selected crops).
- The techniques to increase water productivity (yield per unit water).
- Provide the farmers and extension agents with the information about the best practices to follow to produce crops with reduced needs for chemical inputs for fertilization.

- The techniques to raise and maintain soil fertility and its productive potential using the balanced forms in economically compound fertilizers.
- The techniques to minimize external, especially chemical, inputs in crop production and pest control.
- Economic and social impact assessment of the technology used.
- Technology transfers of the gained results to target farmers (graduates, beneficiaries and small investors).

Indicators:

Execution Indicators

- New irrigation system to reduce the water consumption
- Introduce the new technology by replacing partially chemicals for agriculture by biological tools.
- Farmers and farming communities at the proposed area (as well as farmers under similar conditions) through the participation in the on-farm and demonstration-plot activities, organizing field days and distribution of information and extension materials.
- Extension services, through the provision of recommendations and guidance, enabling them to help their clients more effectively.

Impact Indicators

- Provide an alternative chemicals for agriculture by biological resources
- Increase capacity building for extension staff for new technology
- Increase water use efficiency

PROJECT # 10:

Utilizing Solar Energy for Drying Agriculture Products in Egyptian Rural Areas

Presented by:

NREA Team, Ministry of Agriculture

Cross Cutting Sectors:

Energy and Agriculture

Renewable Energy Application in the Agriculture Sector

Project Rationale/Background

Drying crops is critical for preserving product quality and achieving a storage life of 1-3 years, however, it consumes significant amounts of energy usually by burning diesel or gas. Hot air drying can also cause damage to seeds by breaking essential enzymes, thus affecting germination rates and rendering the product not suitable for use. Alternative drying techniques replacing fossil fuel energy by solar or biomass energy have been widely investigated, and are being therefore developed in order to reduce energy use and its associated cost, while improving product quality. The drying machines operate by drying ambient air in a dehumidifier module using solar energy. The dried air is then blown on to the bin containing the wet product.

The rationale for proposing this project is:

- The Egyptian economy is depending mainly on agriculture activities.
- National Strategy for Renewable Energy is to satisfy 20% of the generated electricity by renewable energy resources by 2020.
- Egypt is ranked 11th worldwide in growing Carbon emissions.
- Heating for drying is considered as one of the most important processes in the agriculture sector

Description:

Project Objectives:

Overall Objective: Promotion of Renewable Energy application in the Egyptian Agriculture Sector in rural areas

Specific Objectives:

- To demonstrate the technical viability of solar drying
- Promoting of local manufacturing of Renewable Energy Technologies for Agriculture application.
- Reduction the use of conventional energy sources in the Agriculture sector.
- Creation of jobs
- Reduction of GHGs and its environmental impact

Project Components:

Technical Component–Support the deployment of solar thermal technologies for dryers in agriculture application. Enhancing the local manufacturing of solar energy components for heating. Build the Capacity of technical staff designing, developing and servicing solar dryers.

Financial component – Development of innovative financial package for solar energy technologies to be extended with more fund from other interested donors.

Project assumptions:

- No. of Units: 250 Units
- Technology: Concentrated Solar
- Estimated Unit cost 4000 $
- Estimate total Cost: one Million US$
- In addition to 10% as contingency.

Project Lead & Participating Stakeholders/Partners:

- Egyptian New & Renewable Energy Authority (NREA).
- Egyptian Ministry of Agriculture.
- Egyptian Organization for Standardization (EOS)
- Federation of Egyptian Industries (FEI)- Chamber of Engineering Industries
- Agriculture Credit Bank.
- Agriculture Associations.
- International Centers of Excellences (China and India)

Possible Funding Model:

Design of an innovative financing scheme of up-scaling and promotion of model in whole sector

Policy Enablers:

- Development of standard specifications for manufacturing of solar dryers for agriculture sector to ensure its high quality and performance
- Design innovative financing package for financing of solar dryers.

Expected Results:

Impact

Promotion and dissemination of renewable energy application in the agriculture sector in Egypt

Outcomes

- Promotion of Renewable Energy application in Egypt
- Egypt to become main supplier of solar dryers for African & Middle East countries

Outputs

- Design of incentive schemes & policies to promote local manufacturing of solar dryers.
- Capacity building for local Egyptian small & medium industries in the field of manufacturing of solar dryers
- Development of standard specifications for manufacturing of solar dryers for agriculture sector to ensure its high quality and performance
- Design innovative financing package for financing of solar dryers.

Indicators:

Execution Indicators

- Design of incentive schemes to promote local manufacturing of solar dryers.
- Capacity building for local Egyptian manufacturing of solar dryers.
- Development of standard specifications for manufacturing solar dryers for agriculture sector to ensure its high quality and performance

Design innovative financing package for financing of solar dryers.

PROJECT # 11:

Promoting Agricultural Waste Recycling in Egypt's Governorates

Presented by:

Agriculture Economic Research Institute (AERI)

Cross Cutting Sectors:

Agriculture-Waste-Energy

Project Rationale/Background

The volume of agricultural waste in Egypt ranges between 30-35 million tons a year of which only 7 million tons is being utilized as animal feed and 4 million as organic manure. The amount and type of agricultural residues depend on a variety of factors; purpose of crop cultivation, uses and consumption pattern of plants, growing season, agro-industrial methods, and behavior of beneficiaries of plant and its residues. These crop residues result after harvesting and are characterized as coarse plant byproducts, big size, chemically low in protein and fat contents, and also high in lignin and cellulous contents. The problem of agriculture waste becomes very obvious and aggregated after the harvest of summer crops. That is because at this time of the season, farmers are in a rush to re cultivate agricultural land, therefore getting rid of the waste represents their highest priorities, usually by burning. As such, burning agricultural waste is not only considered an economic loss but also has harmful effects on the environment. These harmful effects are emission of poisons gases to the air and reducing the microbial activities in the soil. In addition, storing agricultural waste in the field after compacting may result in the reproduction and growth of pests and pathogens that will attack new crops. Therefore, utilization of agriculture wastes in any other environmentally friendly way is very important. This can be achieved through (i) Compost production by fermenting the agricultural waste as a way of recycling which can then be used in re fertilizing the soil organically and reduce the production cost, (ii) Animal feed production by treating some waste such as rice straw by Urea or ammonia to increase its nitrogen content hence its nutritional value, (iii) Food production by growing mushroom on agricultural wastes such as rice straw as a substrate through the conversion of wastes to economic, nutritional human food. Growing vegetables on rice straw compacted bales in areas where soil disease and salinity are constrains, and (iv) bio gas production.

Description:

Project Objective

To promote the use of agricultural waste recycling technologies in rural villages in Lower and Upper Egypt governorates

Specific Objectives

- Establish a pilot project for a household bio-gas unit (10 cubic meter) using agricultural and animal waste
- Establish a pilot unit for a compost production unit
- Establish a pilot unit to produce non-conventional feedstock
- Establish a pilot unit for wastewater reuse for irrigation purposes
- Build the capacity of farmers and agriculture field staff about the basics of agricultural waste recycling in Egypt's rural areas.
- Implement 100 field days for practical demonstration of agricultural waste recycling in selected villages

- Awareness raising about agricultural waste recycling technologies in selected villages including a wide range of stakeholders (decision makers, policy makers, community leaders, media, etc..)
- Produce and disseminate communication and specialized material for agricultural waste recycling technologies

Project Components:

The project will examine different techniques to use agricultural waste, including:

- Composting: Compost is a mixture of crop residues and animal manure fermented together for a period under aerobic conditions. Compost is used for plant nutrition in organic agriculture and is the cornerstone of nutrient resources to conserve soil fertility. With increasing availability of nutrients and improvement in the chemical and physical structure of the soil, crop production also increases. The use of organic compost reduces pollution and consequently health problems with pathogens available in raw animal wastes. In the composting process, heat reaches 70 Celsius for a number of days, killing bacteria, protozoa, and weed seeds. Accordingly, Compost plays a variety of roles in soil fertility and productivity, including:

    - Providing soils with needed humus to improve the soil's physical properties
    - Decreasing water volume needed for irrigation by increasing the soil's capacity to hold water
    - Building soil structure
    - Increasing the capacity of the soil's molecules to exchange cations
    - Adding elements required by plants to the soil.

- Animal feed production: The direct use of agricultural residues as animal feed or as a component of such feeds is one of their oldest and most widespread methods of disposing of these residues. In rural Egypt, cellulose residues play an important part in animal production. Agricultural residues are lower in value as feeds than those specifically processed for animal production. Residues are high in fiber low in protein, minerals, and vitamins. Several methods for increasing feed intake and efficiency have been developed through physical, chemical and microbial treatments of the raw materials. Processes for increasing the digestibility of agriculture residues and availability of nutrition to the animal include:

    - Physical treatment: Shredding dried crop residues and mixing them with green wastes or clover producing green fodder without soil.
    - Biological treatment: Producing silage from fresh agriculture residues and/or such residues mixed with green wastes Improving dried crop residues by use of white rot fungi to increase nutritional value

- Chemical treatment: Spraying or mixing agricultural residues with urea solution Injecting agricultural residues with anhydrous ammonia Mixing agricultural residues with sugarcane molasses.

- Mushroom culture: Various agricultural residues - rice straw, wheat straw, peanut peels, and barley straw- can be used as substrates to grow mushroom for human consumption. Different strains of mushroom cultures were tested for their efficiency in producing fruiting bodies of good quality. Average production of mushrooms on rice straw was 2.0 kilograms (kg) fruit bodies per one kg of moistened rice straw incubated for 40 days.

- Biogas production: Small-scale anaerobic digestion and production of biogas is a widely used process. Historically, the reason behind developing biogas technology was the search for an alternative energy source; however, other environmental aspects and organic manure production have gained additional, often major, importance. The biogas plant is designed to process animal manures and organic wastes to produce biogas and sludge and to control environmental pollution. The plant consists of two main parts: a digester (or a set of them) where the organic materials are organically processed; and the gasholder (or a set of them) where the biogas is collected and stored pending use. Biomass energy has traditionally been used for cooking and baking, which was done in low-efficiency stoves or on open fires. In addition, removal of these nutrient-rich resources from the fields deprived the soil of much needed fertilizers and their replacement often means the use of chemicals. Nevertheless, biogas technology has the potential to become interesting as a way to improve the energy release from agricultural residues, save plant nutrients, and improve health conditions and quality of life in the rural communities. Biogas technology provides:

  - A clean and convenient fuel for cooking, lighting, and heating
  - Electricity for irrigation pumps and other internal combustion engines
  - Manure that is richer in nitrogen, phosphorus, and potassium (NPK); contains suitable amounts of micro-nutrients; acts as a growth regulator; and is more free of pathogens and parasites than traditional farmyard manures. In addition, crop stalks and straw - that are otherwise burned as fuel- are saved for use to make fodder and/or silage and produce compost.

The project includes 4 main phases:

- **Phase 1:** Assessment of available technologies for agricultural waste recycling and typical problems/challenges facing farmers to adopt these technologies
- **Phase 2:** Study current situation for the use of agricultural waste in Delta and Upper Egypt

- **Phase 3:** Capacity building and on site trainings for farmers to gain experience on how to use agricultural recycling technologies especially bio-gas units
- **Phase 4:** Pilot projects to implement agricultural recycling projects in different governorates

Project Lead & Participating Stakeholders/Partners:

AERI – Agriculture Economic Research Institute in collaboration with:

- Soils, Water and Environment Research Institute, Agricultural Research Center
- Agricultural Research Center
- Extension service, MOALR
- Economic Affairs Sector, MOALR
- NGOs/Civil society organizations
- Agricultural cooperatives

Possible Funding Model:

Design of an innovative financing scheme of up-scaling and promotion of model in whole sector

Estimated Budget:

2.7 million Euros

Policy Enablers:

Support government efforts to limit the negative environmental effects results from burning waste, especially rice straw which lead to Egypt's chronic problem of black cloud

Expected Results:

Impact

Promotion and dissemination of renewable energy application in the agriculture sector in Egypt

Outcomes

- Improved Environmental conservation
- Enhanced capacity for agricultural waste recycling
- Improved social and economic benefits for farmers from cost savings and employment opportunities in new areas of agricultural waste recycling
- Industrial activities along the waste recycling value chain
- Rural development

Outputs

- 100 biogas pilot units (capacity of 10 cubic meter) constructed
- 100 practical demonstration days on agricultural waste recycling
- 10 awareness sessions including 500 participants
- Conference promoting agricultural waste recycling technologies
- Compost production unit in operation
- Non-conventional feedstock
- 10,000 Communication material, booklets, and brochures presenting agricultural waste recycling technologies

4: SCP Component for Sustainable Water Management

The working group proposed 3 projects under this component

PROJECT # 12:
A Modified Wastewater Reuse Code

Presented by:

- Centre for Environment and Development in the Arab Region and Europe (CEDARE)
- Ministry of Water Resources and Irrigation - HCWW - Ministry of Agriculture and Land Reclamation

Cross Cutting Sectors:

Housing, Utilities & Urban Communities Sector, Agricultural Sector, Environmental Sector, Rural Development Sector

Project Rationale/Background

According to the Egyptian code for wastewater reuse (no.501 /2005), no edible crops can be cultivated and irrigated on wastewater – regardless of the treatment level. This is considered as barrier for wastewater reuse projects and which is also too restrictive comparing to WWR codes of other countries. The modified Wastewater Reuse Code should address the following aspects:

- Level of wastewater treatment (three to four degrees of wastewater treatment)
- Types of plantations and crops for which irrigation by treated wastewater is permissible
- Regulations for irrigation and drainage systems
- Regulations to control the extent of direct exposure of workers and the public
- Institutional system (responsibility & commitment of concerned agencies, inspection and corrective actions

As such, the project rationale is based on the following elements:

- Egypt has to face the water scarcity challenge and
- 7.6 Billions m3 /Year of wastewater are produced and need to be efficiently put to use
- Wastewater is expected to reach 11.6 BCM/year by 2030
- Wastewater is currently restricted to non-edible corps, and Forestations projects which should not be the ultimate goal of wastewater reuse projects
- There is an increasing water demand for agricultural expansion and food security
- Recommendation by Egypt 2030 Strategic Vision for Wastewater Reuse

Description:

Project Objectives:

Classification of plants and crops allowed for irrigation with different levels of treated Wastewater

Project Components:

Implementation phase I

Review of:

- Studies available from the Egyptian experience
- International experience, and in the Arab Region
- Guidelines of FAO, WHO, US-EPA and UNEP on wastewater reuse in agriculture purposes
- Conduct Expert Meetings
- Conduct National Dialogues

Implementation phase II

Draft Modified Code by:

- Describing different levels of wastewater treatment (Characteristics)
- Specifying crops
- Specifying methods and conditions for irrigation
- Specifying public health requirements, in relation to the circulation of crops\
- Specifying public health requirements in relation to agricultural workers
- Specifying monitoring and control systems

Project Lead & Participating Stakeholders/Partners:

- Ministry of Water Resources and Irrigation
- Ministry of Housing, Utilities & Urban Communities
- Ministry of Agriculture and Land Reclamation
- Ministry of Environmental Affairs
- CEDARE
- Arab Water Council
- FAO

Possible Funding Model:

Based on percentage contributions of the government, international donors, national banks, regional and international development banks.

Estimated Budget:

100,000 USD

Policy Enablers:

Main Policy Action to be adopted by the Government to achieve strategic vision in wastewater reuse projects:

- Improve Sanitation Services
- Improving the Quality of Treated Wastewater
- Promoting the Involvement of Private Sectors in Reuse Projects
- Modify Wastewater Reuse Code to allow for a wider agriculture production including edible crops.

Expected Results:

Impact

Enhanced classification of plants and crops allowed for irrigation with different levels of treated Wastewater

Outcomes

- Achieving Sustainable Consumption of Wastewater
- Achieving Sustainable Agricultural Production & Food Security
- Achieving Sustainable Environment & Pollution Abatement

Outputs

- Expert Meetings
- National Dialogues
- A modified Wastewater Reuse code

Indicators:

Execution Indicators:

- Number of Expert Meetings
- Number of National Dialogues
- Draft Modified Code
- Approval & Issuance of Modified Code

Impact Indicators:

- Implementation of Code in Wastewater Reuse Projects
- Including Wastewater Reuse as a source of Irrigation for the 1 Million Feddan Agriculture Project

PROJECT # 13:

Integrated Waste Water Reuse Pilot Project

Presented by:

- Centre for Environment and Development in the Arab Region and Europe (CEDARE)
- Ministry of Water Resources and Irrigation - HCWW - Ministry of Agriculture and Land Reclamation

Cross Cutting Sectors:

Housing, Utilities & Urban Communities Sector - Agricultural Sector - Environment Sector - Industrial Sector - Rural Development Sector

Project Rationale/Background

With the surface water resources of Egypt currently fully exploited, and the groundwater pumping reaching the maximum limit, the need for alternative water resources has never been of profound urgency as it is nowadays. As of 2011, the national produced wastewater amounted to about 7 BCM, about 3.7 BCM of which were untreated, 2.4 BCM were secondary treated, 0.9 BCM were primary treated, and only 0.068 BCM were tertiary treated. Out of all the 3.368 BCM of treated wastewater, only 0.271 BCM are reused directly for Agriculture, while the remaining amount is disposed to the national drainage network. By 2030, the total population of Egypt is expected to reach 112.27 Million inhabitants based on an annual growth rate of 2.2 %. The total national amount of produced wastewater in 2030 will be about 11.673 BCM. Assuming that all primary treatment plants will be upgraded to secondary, the total expected amounts to be secondary treated at the national level in 2030 is 11.606 BCM. (2030 Strategic Vision for Treated Wastewater Reuse in Egypt, CEDARE).

Despite its apparent high level of usage, the value of wastewater as a potential resource is often underestimated. If managed properly and guidelines for utilization are adhered to, instead of being a source of problems, well-managed wastewater can provide beneficial effects for society, the economy and the environment, ensuring social equity and enhancing food security.

First of all, components found in wastewater can contain useful and valuable nutrients that are required by plants. These nutrients and fertilizers can reduce the input of artificial fertilizers, which not only results in a reduction of the environmental impacts associated with the use and production of artificial fertilizers, but also has positive impacts on farmers' incomes. Farmers therefore benefit through increased productivity and yields and faster growing cycles, while decreasing their needs for artificial fertilizers and additional water sources (Corcoran et al., 2010).

Another benefit of wastewater lies in its availability. In urban areas where alternative water supplies are lacking, wastewater is an advantageous resource because it is available all year round and is a low-cost option for farmers.

There are also potentially significant positive health effects from improved food supply and nutrition in arid and food-insecure areas. To date, a systematic global assessment of the positive health benefits of the use of wastewater in agriculture has not been conducted and positive health benefits versus health risks will vary widely depending on the setting.

Planned wastewater use for irrigation, however, is an increasingly important resource in recognition of its potential benefits, especially in urban and peri-urban agriculture. This is driving wastewater use in both developing and industrialized countries – especially in water-scarce areas where alternative supplies are lacking.

In this respect, the Centre of Environment and Development for the Arab Region and Europe (CEDARE) organized a serious of Dialogues on Wastewater Reuse in Egypt. As a result of these dialogues and the inter-ministerial meetings, CEDARE has prepared the "2030 Strategic Vision for Wastewater Re-use in Egypt". Rigorous process was undergone by CEDARE to address the Ministries to nominate committee members, hold committee meetings, and advocating for the wastewater reuse code revision which went well through the revision process.

The above mentioned Strategic Vision proposed that in case of the Delta governorates that have already exploited their agricultural land potential, the secondary treated wastewater will be directed to the main drainage network allowing reuse downstream through agricultural drainage mixing pumping stations to be conveyed to Northern planned agricultural expansion areas such as North Sinai in the North East and Hammam area and others in the North West. Whereas, in case of the Desert front governorates and/ or those with identified agricultural expansion plans, the secondary treated wastewater will be used directly for agriculture.

According to the Ministry of Agriculture and Land Reclamation, 1.0 Million feddans will be reclaimed for cultivation and other projects, with an average annual water requirement of about 4100 CM/feddan according to the NWRP 2017. These water requirements can be satisfied by the secondary treated wastewater produced from the nearby already existing cities in addition to new cities.

This pilot project proposes the reclamation of about 20 thousand feddan using the potential secondary treated wastewater at an estimated water requirement of about 4100 CM/feddan/ year.

Use of wastewater should be managed within certain restrictions imposed for environmental protection and to safeguard public health. A set of guidelines and control measures for treated wastewater reuse has been developed and issued in the Egyptian Code for Reuse of Treated Wastewater in Agriculture. Treated wastewater can be used directly as a source for agriculture.

The current Wastewater Reuse code should be revisited and modified to make the best use of the amounts of treated wastewater that will be made available through the adequate implementation of this strategy. The revised code may introduce more variety to the current assortment of crops that could be cultivated on treated wastewater, and according to the level of treatment.

Description:

According to the Ministry of Agriculture and Land Reclamation, 1.0 Million feddans will be reclaimed for cultivation and other projects, with an average annual water requirement of about 4100 CM/feddan according to the NWRP 2017. These water requirements can be satisfied by the secondary treated wastewater produced from the nearby already existing cities in addition to new cities.

The 1 Million feddans will be divided as follows:

Place	1 Million feddans Project Area (Thousand Feddans)	*Proposed additional half Million feddans Area (Thousand Feddans)
Toshka (Surface Irrigation)	108	
Toshka (Irrigation by Wells)	30	
Old Farafra	200	60*
New Farafra	100	90*
El Dakhla Extension	50	50*
East of Owaynat Extension	50	50*
South of Qattara depression	50	50*
Southern East of Qattara Depression	50	50*
West of Menia	200	
Moghra	150	
East of Siwa	30	30
El Tor		25
South of Qantara Canal		20
West of Com Ombo		25
Bahareya Oasis		20
El Sheikh Gaber Canal		43
Total	1018	513

The project of 1 Million feddans was extended to include 500 thousand more feddans with new capacities shown above.

This pilot project proposes the reclamation of about 20 thousand feddans using the potential secondary treated wastewater at an estimated water requirement of about 4100 CM/feddan/year. Agriculture and urban expansion is currently one of the main governmental priorities for development.

Governorate	2011			Estimated Area to be cultivated (2011) Feddan	2030	Estimated Area to be cultivated (2030) Feddan
	Not treated MCM	Primary MCM	Secondary MCM		MCM	
Aswan	33.19	46	-	19,314	190.50	46,463
New Valley	47.28	9.4	-	13,921	30.13	7,349
Menya	126.64	3.5	31.3	31,741.5	672.21	163,954
Marsa Matrouh	38.14	-	3.3	9,302	51.48	12,556
Beheira	267.64	7.3	51.1	67,049	761.93	185,887
Alexandria	377.92	351.5	87.8	177,907	661	161,219

Thus the agriculture extension into the desert-front governorates where new lands may be available and where reuse of wastewater is a potential, is the subject of this pilot project. Six governorates which are already included in the new 1.5 million feddans agriculture/urban expansion project were selected. According to the 2030 Strategic Vision for Wastewater Reuse, the quantities of the 2011 Primary treated wastewater, secondary treated wastewater, and untreated quantities of wastewater in the six Governorates are shown below. The expected 2030 projections for the produced and secondary treated wastewater is also shown in the table.

Project Objective

To implement an Integrated Wastewater Reuse Pilot Project

Specific Objectives

- Filling the water resources gap
- Achieving food security
- Sustainability of water resources for food production
- Environmental management of wastewater
- Wastewater reuse for sustainable food production

Project Components:

Preparation phase (1-5 years)

- Feasibility Study of the project
- Planning and design of wastewater reuse systems: evaluation of amount of reclaimed water to be used for irrigation by direct or indirect reuse
- Delimitation of area where reclaimed water can be used and design network for their distribution.

Implementation phase I (5-10 years)

- Application of appropriate irrigation, agricultural, post-harvest, and public health practices that limit risks to farming communities, vendors, and consumers.
- Health risks analyses of reclaimed water used for irrigation and definition of monitoring protocol of wastewater reuse effects on soil, aquifers, crops, users and consumers.
- Technical meeting among officers that have competence in the field of water resources management and monitoring
- Development and application of guidelines for untreated wastewater use that safeguard livelihoods, public health and the environment.
- Education and awareness programs for all stakeholders, including the public at large, to disseminate these measures.

Implementation phase II (10-20 years)

- Utilization of produced treated wastewater and establishment of efficient solid waste management system should be implemented.
- Upgrading the treatment plants to secondary treatment level.
- To maintain the existing wood production forest areas of 2011 without further expansion and direct future treated wastewater to Agriculture Expansion areas to satisfy the increasing Agricultural water demands.
- Modify Wastewater Reuse Code to allow for expansion in permissible agriculture crops cultivation on treated Wastewater according to international standards (e.g. new WHO guidelines).
- Develop governorate specific plans by matching Agriculture expansion plans with urban development plans, WSS plans, and Water Resources Management plans.

Project Lead & Participating Stakeholders/Partners:

The project will address the problems mainly the economic inefficiency, public health problems, and environmental degradation. These problems are mainly attributed to the lack of standards, regulations, institutional capacity and public awareness. The following constraints are also addressed regarding the wastewater reuse:

- Policy and Planning: There are no clear policies and adequate planning, monitoring and control measures.
- Regulatory Mechanisms: No standards, suitable regulatory criteria and mechanisms exist. Even if the control and regulation exist, they are generally not enforced.
- Technical: Technical capacity is low, particularly at the field level. Most wastewater treatment plants in the region have operational control and maintenance problems. As a result the effluent usually does not comply with the recommended guidelines.
- Institutional: Several institutions have responsibility, which is not clearly distributed. There is a lack of cooperation mechanisms among the various authorities involved in the collection, treatment and reuse of wastewater.

Five main key players have been identified and assigned pivotal roles in this strategic vision. The following list shows those different entities along with their roles and expected outcome if applicable:

i. Ministry of Water Resources and Irrigation

- Act as the main coordinator for all the visions related activities.
- Assess the legal and technical obstacles related to treated wastewater reuse and provide solutions.
- Assess and confirm the different technical capabilities deemed necessary for the implementation of the vision, such as the pumpage capacity needed for treated wastewater disposal into the main drainage network.
- Enhance the general public awareness on the importance of treated wastewater reuse as a future strategic solution to water scarcity.

ii. Ministry of Housing, Utilities & Urban Communities

- To specify the land areas to be cultivated directly or indirectly by treated wastewater in cooperation with the
- Ministry of Agriculture.
- To regularly indicate the treated wastewater quality and quantity that should drain into agricultural drains and that could be directly reused.
- To confirm the operation status of the treatment and to control the quality standards of treatment.
- To explore agriculture reuse investment opportunities to share costs.
- To allocate and supervise the industrial wastewater drainage to the sanitation network.

iii. Ministry of Agriculture and Land Reclamation

- Selecting the crop composition according to the wastewater reuse code and water quality.
- Allocating the areas that can be cultivated in cooperation with the HCWW and MWRI
- Supervising and controlling the agricultural process
- Putting and applying the laws to prevent violations of farmers
- Controlling the reuse of treated sludge in agriculture according to law 254 for year 2003
- Controlling and supervising the quality of organic fertilizers
- Revision of decree 603/2002 that prohibits wastewater reuse for edible crops.

iv. Ministry of Health and Population

- To supervise the quality control and quality standards of the treated wastewater.
- To supervise the quality control of the treated wastewater used in agriculture.

- To supervise the quality control of the treated industrial wastewater quality drained in water ways.

v. Ministry of Environmental Affairs

- To confirm the operation of the treatment plants inside the factories.
- To monitor the industrial effluents water quality.
- To make sure appropriate treatment is included in EIAs and Strategic EIAs of industrial zones.

Possible Funding Model:

As for the economic and financial dimension, it is suggested that economic studies should be carried out such as the cost effectiveness analysis, cost-benefit analysis and financial feasibility. It is also suggested that through the development of financial measures, such as recovering part of investment and operation/maintenance costs through user fees and taxes, the expenses of reuse schemes can be relieved.

The economic evaluation of irrigation with wastewater possesses has two major difficulties.

The first difficulty is the monitoring and evaluation of non-financial aspects:

- Reduction of environmental pollution or
- health risks

The second one is the allocation of treatment costs between the producer and the user of wastewater. It is argued that if the above difficulties are handled, the Cost-Benefit Analysis of wastewater reuse in irrigation can be made based on the following elements:

- Estimation of least-cost disposal options that meet the environmental and health standards,
- Identification of the demand areas for wastewater and the corresponding cost of transportation,
- Incremental treatment cost of wastewater,
- Price of wastewater, since the farmers are enabled to use the wastewater without paying for it.

Estimated Budget:

According to the strategic vision the quantities of Primary treated wastewater, secondary treated wastewater, and untreated quantities of wastewater in the six Governorates are shown below. That can support the proposed land reclamation. And according to the strategic Vision 2030, the population count with a projected produced wastewater is also shown in the table below.

- At an investment cost of 0.3 Euro/m3 (2.55 EGP/m3) annually upgrading from primary to secondary the total estimated cost is about 1.23 thousand euros/ feddan (10.5 thousand EGP/feddan)
- At a unit investment cost for treatment of 0.75 Euro/m3 (6.4 EGP/m3) annually no treatment the total estimated cost is about 3.1 thousand euros/feddan (25.5 thousand EGP/feddan)

- The associated investment costs for conveyance infrastructure are estimated at 0.2 Euro/m3 (1.7 EGP/m3) the total estimated cost is about 0.8 thousand euros/feddan (7 thousand EGP/feddan)
- The Operation & Maintenance cost for the reuse of wastewater conveyed directly to the agriculture expansion areas is estimated at 0.035 Euro/m3 (0.30 EGP/m3) annually the total estimated cost annually is about 0.14 thousand euros/feddan (1.2 thousand EGP/feddan)

Accordingly, the implementation costs of the proposed project requires, over the next 20 years for the allocated area which is about 20,000 feddans, a total budget of investment cost for conveyance infrastructure is about 16 million Euros (136 million EGP) that could be paid in installments over the project duration (20 years), in addition to the above explained investment cost, and operational and maintenance cost per feddan per year.

Governorate	2011			Estimated Area to be cultivated (2011) Feddan	2030	Estimated Area to be cultivated (2030) Feddan
	Not treated MCM	Primary MCM	Secondary MCM		MCM	
Aswan	33.19	46	-	19,314	190.50	46,463
New Valley	47.28	9.4	-	13,921	30.13	7,349
Menya	126.64	3.5	31.3	31,741.5	672.21	163,954
Marsa Matrouh	38.14	-	3.3	9,302	51.48	12,556
Beheira	267.64	7.3	51.1	67,049	761.93	185887
Alexandria	377.92	351.5	87.8	177,907	661	161,219.5

Policy Enablers:

Satisfying future demands in Egypt depends on better utilization and efficient use of present water resources.

Optimal water management is an essential prerequisite for sustainable development of Egypt. The future may carry lots of risks if Egypt does not succeed in formulating and implementing a water policy which can match the limited freshwater supply and the developed alternative water resources with the increasing demand.

The management of wastewater use in agriculture typically involves many of the following actors, which need to cooperate and coordinate their actions and regulations:

- Ministries of Agriculture, Water Resources, Health, the Environment, Energy and Development
- Research institutions and universities

- Non-governmental institutions and organizations
- Farmers' groups
- Consumers
- Municipalities and local water management institutions
- Water operators.

To facilitate the safe management of wastewater in agriculture in this complex context, appropriate policies, legislation, institutional frameworks and regulations at international, national and local levels need to be in place, which brings these actors together.

Important aspects should be addressed, such as the following:

- Institutional roles and responsibilities, i.e. the responsibilities and jurisdictions among public institutions and the coordination mechanisms among them;
- Laws and regulations, i.e. legal instruments to facilitate and govern the safe use of wastewater in agriculture (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation);
- Economic instruments, i.e. the financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services); and
- Education and social awareness, i.e. the education and training tools used to increase knowledge and skills on the safe use of wastewater in agriculture, as well as advocacy and communication campaigns used to impact public perception and awareness.

An integrated risk assessment with maximum protection for human health and the environment as well as the maximum use of resources (water and nutrients) to support the livelihoods of poor farmers needs to be considered when using wastewater. Applications need to be monitored to ensure that wastewater is being used in a manner consistent with the intended applications and practice. Tested technologies and strategies for the safe use of wastewater in agriculture are available worldwide, but the capacities to implement them are still lacking in many countries.

Expected Results:

Impact

Millions of tons of valuable resources (e.g. water, nutrients and energy) are recovered from wastewater for productive activities in agriculture and other sectors.

Outcomes

- Improved environmental conditions
- Sustained food production
- Presentation of fossil groundwater for longer sustainability for drinking purposes

Outputs

- Upgrading of the existing wastewater treatment plants
- Agricultural expansion by the reuse of wastewater

- Improving the impacts on environment and public health
- Increase in the Population served
- The application of the wastewater treatment technology
- Safe usage of the effluent

Indicators:

Execution Indicators

Developing and using a set of systemic indicators for the assessment of the sustainability of wastewater reuse in the Egypt is a must. Within this context, a systemic approach to assess planned and installed wastewater reuse schemes is needed. Moreover such a systemic perspective should be developed in a participatory process with a specific focus on the local circumstances. It is suggested that the evaluation of treated wastewater irrigation techniques should consider the following aspects:

- Level of Agricultural production,
- Cost of irrigation,
- Cost of treatment,
- Level of wastewater treatment required,
- Level of wastewater delivered,
- Water use efficiency,
- Health risks, and
- Cost of distribution.

Impact Indicators

- The economic evaluation of irrigation with wastewater possesses has two major difficulties.
- The first difficulty is the monitoring and evaluation of non-financial aspects:
- Reduction of environmental pollution or
- health risks
- The second one:
- The allocation of treatment costs between the producer and the user of wastewater.
- It is argued that if the above difficulties are handled, the Cost-Benefit Analysis of wastewater reuse in irrigation can be made based on the following elements:
- Estimation of least-cost disposal options that meet the environmental and health standards,
- Identification of the demand areas for wastewater and the corresponding cost of transportation,
- Incremental treatment cost of wastewater,
- Price of wastewater, since the farmers are enabled to use the wastewater without paying for it.

PROJECT # 14:

Sustainable Water Production and Consumption Model for Agricultural, Industrial, Urban Development in the Western Desert

Presented by:

- Centre for Environment and Development in the Arab Region and Europe (CEDARE)
- Ministry of Water Resources and Irrigation - HCWW - Ministry of Agriculture and Land Reclamation

Cross Cutting Sectors:

Housing, Utilities & Urban Communities Sector - Agricultural Sector - Environment Sector - Industrial Sector - Rural Development Sector

Project Rationale/Background

Egypt suffers from high population densities. The Nile valley and delta annual increase in population is over 2 million. The largest share of the population is mainly centralized in less than 10 % of Egypt's area, which leads to pressure on infrastructure, building on agricultural land, resulting in a significant decrease in the cultivated area. The only solution is spreading any increase in population horizontally to the wide deserts. This horizontal spreading will lead to an increase in the potential for development in agriculture, manufacturing, and urban expansion. Accordingly, the rationale and main reasons relevant to propose this project are as follows:

- Water demand is increasing due to population growth.
- Existing water resources are decreasing (Egyptian share from Nile may be affected by construction works in upstream riparian countries).
- The Nubian sandstone aquifer is a non-renewable groundwater source as its total volume of 5450 BCM are exploitable without any new recharge.
- Opportunity to benefit from non-conventional water resources like waste water reuse, as we only reuse 0.271 BCM out of 7 BCM waste water produced annually.
- Over population in area of valley and delta, which lead to pressure on the infrastructure.
- Stimulating economic growth by providing new job opportunities in different fields of agriculture, industry ...etc.

Given this background, this project aims at developing a model for the optimal allocation and use of conventional and non-conventional water resources in the western desert of Egypt. A selected land area will be identified within the 1.5 million feddan project. Development plans in the agriculture, housing, and industrial sectors will be identified within the selected land development area. Water requirements for the 3 development sectors will be assessed. The best water allocation plan that will give the longer life time of the available non-renewable groundwater will be designed.

The overall objective is to maximize the duration of usage of the Nubian sandstone aquifer, as it is a non-renewable aquifer. It depends on numerous variables, including but not limited to, the areas specified for each activity, types of crops to be cultivated, and the sources of water – whether treated wastewater or groundwater withdrawals – all while keeping in mind the economic, social, political, and environmental aspects. The 1 Million feddan will be divided as follows:

Location	1 Million feddans Project Area (Thousand Feddans)	*Proposed additional half Million feddans Area (Thousand Feddans)
Toshka (Surface Irrigation)	108	
Toshka (Irrigation by Wells)	30	
Old Farafra	200	60*
New Farafra	100	90*
El Dakhla Extension	50	50*
East of Owaynat Extension	50	50*
South of Qattara depression	50	50*
Southern East of Qattara Depression	50	50*
West of Menia	200	
Moghra	150	
East of Siwa	30	30
El Tor		25
South of Qantara Canal		20
West of Com Ombo		25
Bahareya Oasis		20
El Sheikh Gaber Canal		43
Total	1018	513

The project of 1 Million feddans was extended to include 500 thousand more feddans with new capacities shown above.

Description:

Project Objective

Sustainable Water Production and Consumption Model for Agricultural, Industrial, Urban Development in the Western Desert

Specific Objectives

- Sustainable use of non-renewable groundwater
- Sustainability of water resources for food production
- Sustainability of water resources for industrial production
- Sustainability of water resources for housing development and drinking purposes.
- Designing a model for sustainable desert development to be replicated

Project Components:

Preparation phase (3 months)

- Select Land area
- Identify agricultural potential areas
- Identify potential Industrial development
- Identify housing development plans

Implementation phase I (6 months)

- Access water requirements for each sector
- Access expected wastewater production or amounts
- Access nearby conventional and non-conventional water resources

Implementation phase II (6-12 months)

- Develop a master plan for the land development
- Develop a 50 years outlook for the state of water

Project Lead & Participating Stakeholders/Partners:

- Ministry of Water Resources and Irrigation - Continuous and automatic sampling of treated wastewater
- Ministry of Housing, Utilities & Urban Communities
- Ministry of Agriculture and Land Reclamation Coordinating with the 2030 Agricultural Development Strategy
- Ministry of Industry
- Ministry of Environmental Affairs
- Arab Water Council - Supporting the aforementioned activities
- Private sector - Contributing to construction and operation of wastewater treatment plants, Using treated wastewater in industry

Possible Funding Model:

Based on percentage contributions of the government, international donors, national banks, regional and international development banks.

Estimated Budget:

90,000 Euros

Management Structure:

Create a project management unit based at the Ministry of Environment and the EEAA and a focal point / representatives at partner banks.

Policy Enablers:

Satisfying future demands in Egypt depends on better utilization and efficient use of present water resources. Optimal water management is an essential prerequisite for sustainable development of Egypt. The future may carry lots of risks if Egypt does not succeed in formulating and implementing a water policy, which can match the limited freshwater supply and the developed alternative water resources with the increasing demand.

To facilitate the safe and enhanced management of already extracted water for irrigation, high salinity groundwater and wastewater in agriculture in this complex context, appropriate policies, legislation, institutional frameworks and regulations at international, national and local levels need to be in place which brings these actors together. Important aspects should be addressed, such as the following:

- Institutional roles and responsibilities, i.e. the responsibilities and jurisdictions among public institutions and the coordination mechanisms among them;
- Laws and regulations, i.e. legal instruments to facilitate and govern the safe use of wastewater in agriculture (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation) and restrict establishing new wells. I.e. only controlled wells taking into consideration the hydrological effect after operation.
- Economic instruments, i.e. the financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of ground water delivery , wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services)
- Education and social awareness, i.e. the education and training needed to increase knowledge and skills on non-renewable water resources management and impact on future generations, also the safe use of wastewater in agriculture, as well as advocacy and communication campaigns used to impact public perception and awareness.

Expected Results:

Outcomes

- Improved environmental conditions
- Sustained food production
- Presentation of fossil groundwater for longer sustainability for drinking purposes
- Increase the hard currency from agricultural manufacturing.
- Solving valley congestion problem.

Outputs

- Water allocation plan.
- Improving the impacts on environment and public health.
- Significant impact on economy by increasing the agricultural and industrial products.
- Prevent over exploitation of Nubian sandstone aquifer.
- Decrease the effect of desertification.
- Presence of supporting agricultural manufacturing facilities.
- Agricultural expansion by the reuse of wastewater.
- Decrease unemployment rates.

Indicators:

Execution Indicators

- Master plan
- Water Allocation Plan
- Future State of the Water Outlook

Impact Indicators

- The types and areas of agricultural crops.
- Areas to be specified for industrial activities.
- The population expected to be relocated.
- The time span to exploit the Nubian sandstone aquifer.
- Cost plan of the project.

PROJECT # 15:

Siwa Sustainable Consumption and Production Water Strategy

Presented by:

- Centre for Environment and Development in the Arab Region and Europe (CEDARE)
- Ministry of Water Resources and Irrigation - HCWW - Ministry of Agriculture and Land Reclamation

Cross Cutting Sectors:

Housing, Utilities& Urban Communities Sector, Agricultural Sector, Environmental Sector, Health Sector, Industrial sector

Project Rationale/Background

Egypt suffers from high population densities. The Nile valley and delta annual increase in population is over 2 million. These people mainly are centralized in less than 10 % of Egypt's area, which leads to pressure on infrastructure, building on agricultural land causing decrease in the cultivated area. The only solution is spreading any increase in population horizontally to the wide deserts. If the increased population till 2030 will be 30 million and the government plans to establish new communities that accommodate all this increase away from Nile valley and delta, Siwa's share from these communities can reach 250,000 citizens.

Siwa Oasis is in the western desert. It is about 90 kilometers east of the Libyan borders and 300 kilometers south of the Mediterranean Sea. It remote place helps in stretching urban area. It has the potentials to become a stand-alone city. In order to achieve this, planned agricultural, industrial and touristic development is needed in a sustainable manner to maintain the oases that are landmarks of Siwa. These oases depend mainly on natural flows of groundwater.

With the government plan for reclamation of 1 million feddans, A thorough assessment is needed to identify the exact places of these lands, the crops to be cultivated, and the accompanying activities to establish. The optimum goal of course is achieving the maximum crop per drop, job per drop and food security. Therefore the best location shouldn't only depend on the suitable soil and availability of ground water in the desert, but also proximity to non-conventional water resources that may be needed to achieve sustainable water consumption for production.

Since the Nubian Sandstone Aquifer contains about 5,425 BCM of stored groundwater in the desert (Khaled Abuzeid, 2011), it is the candidate to be the first water supplier for new communities. However, The problem is that resource is non-renewable. So the term sustainability must be considered in any assessment for choosing the best course of action. The dilemma here is although agricultural activities are the first choice in desert development, Agricultural activities –directly using non-renewable fossil ground are the

lowest option in achieving sustainability (Khaled Abuzeid,2011). So choosing crops with lower water requirements and high agro-industrial potential is one solution. But wastewater reuse can be an integral part of the solution. Since the 2005 Egyptian code doesn't allow the irrigation of edible crops using treated wastewater (till now), other options for their reuse can be considered. Landscape and non-edible crops until the modified code is issued including more allowed crops. This project objective is the reclamation of 30,000 feddans which is planned for Siwa by the government in the most sustainable and efficient possible way.

Description:

The project includes the following options:

First, reclamation of 10000 feddans in east of Siwa depending on water saved from irrigation systems improvement. (using controlled wells, modern systems like drip irrigation which is suitable for dates and olives trees and sprinklers irrigation for vegetables can save huge volume for water) Using groundwater for reclamation of the remaining area but substituting the usage of water from ground water to wastewater gradually in the future , taking into consideration new communities that will be established by 2030 in the area to accommodate the population growth in Nile valley. Second, reclamation of 2000 feddans depending on usage of the treated wastewater from the wastewater treatment plant that will be established in Siwa. Third, Considering the possibility of relocating the reclamation of up to 10000 feddans by wastewater from entire Matrouh governorate to place nearer to Matroh city. Fourth, Using groundwater for reclamation of the remaining area but substituting the usage of water from ground water to wastewater gradually in the future, taking into consideration new communities that will be established by 2030 in the area to accommodate the population growth in Nile valley.

Project Objectives:

Specific Objectives:

- Filling the water resources gap.
- Achieving food security
- Sustainability of water resources for food production
- Environmental management of groundwater and wastewater
- Wastewater reuse for sustainable food production
- Decrease unemployment rates
- Encourage agricultural manufacturing

Project Components:

Preparation phase (6 months)

- Feasibility Study of the project
- Marketing plan for the products
- Planning and design of wastewater reuse systems: evaluation of amount of reclaimed water to be used for irrigation by direct or indirect reuse
- Planning and design of groundwater use systems: evaluation of amount of reclaimed water to be used for irrigation by direct or indirect reuse

- Delimitation of area where reclaimed water can be used and design network for their distribution.
- Hydrological study
- Planning which types of crops to be cultivated
- Estimating water losses from already existing irrigation and drainage systems.

Implementation phase I (2 years)

- Improving all irrigation and drainage systems.
- Substitute conventional wells with enhanced, controlled ones.
- Health risks analyses of reclaimed water used for irrigation and definition of monitoring protocol of wastewater reuse effects on soil, aquifers, crops, users and consumers.
- Education and awareness programs for all stakeholders, including the public at large, to disseminate these measures.
- Training programs for farmers and workers

Implementation phase II (2 years)

- Well digging and Establishing water conveyance systems
- Reclamation of delimitated areas and irrigation networks
- Constructing the Manufacturing unit
- Utilization of produced treated wastewater and establishment of efficient solid waste management system should be implemented.
- Develop governorate specific plans by matching Agriculture expansion plans with urban development plans, WSS plans, and Water Resources Management plans.

Project Lead & Participating Stakeholders/Partners:

Six main key players have been identified and assigned pivotal roles in this strategic vision. The following list shows those different entities along with their roles and expected outcome if applicable:

i. Ministry of Water Resources and Irrigation

- Act as the main coordinator for all the visions related activities
- Supervising irrigation and drainage systems enhancement and controlling water losses.
- Assess the legal and technical obstacles relate to Groundwater use and provide solutions.
- Assess the legal and technical obstacles related to treated wastewater reuse and provide solutions.
- Assess and confirm the different technical capabilities deemed necessary for the implementation of the vision, such as the wells position, depth, type, and pumping capacity.

- Assess and confirm the different technical capabilities deemed necessary for the implementation of the vision, such as the pumping capacity needed for treated wastewater disposal into the main drainage network.
- Enhance the general public awareness on the importance of fossil ground water and treated wastewater reuse as a future strategic solution to water scarcity.

ii. Ministry of Housing, Utilities & Urban Communities

- To specify the land areas to be cultivated directly or indirectly by ground water and treated wastewater in cooperation with the Ministry of Agriculture.
- Supervising wells controlling and improving systems.
- To regularly indicate the ground water and treated wastewater quality and quantity that should be maintained.
- To confirm the operation status of the wells and treatment plants to control the quality standards.
- To explore investment opportunities to share costs.
- To allocate and supervise the industrial wastewater drainage to the sanitation network.

iii. Ministry of Agriculture and Land Reclamation

- Selecting the crop composition according to desert soil capabilities, wastewater reuse code, water quality and sustainability.
- Allocating the areas that can be cultivated in cooperation with the HCWW and MWRI
- Supervising and controlling the agricultural process
- Putting and applying the laws to prevent violations of farmers
- Controlling the reuse of treated sludge in agriculture according to law 254 for year 2003
- Controlling and supervising the quality of organic fertilizers
- Revision of decree 603/2002 that prohibits wastewater reuse for edible crops.

iv. Ministry of Health and Population

- To supervise the quality control and quality standards of the ground water used in agriculture
- To supervise the quality control and quality standards of the treated wastewater.
- To supervise the quality control of the treated wastewater used in agriculture.
- To supervise the quality control of the treated industrial wastewater quality drained in water ways.

v. Ministry of Industry, Trade and Small Industries

- Provide technical assistance for the agricultural manufacturing.
- To supervise the quality control of the products.
- Marketing of industrial products in foreign markets.

vi. Ministry of Environmental Affairs

- To confirm the operation of the treatment plants inside the factories.
- To monitor the industrial effluents water quality.
- To make sure appropriate treatment is included in EIAs and Strategic EIAs of industrial zones.

vii. CEDARE

vi. Arab Water Council

Possible Funding Model:

Based on percentage contributions of the government, international donors, national banks, regional and international development banks.

Estimated Budget:

- There is already an assigned budget by the government for improving irrigation, drainage systems and substituting regular wells with controlled wells with low losses but it needs enhancement for achieving Siwa's development goals.
- The associated investment costs for reclamation of new land 750 Euro/feddan (6750 EGP/Feddan)
- Unit cost of wastewater treatment is 0.95 Euro/CM (8.55 EGP/CM) The associated investment costs for conveyance infrastructure of treated wastewater is about 555 Euros/feddan(5000EGP/feddan)

Comparing the initial cost of providing water source in 3 different scenarios:

First: Using options 1, 2, and 4 (30000 feddans in Siwa):

- 18,000 feddans will be irrigated by ground water initially, the total cost of wells is about 540 million EGP, 8000 will later be irrigated by treated wastewater
- Wastewater treatment will cost 25 million EGP (enough to irrigate 2000 feddans)
- Wastewater conveyance will cost in the region of 10 million EGP (2000 feddans initially)
- Extra water conserved by installing irrigation improvement systems in existing lands will be enough for 10000 feddans and cost 75 million EGP
- Reclamation of 30,000 feddans at 6750 EGP/feddan comes to about 200 million EGP
- The total cost of this scenario is 850 million EGP

Second: Using the four options stated before (20000 feddans in Siwa and 10000 near Matrouh):

- 8,000 feddans will initially be irrigated by ground water initially, the total cost is about 240 million EGP
- Wastewater treatment will cost 150 million EGP (enough to irrigate 12000 feddans)
- Wastewater conveyance will cost in the region of 60 million EGP (2000 feddans initially in Siwa and 10000 using 41 BCM near Matrouh)
- Extra water conserved by installing irrigation improvement systems in existing lands will be enough for 10000 feddans and will cost 75 million EGP
- Reclamation of 30,000 feddans at 6750 EGP/feddan comes to about 200 million EGP
- The total cost of this scenario is 725 million EGP

Third: Using groundwater for irrigation of 30,000 feddans

- 600 wells, covering 50 feddans each, at a total cost of 900 million EGP (1.5 million EGP per well)
- Reclamation of 30,000 feddans at 6750 EGP/feddan comes to about 200 million EGP
- Total cost of third scenario is 1.1 billion EGP

The second scenario is the most economical of the three, but other aspects (social, political, etc) must be considered

Policy Enablers:

To facilitate the safe and enhanced management of already extracted water for irrigation, high salinity groundwater and wastewater in agriculture in this complex context, appropriate policies, legislation, institutional frameworks and regulations at international, national and local levels need to be in place which brings these actors together.

Important aspects should be addressed, such as the following:

- Institutional roles and responsibilities, i.e. the responsibilities and jurisdictions among public institutions and the coordination mechanisms among them;
- Laws and regulations, i.e. legal instruments to facilitate and govern the safe use of wastewater in agriculture (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation) and restrict establishing new wells. I.e. only controlled wells taking into consideration the hydrological effect after operation.
- Economic instruments, i.e. the financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of ground water delivery, wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services)

- Education and social awareness, i.e. the education and training needed to increase knowledge and skills on non-renewable water resources management and impact on future generations, also the safe use of wastewater in agriculture, as well as advocacy and communication campaigns used to impact public perception and awareness.

Expected Results:

Impact

To facilitate the safe and enhanced management of already extracted water for irrigation, high salinity groundwater and wastewater in agriculture

Outcomes

- Improved environmental conditions.
- Sustained food production.
- Saving some of fossil groundwater for longer sustainability for drinking purposes.
- Providing biodiesel for expected needs of airline industry.
- Decrease poverty rates in Siwa.
- Increase the hard currency from agricultural manufacturing.
- Establishing Siwa as a metropolis.

Outputs

- Usage of available already extracted groundwater in Siwa in a sustainable matter.
- Decrease dangerous level of water table.
- Decrease the effect of desertification.
- Presence of supporting agricultural manufacturing facilities.
- Using of the newly constructed wastewater treatment plants.
- Agricultural expansion by the reuse of wastewater.
- Improving the impacts on environment and public health.
- The application of the wastewater treatment technology.
- Safe usage of the effluent.
- Decrease unemployment rates in Siwa.

Indicators

Execution Indicators

It is suggested that the evaluation techniques should consider the following aspects:

- Level of Agricultural production,
- Percentage of water saved due to water systems enhancement
- Quality of water saved due to water systems enhancement
- Cost of irrigation,
- Cost of treatment,

- Level of wastewater treatment required,
- Level of wastewater delivered,
- Water use efficiency,
- Health risks,
- Cost of distribution
- Number of years with Sustainable production
- Crop per drop

As for the economic and financial dimension, it is suggested that economic studies should be carried out such as the cost effectiveness analysis, cost-benefit analysis and financial feasibility. It is also suggested that through the development of financial measures, such as :

- Recovering part of investment and operation/maintenance costs through user
- fees and taxes
- The expenses of reuse schemes can be relieved
  Job per drop
- Hard currency revenue

Impact Indicators

The economic evaluation of the project has two major difficulties. The first difficulty is the monitoring and evaluation of non-financial aspects:

- Reduction of environmental pollution
- Health risks

The second one: The allocation of well establishing, water conveyance and treatment costs between government and the users. It is argued that if the above difficulties are handled, the Cost-Benefit Analysis of wastewater reuse in irrigation can be made based on the following elements:

- Incremental groundwater supply cost
- Price of groundwater, since the farmers are enabled to use the groundwater without paying for it
- Incremental Electricity supply cost
- Estimation of least-cost disposal options that meet the environmental and health standards
- Identification of the demand areas for wastewater and the corresponding cost of transportation
- Incremental treatment cost of wastewater
- Price of wastewater, since the farmers are enabled to use the wastewater without paying for it.

PROJECT # 16:

Development of Water Strategy to Raise Water Use Efficiency in Fayoum Governorate

Presented by:

Arab Water Council (AWC), Ministry of Water Resources and Irrigation, Ministry of Agriculture and Land Reclamation, Ministry of Environment, Ministry of Local Development, Academia, water users associations, investors associations, local communities

Cross Cutting Sectors:

Agriculture, municipal, industry, local development, Environment

Project Rationale/Background

The Fayoum depression is located 90 km south of Cairo and 30 km west of the River Nile. The depression has well defined boundaries: limestone ridges to the East, South and West and Lake Qarun to the North. The water resources in Fayoum are limited to its share from the Nile (surface) water. Bahr Youssef is the primary source of water in Fayoum. It branches from Al-Ibrahemia Canal which in turn branches from the River Nile. The discharge through Lahun barrage, which controls water flow to Bahr Youssef, is about 2.56 billion cubic meters per yea. The average rainfall in Fayoum is about 10.8 mm/year which does not add any effective water resources to the water budget. There is no groundwater use nor desalination in Fayoum.

With regard to the quality of water, large amounts of sewage, industrial and agricultural wastes are disposed to agricultural drains in Fayoum leading to the deterioration of water quality in the drainage network and in Lake Qarun. There is currently a gap between water supply and demand, which is estimated at about 1.0 BCM/year. This gap is currently filled through ruse of drainage water (including both official and unofficial reuse). The proposed project is aiming at developing a water strategy for Fayoum governorate that shall work on raising the water use efficiency in the governorate taking into account the local conditions and using participatory approach. The approach and the methodology used can be applied and replicated in other areas in the country and in the Arab region making use of lessons learned and experience gained. The project will address applying measures that aim at raising the water use efficiency in Fayoum including, but not limited to, the following:

- Irrigation improvement projects
- Use of modern irrigation techniques
- Appropriate selection of optimum cropping pattern
- Reuse of drainage water
- Reuse of treated wastewater
- Participatory water management
- Reduction of the UFW in municipal water network
- Efficient water use in the industrial sector.

Description:

Fayoum is one of the poorest governorates in Egypt. It needs support to enhance the social and economic conditions for the poor population. Fayoum has great potential for tourism activities around Lake Qarun, Wadi Rayan and other areas. The good management of Lake Qarun (with regard to water levels and environmental quality) is essential for promoting such tourism activities.

The water management in Fayoum is unique. Fayoum is a closed system that has one source of water (Bahr Youssef) and one sink (Lake Qarun). There is some mismatch between water supply and demand over the year (supply is more than demand in winter causing more drainage water and higher water levels in Lake Qarun, while demand is more than supply in summer causing water shortage problems). The area suffers different water management problems including, but not limited to, the following:

- Limited water resources and limited potential to increase the resources
- Increasing demand for different socio-economic sectors
- The illegal cultivation that puts more pressure on the limited water resources
- The mismatch between water supply and demand over the year
- Water shortage during the high demand season (Summer season)
- The effect of water management in Fayoum on the water levels and water quality of Lake Qarun and how that affects surrounding environment and socio-economic activities.

Project Objectives:

Optimum use of limited water resources for sustainable development and poverty alleviation through enhancing water use efficiency

Specific Objectives

- Raise water use efficiency in the agriculture sector
- Raise water use efficiency in the municipal and industrial sectors
- Reduce the (increasing) gap between water supply and demand
- Enhance the water management through more participation of water users associations
- Conserve/ enhance the environmental condition of Lake Qarun

Project Components:

Component 1: Baseline assessment for the current situation and stakeholder analysis

- Carry out stakeholder analysis and define main partners and their roles and responsibilities
- Collect basic data / information / maps for Fayoum governorate
- Carry out baseline assessment for the water resources situation

Component 2: Development of enhanced water use efficiency Strategy

- Define main issues and challenges facing water resources management
- Analyze the water resources, water demand and water balance situation
- Define potential measures to be included in the water use efficient strategy
- Prepare the implementation plan including measures, roles and responsibilities, cost (Capex and Opex), time frame, …
- Continuous discussions with the stakeholders along the way of strategy development is essential

Component 3: Strategy approval, dissemination and documentation of lessons learned for replication in the Arab region

- Approval of the efficient water use strategy by relevant stakeholders
- Wide dissemination of efficient water use strategy to all stakeholders
- Establish an implementation and coordination mechanisms for the strategy
- Develop an M&E system to follow up and assess the strategy implementation
- Documentation of lessons learned and experience gained from the pilot area in order to be used for future replication in Egypt and in the Arab countries.

Project Lead & Participating Stakeholders/Partners:

The project aims at enhancing the water use efficiency in all water using sectors, including agriculture, municipal and industrial sectors. The Arab Water Council (AWC) shall coordinate the overall activities of the project. The main key stakeholders together with their main roles and responsibilities are identified as follows:

1. **Ministry of Water Resources and Irrigation (MWRI)**
   - The coordinator for the efficient water use strategy formulation.
   - Estimate the cost of relevant measures (both investment and operation and maintenance), implementation time frame and relevant stakeholders.
   - Develop detailed operational plans for the MWRI promising measures.
   - Cooperate and coordinate with other relevant stakeholders

2. **Ministry of Housing, Utilities and Urban Communities (MHUUC)**
   - Define water use efficiency measures in the municipal sector
   - Estimate the cost of municipal sector relevant measures (both investment and operation and maintenance), implementation time frame and relevant stakeholders.
   - Develop detailed operational plans for the promising measures in the municipal sector.
   - Cooperate and coordinate with other relevant stakeholders

1. **Ministry of Agriculture and Land Reclamation (MALR)**
   - Define water use efficiency measures in the agriculture sector (especially at the field level)
   - Estimate the cost of agriculture sector relevant measures (both investment and operation and maintenance), implementation time frame and relevant stakeholders.
   - Develop detailed operational plans for the promising measures in the agriculture sector.
   - Cooperate and coordinate with other relevant stakeholders

2. **Ministry of Industry**
   - Define water use efficiency measures in the industrial sector (innovative technologies, recycling, etc.)
   - Define economic instruments for water efficient and clean industrial technologies
   - Estimate the cost of industrial sector relevant measures (both investment and operation and maintenance), implementation time frame and relevant stakeholders.

     Develop detailed operational plans for the promising measures in the industrial sector.
   - Cooperate and coordinate with other relevant stakeholders
3. **Ministry of Environment**
4. **Private Sector/ Investors**
5. **Water users association**
6. **Civil society / NGOs**

Estimated Budget:

900,000 Euros

Management Structure:

- The project coordinator: Dr. Huseein El-Atfy (Secretary General , Arab Water Council)
- Focal points in relevant ministries
  - Ministry of Water Resources and Irrigation (national and local levels)
  - Ministry of Housing, Utilities and Urban Communities (national and local levels)
  - Ministry of Agriculture and Land Reclamation (national and local levels)
  - Ministry of Industry
  - Ministry of Environment (national and local levels)
- Focal points in Fayoum
  - Water users associations
  - Investors associations
  - Civil society
  - Academia (local universities and research centers)

Policy Enablers:

- Adopt participatory water management approach that actually gives more water management roles and responsibilities to water users and to private sector.
- Enforce Inter-ministerial coordination mechanisms at both national and local levels
- Adopt economic instruments to support measures aiming at enhancing water use efficiency
- Explore and adopt innovative financing mechanisms in water sector

Expected Results:

Outcomes

- Enhanced water management in Fayoum
- Sustainable food production
- Satisfying water demand for different uses
- Reducing the gap between water supply and demand
- Enhanced management and environmental conditions of Lake Qarun

Outputs

- Concrete strategy for raising water use efficiency in Fayoum
- Water balance for Fayoum indicating current and future situations
- Concrete and practical water use efficiency measures together with their estimated cost, responsibilities for implementation, implementation time frame, and coordination mechanism.
- Awareness raising on water issues and challenges in Fayoum and roles and responsibilities of different users to face it.

Indicators:

Execution Indicators

- Enhanced water use efficiency strategy for Fayoum is developed
- The developed strategy is adopted by relevant stakeholders
- Mechanisms for implementation and coordination of the developed strategy are established
- M&E system for the strategy is developed
- Documentation of lessons learned and experience gained for potential replication in the Arab countries is developed

Impact Indicators

- Enhanced water management in Fayoum
- Enhanced water balance in Fayoum
- Enhanced water and environmental conditions for Lake Qarun
- Sustainable food production
- Enhanced environmental conditions for Lake Qarun

PROJECT # 17:

Improving Water Quality in Lake Manzala Engineered Wetland (LMEW)

Presented by:

Arab Water Council (AWC) / CEDARE / Ministry of Water Resources & Irrigation (MWRI)/ Ministry of State for Environmental Affairs (EEAA) / Ministry of Agriculture and Land Reclamation (MALR) /Research Centers / Academia / Local Communities/ Civil Society

Cross Cutting Sectors:

Water –Agriculture – Environment

Project Rationale/Background

- The percentage of Egyptians living below the food poverty line is continuously increasing due to the increasing food prices coupled with reduced effective earnings. This situation should urge the Egyptian government to satisfy the food security to improve poverty reduction in the poor areas in Egypt.

- Food security is a complex sustainable development issue, linked to health through malnutrition, but also to sustainable economic development, environment and trade.

- In Egypt, food security mainly depends on the development of the agriculture sector and improving the fishery production. Due to freshwater scarcity in Egypt, the use of non-conventional water resources such as treated low-quality water in agriculture and fishery has become a must.

- The natural treatment systems such as wetlands could be a suitable substitute to the conventional treatment techniques due to several advantages among which are: the high treatment efficiency especially the biological load treatment, the relatively low capital investment, the easy operation and maintenance and the suitability for semi-arid climatic conditions.

- In Egypt, there are both natural and artificial wetlands. The artificial wetlands are engineered systems that utilize the natural processes involving wetland vegetation, soils, and their associated microbial assemblages to assist in treating wastewater. An example of artificial wetlands is Lake Manzala Engineered Wetland (LMEW).

- Construction of LMEW has been completed in 2004 to include five main components: 1) Intake channel and pumping station; 2) Sediment basins; 3) Surface flow treatment cells; 4) Reciprocating subsurface flow treatment cells; 5) Fishery facility and fish farm. However, the research program was not completed due to lack of funds.

- In Lake Manzala area, farmers use the untreated drainage water for different purposes such as crop irrigation and fish farming along Bahr El-Baqar drain. Produced food in the area using drainage water is chemically and microbially contaminated. Low-cost treatment technologies can be applied to treat drainage water which will be used for producing high-quality crops and fish.

- Treatment of the drainage water before entering fish ponds through LMEW will have a vital role in enhancing the quality and marketability of fish produced for local or domestic markets. From this point of view, the engineered wetland (LMEW) could help in achieving food security by providing reasonable water quality that could be safely used in agriculture and fish production.

- Research efforts are needed to guide the farmers on how to treat drainage water as a non-conventional water source for food production. Expectations are to exchange experience with countries in the Arab region, to improve understanding of the value of Arab wetlands, and to enhance regional wetland initiatives, with the aim of wetland conservation on the Arab scale.

Description:

Food security in Egypt is threatened by water and land resources vulnerabilities. While the River Nile is the major water resource, its water quality is subject to pollution due to agricultural, industrial & municipal activities. The proposed project to treat drainage water applying low-cost techniques in terms of constructed wetlands will be carried out in Lake Manzala Engineered Wetland (LMEW) located in the Eastern Delta at the tail end of Bahr El-Baqar Drain where recent experiences with construction of wetlands demonstrated appealing results, however the already started research program was not completed due to lack of funds. The objectives of the proposed project are: to demonstrate the effectiveness of wetland technology in wastewater treatment; to present alternative uses of treated water (irrigated agric. & fish farming), to conserve Manzala Lake environment, and to investigate the impact of water treatment on the community of farmers and fishermen in the project area. The methodology used in this research will provide an economically and environmentally sound alternative to traditional wastewater treatment techniques. The Project will facilitate collaboration among Arab experts in this field, will disseminate project outcomes in the region, and will assist in drafting the guidelines for utilization of this technology. The Project will also provide the know-how & will support capacity development through training programs for work teams.

Project Objectives:

Achieving food security and improving economic well-being and health of local residents (poor farmers & fishermen) in the Nile Delta fringes by increasing crop and fish production and improving their quality using the treated drainage water of Lake Manzala Engineered Wetland

Specific Objectives:

- Demonstration of the efficiency and effectiveness of the low-cost technology of engineered wetlands in wastewater treatment.
- Presentation of potential alternatives for the use of treated wastewater whether in irrigation uses or for fish farming.
- Development of guidelines for restoration of Manzala Lake environment in compliance with international agreements.
- Working towards the enhancement of the social and economic living standards for the community of farmers and fishermen.

Project Components:

Component 1: Inception Phase and Establishment of the treatment system

Activity 1.1: Finalize and approve of the project work plan

Activity 1.2: Administration and Materials Management

Activity 1.3: Nationwide assessment of the extent and significance of drainage water treatment and reuse

Activity 1.4: Field survey and pre-investigation for the site

Activity 1.5: Determining the pollution load and features of the site

Activity 1.6: Designing the treatment system

Activity 1.7: Implementing the treatment system

Component 2: Monitoring of the treatment system

Activity 2.1: Establishment of the monitoring program

Activity 2.2: Monitoring of operation and maintenance

Activity 2.3: Data storage and analysis

Component 3: Reuse of the treated water

Activity 3.1: Finalize the reuse options and their implementation procedures

Activity 3.2: Design and establish the reuse pilot sites

Activity 3.3: Fish farming activities

Activity 3.4: Irrigation activities

Activity 3.5: Monitoring of the reuse sites (Socio-economic / physical /Environmental)

Activity 3.6: Data storage and analysis

Component 4: Development and application of drainage water treatment and reuse guidelines

Activity 4.1: Guidelines for the application of low-cost treatment techniques

Activity 4.2: Development of treated water reuse guidelines

Activity 4.3: Public awareness program on drainage water treatment and reuse

Activity 4.4: Periodic Report

Activity 4.5: Project Final report and workshop

Project Lead & Participating Stakeholders/Partners:

- Arab Water Council
- Ministry of Water Resources and Irrigation / National Water Research Center
- Ministry of Agriculture and Land Reclamation
- Ministry of State for Environmental Affairs
- CEDARE
- FAO
- IFAD
- UNDP
- Research Centers / Universities / Academia
- Local community / Civil Society

Estimated Budget:

2.7 million Euros

Policy Enablers:

- Design and construct an applicable model to treat the agricultural drainage water using wetland system and use this treated water in fish farming and land reclamation and cultivation.
- Guide the fish farmers on how to treat drainage water as a non-conventional water resource for fish breeding using wetlands.
- Conduct environmental and socio-economic studies, including gender empowerment, to be performed besides the other technical studies.

Expected Results:

Impact

Water Quality and Food Security in Lake Manzala are enhanced

Outcomes

The expected outcomes of the study include:

- Reducing the pressure of the agricultural sector on the scarce freshwater of Egypt.
- Developing guidelines for low-cost treatment techniques design and the reuse of treated wastewater in irrigated agriculture and fish farming.
- Disseminating the technology as one of the low-cost options for water treatment to other locations in Egypt and other countries on the Arab scale.

Developing national expertise on engineered wetland technology and raising national awareness - with special focus on women - regarding the importance of treating low-quality water as a non-conventional source of water

Outputs

- Framework for a comprehensive integrated project will be developed (considering technical, environmental, economic, and social aspects).
- Information system (water quantity and quality data, socio-economic data, plant, animal and fish data) will be established and data analysis and statistical illustrations produced.
- Monitoring and evaluation activities will be documented including indicators and performance assessment.
- Guidelines will be developed for use of treated wastewater of wetlands.
- Project results will be disseminated and awareness campaigns initiated.

Indicators:

Execution Indicators

Among the indicators suggested to be used in the project are the following:

- Adoption of new technologies.
- Quality of wastewater after treatment.
- Quantity and quality of produced crops and fish as compared to the same parameters before the project.
- Net income of farmers and fishermen before and after the project.
- Improvement of health and socio-economic conditions of the fishermen and farmers and their families.
- Extent of gender participation in project activities.

The project itself will be monitored via published papers, technical reports, training programs, awareness documents, events held, Diploma and M.Sc. degrees obtained

Impact Indicators

- Provide an environmentally safe and economic approach to wastewater treatment which could be applied on smaller scale in villages to treat the municipal wastewater.
- Improvement of water quality entering Manzala Lake from Bah El-Baqar Drain resulting in better quality water available for crop irrigation and fish farming.
- Empower the contribution of women in the farmers and fishermen communities in decision-making.
- Decrease the health vulnerability of the community around the lake.
- Employment for the local inhabitants working in the agriculture sector.

PROJECT # 18:

Supporting Best Practices in Decision support system is for Sustainable Water Resources Planning Strategies

Presented by:

Ministry of Water Resources and Irrigation (MWRI)

Cross Cutting Sectors:

Water –Climate Change – Environment

Project Rationale/Background

Water in Egypt became a significant barrier for development. Furthermore, Climate Change is considered as an uncertain issue that must be studied and involved in water resources planning. Climate change risks related to droughts are considered a major disaster occurring in the Arab region with an estimated 38.09 citizens affected between the years 1970-2009. Water stress and the effects of droughts are seriously worsened by human factors such as population growth that forces people into drier and drier regions and inappropriate cropping and herding practices. The impacts of drought are likely to become ever more severe as a result of development processes and population increases leading to long-term land degradation. Furthermore, the eco-system of Nasser Lake is getting deteriorated due to the pollution of water, through various sources. It leads to the outbreak of numerous diseases; the majority is being lethal and contagious. Nasser Lake pollution sources reflect several human activities such as dumping the wastewater of local communities, agriculture waste, and bilge mixed with oils and fuel resulting from tourism and navigational activities. So, conducting an integrated environmental framework for Nasser Lake is highly required under the aforementioned pressures.

Including the climate change issue and the reduction/increase of water resources due to climate change is a significant issue in water resource planning and the development of Egypt's water strategy. As such water quality and quantity information systems including climate variations and potential risks from Climate change require an enhanced research & management information systems and up to date data for sustainable management of water resources and its associated risks. Furthermore, information systems on water quality and predictions are a key element in sustainable water resources management and fresh water in Egypt.

Given this background, this projects aims at supporting the Ministry of Water Resources and Irrigation to develop its research capacity to identify and adopt informed decision making for sustainable water resources management. The project comes in line with Egypt's National Water Resources Strategy with a specific focus on Framework 2: Protection of Agricultural Land, and Framework 4: Providing an appropriate environment for implementation of the NWRP.

The project supports the MWRI Staff as well as the Environmental and Climate changes Research Institute (ECRI) established in 1994 to perform high level research on the impacts of both climate change and environment on water resources, in particular water resources. ECRI relies on its own technical staff (34 researchers) in different aspects with local or international consultants professionals. The staff includes engineers, agronomists, biologists, chemists….. etc. Moreover, ECRI jointed different projects and studies to investigate climate change impacts. This proposal would build on the framework of the previous climate change projects and activate the recommendations to form a team of junior engineers and researchers, and provide necessary theoretical and practical training related to Regional Circulation Modeling, hydrological modeling and developing adaptation strategies.

Project Components:

Project Objectives:

Enhance Decision support system and Information Base for Sustainable Water Resources Management

Specific Objectives:

Predicting of environmental migration in Egypt through developing a drought map for Egypt

- Develop an Integrated Environmental Framework for Nasser Lake Environmental Management
- Enhance the Decision Support System for the Integrated Water Resources Management of Egypt based on Environmental Balance to Accommodate the Climate Changes

Description:

Component 1: Predicting of environmental migration in Egypt through developing a drought map for Egypt

- Develop Vegetation Condition Index Maps for 30 years
- Temperature Condition Index Maps for 30 years.
- Vegetation Health Index Maps for 30 years.
- Develop a methodology for presenting the impact of drought on Egypt (1,000,000 km2)

Component 2: Develop an Integrated Environmental Framework for Nasser Lake Environmental Management

- Data acquisition (hydrology, geology, climate, sedimentation, sand dunes, human activities, agriculture, biology, socio-economy…etc)
- Data compile and analyze.
- Identify sources of pollution around the lake.
- Identify quantity and quality of pollutants.
- Assess the impacts of pollutants on water quality.
- Suggest measures to control the pollution of Nasser Lake based on previous findings and stakeholder engagement through workshops and individual meetings.

- Assess previous plans for developing Nasser Lake and identify the gaps.
- Fill the gaps of the previous plans.
- Develop an integrated environmental framework for Nasser Lake.

Component 3: Enhance the Decision Support System for the Integrated Water Resources Management of Egypt based on Environmental Balance to Accommodate the Climate Changes

Enhance the Developed DSS by SRU to accommodate the Climate Changes expected in the future in Egypt and in Upper Nile Area where Egypt's most water comes from. This will assist the Planning lSector and Minster Office to have wider vision on IWRM and Future Water Strategies of Egypt.

Project Lead & Participating Stakeholders/Partners:

- Ministry of Water Resources and Irrigation.
- Ministry of Agriculture
- Ministry of Environmental Affairs
- Research Centers and Universities

Estimated Budget:

1.5 million USD

Policy Enablers:

The project activities are in line with the National Water Resources Plan

Expected Results:

Impact

Enhanced Research Capacity and Information Systems for Sustainable Water Management

Outcomes

- Improved Prediction of environmental migration in Egypt through developing a drought map for Egypt
- Developed Integrated Environmental Framework for Nasser Lake Environmental Management
- Enhanced the Decision Support System for the Integrated Water Resources Management of Egypt based on Environmental Balance to Accommodate the Climate Changes

Outputs

Outputs Result1

- Develop a mitigation policy for facing the drought in Egypt

1.2. Develop historical maps that highlights the drought and its implications in Egypt in the last 30 years

1.3. Study the relationship between drought in Egypt and the social, economic and environmental issues such as people migration, migration to cities, rural areas development, Mega Water Resources projects success or fail, etc.

Outputs Result 2

- The proposal aims to enhance the livelihood and human health of the Egyptian citizens by controlling the pollution in Nasser Lake. This goal will be achieved by achieving the following objectives.

2.2. Update the environmental knowledge of Nasser Lake at the last two decades.

2.3. Assess the pollution sources around Nasser Lake and assess its impacts on Nasser Lake water quality.

2.4. Suggest measures to control the pollution of Nasser Lake.

2.5. Develop an integrated environmental framework to maintain Nasser Lake

Outputs Result3

3.1. Developing the scientific thinking for ECRI staff.

3.2. Training ECRI staff to handle the available climate data and statistical analyzing of data.

3.3. Training ECRI staff to handle with regional circulation climate models (RCMs).

3.4. Training ECRI staff on a hydrological modeling.

3.5. Training ECRI staff on developing of adaptation strategies.

3.6. Supporting ECRI staff to publish in international peer-reviewed journals and international conferences

5: SCP Component for Sustainable Energy Applications

The working groups under this component proposed 6 projects

PROJECT # 19

Biogas Digesters to Generate Energy in Commercial Establishments

Presented by:

NSWMP

Cross Cutting Sectors:

Waste, Integrated Communities, Rural Development, Agriculture, Energy

Project Rationale/Background

Egypt is currently suffering from an energy crisis as well as an environmental crisis and innovative and sustainable solutions should be found particularly as we venture into establishing new integrated communities. Within the context of developing the one million feddans in Egypt and the development of integrated urban communities this project aims to construct a total number of 20 digesters units with a capacity of (40m3) each to produce sufficient energy for a number of commercial and public entities such as bakeries, restaurants schools, hospitals, and other commercial establishments.

Biogas digesters can convert waste, mainly animal and plant waste into clean burning fuel, while also generating residues that could be used as fertilizers. The technology has been around for years and over 30 million households in China are currently relying on biogas for their energy consumption. Biogas digesters are generally constructed using basic material such as clay sand and bricks, which are locally available, which makes them affordable to construct.

Rationale

- The national project of developing 1 million feddan is one of the priority projects for the current government and finding means of generating energy in a sustainable way for the communities there is essential.
- Egypt is facing an energy crisis and there is a need to find alternative sources of energy other than fossil fuels
- There is an urgent need for soil improvers and bio-digesters produce as a byproduct soil improvers to be able to reclaim one million feddan.
- Finding sustainable solutions for the management of organic waste is a major challenge

Project Components:

Project Objectives:

- Manage agricultural and municipal waste in an environmentally sound manner.
- Conservation of natural resources especially in expanding rural areas
- Generate clean, renewable and alternative energy sources
- Support SMEs sustainable growth and create green business opportunities.

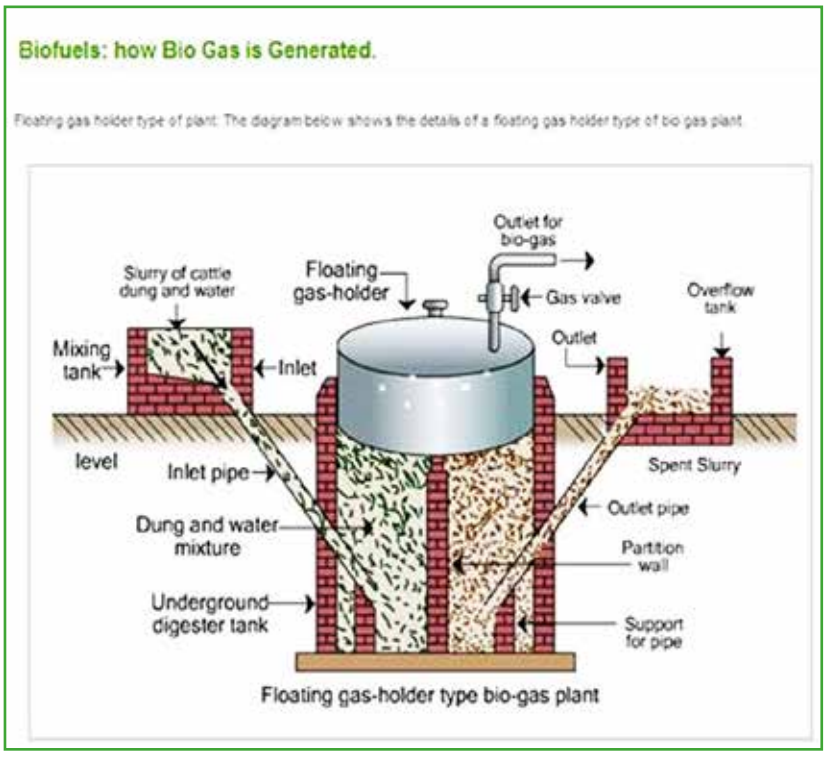
Description:

The digesters would be constructed by small and medium enterprises through microcredit loans to be also subsided by the government. One cubic meter of biogas can satisfy one of the following

- An internal combustion engine of 1 Hp for 1hour
- Operating a stove medium lit for 2-3 hours
- A fridge 10 feet for 1-2 hours
- Generating electrical energy of 1.3-1.5 kwh
- A medium sized stove for 2 hours.

The proposed biogas units would have the capacity to generate 6 m3 of biogas daily as well as 60 kg of soil improver. The estimated cost of each unit would be 18000 LE. The project will seek to build 20 units to be exclusively utilized for energy needs of some commercial establishments in the new integrated communities including supermarkets, restaurants, bakeries etc.

The feedstock for the biogas units would come from animal manure, organic household waste and crop residues.



Project Components

Phase 1 (6 months)

- Training small and medium enterprises, farmers, business owners on how to construct biogas units, how to operate them.
- Market analysis for energy and soil improvers in new communities.
- Awareness campaign to citizens on the value of biogas

Phase 2 (6 months)

- Selection of beneficiaries.
- Provision of loans
- Construction of units

Project Lead & Participating Stakeholders/Partners:

NSWMP – Ministry of Environment

Estimated Budget

150,000 Euros

Policy Enablers:

- Subsiding loans to be provided to small and medium enterprises to be able to construct and sustain the units
- Providing also subsides for cleaner energy forms such as biogas similar to subsidies provided to fossil fuels. A feed in tariff to make biogas production commercially viable.
- Having a clear strategy for energy in new urban communities that specifies the desired energy mix including energy from biogas. The government also needs to set an obligation on certain commercial establishments to utilize biogas as a certain percentage of their energy consumption.
- Demonstrate seriousness in developing the proposed one million fedans and start investing in infrastructure to support the relocation of youth to such new urban communities.
- The MoE of environment could also utilize some of the resources in the Environmental Protection Fund for funding the establishment of biogas units and disseminating it on a larger scale.

Expected Results:

Outcomes

- New urban communities find sustainable sources of energy substituting the need for fossil fuels.
- Desert land in new communities becomes suitable for agricultural purposes as a result of compost provided from the biogas units.

- Improved wellbeing of citizens in new communities who benefit from better quality produce from land utilizing organic fertilizer instead of chemical ones.
- Protection of the Environment from the adverse effects of burning agricultural residues and from the pollution of waterways from animal manure and other types of waste.

Outputs

- 120 m3 of biogas generated daily sufficient to supply 180kwh of electrical energy
- 500 tons of compost generated yearly sufficient for the cultivation of 160 fedans.
- At least 40 qualified technical staff are capable of designing and operating small scale biogas units.

Indicators:

Execution Indicators

- X number of biogas digesters are constructed and are operational…
- X number of training sessions conducted
- X number of awareness sessions conducted.
- X number of loans provided for construction

Impact Indicators

- X number of Commercial and public facilities receive a steady supply of biogas from the digesters
- X quantities of soil improvers sold to farmers.
- Substitution of fossil fuels by clean gas from bio digesters reached X %

PROJECT # 20

Biogas Production from Sewage Sludge

Presented by:

NSWMP

Cross Cutting Sectors:

Energy. Waste, Agriculture

Project Rationale/Background

The Energy strategy for Egypt proclaims that 20% of Egypt's energy needs should come from renewable sources. Recent adoption of feed in tariffs for wind and solar energy are examples of policy instruments adopted by the Egyptian government to achieve the 20% target and address the energy shortages facing the country. Egypt's constitution also stipulates for the need for exploring new and renewable energy sources. Production of energy from biogas is however still not adequately explored. The strategy of the government to establish a number of new communities requires that extensive work is done to find sustainable energy sources to address the energy needs of the new communities. In the united States, in 2010, 162 anaerobic digesters generated 453 million Kwh of energy in Germany there are 6800 large-scale anaerobic digesters.

This project is multi-sectoral addressing needs in the waste, energy and agricultural sector. Anaerobic digestion provides a multitude of environmental and health benefits including green house gas abatement, reduction of waste, production of clean energy and production of fertilizer.

The project contributes to the theme of sustainable community development. The project proposes policy instruments, which pave the way for replication of the project in different locations so it could have a wider impact

Project Components:

Description:

The proposed Biogas digesters rely on anaerobic digestion of sewage sludge. The gas is a mixture of methane and carbon dioxide with a small percentage of other gases. Biogas is colorless and also not poisonous or hazardous and relatively easy to move. Biogas is generally considered a carbon neutral source of energy. The calorific value of biogas ranges from 3000-6000 Kcal/m3.and every m3 generates from 1.25-2.48 KWH. It is a very clean and viable alternative to fossil fuels.

A byproduct of the anaerobic digestion process is the Digestate, which is a suitable soil improver, which can be marketed as well, and hence the project is multifaceted and could benefit more than one sector. The project seeks to establish 8 biogas digesters adjacent

to sewage treatment plant, each digester with an output capacity of 250 KW/H. The total cost for the 8 digesters would be in the range of 20 million Euros. The project would be implemented during two phases; the first phase would entail the construction of 4 digesters and the second phase 4 more digesters bringing the total to 8 digesters.

The net cost of digesters and Biogas depends on a number of factors including :

- The type of technology chosen (capital and operational expenses)
- The quantity and availability of the type of waste used.
- The intended use and the value of biogas
- The market value for the produced digestate(fertilizer)

Conditions may currently be prohibitive for the large-scale production of biogas hence the government needs to
intervene with the needed policy instruments to make the project cost effective.

Project Objectives:

- Promote alternative and sustainable methods for the treatment of sewage sludge to protect the health and the environment.
- Contribute to addressing energy shortages through exploiting sustainable energy sources in new communities.
- Support sustainable agriculture through production of soil nutrients as a by-product.

Phase 1

- Finalizing feasibility study.
- Establishing 4 biogas units
- Partnering with international research and academic institutions working in that field
- Identifying further sources of funding

Phase 2

- Establishing 4 more biogas digesters

Project Lead & Participating Stakeholders/Partners:

Ministry of Environment/Ministry of Electricity/ Holding Company for Water and Waste Water

Estimated Budget

20 million Euros

Policy Enablers:

- Setting a feed in tariff for electrical energy generated from biogas production
- Amending regulation for establishment of sewage treatment facilities to include the obligation to establish biogas digesters next to it.
- Enhancing the value of the produced digestate through the promoting its used for land reclamation purposes specially for the mega projects announced (reclamation of one million feddans).

Expected Results:

Outcomes

- Improved protection of health and environment from poor management of sewage sludge
- Achieved energy sustainability in new communities
- Improved crop yield and quality of agricultural produce.
- Saving costs of conventional fuel sources and saving natural resources.

Outputs

- 8 biogas digesters fully constructed and operational.
- 4 mega watt/h generated
- 67000 tons of soil improvers generated and utilized.
- 120 jobs created

Indicators:

Execution Indicators

- 8 digesters fully operational
- Amounts of Outputs from energy and soil improvers sold
- x amount of sewage sludge treated.

Impact Indicators

- X amount of emissions reduced.
- X amount of land becomes fertile.
- X number of households/facilities receive sustainable electrical output

PROJECT # 21

Utilizing Solar Energy for Heating purposes in Egyptian Hotels & Hospitals (Tourism & Health Sectors)

Presented by:

New and Renewable Energy Agency (NREA)

Cross Cutting Sectors:

Renewable Energy Application in hotels & hospitals sectors

Small and Medium Industrial Sectors

Project Rationale/Background

Egypt's National Strategy for Renewable Energy is to satisfy 20% of the generated electricity by renewable energies by 2020. A relevant area of intervention for intervention includes Heating & Cooling processes, which are essential for both sectors (Hospitals & Hotels) as they represent valuable percentage of their total energy consumption. As such, the objective of the project is to install small & medium Concentrated Solar Plants (CSP) in hotels & hospitals to provide their needs from thermal energy in sustainable way. The new units will replace the existing ones which depend on electricity & kerosene. Further, the project will support the local manufacturing of quality components of the solar systems.

Project Objective

Promotion of Renewable Energy application in the Egyptian Health & Tourism Sectors

Specific Objectives

- Promoting of local manufacturing of Renewable Energy Technologies for Solar application.
- Reduction the use of conventional energy sources.
- Creation of jobs.
- Reduction of GHGs and its environmental impact

The project implementation is expected to result in the following:

- Financing for the deployment of solar systems.
- The market manufacture, supply and distribution of solar energy components and systems is strengthened
- Service providers for solar systems enhanced.
- Providing sustainable and safe energy source.

Project assumptions:

- No. of Units: 20 Units
- Technology: Concentrated Solar Plant CSP
- Capacity: 0.25 to 0.5 MW per each

- Total Capacity: 5-10 MW.
- Estimate total Cost: 25 Million US$ to 50 Million US$
- In addition to 10% as contingency.

Policy Enablers:

Development of standard specifications for manufacturing of solar systems for heating, cooling, steam production and other thermal purposes to ensure its high quality and performance.

Design innovative financing package for financing of solar systems especially for hotels & hospitals sectors.

Expected Results:

Outcomes

- Promotion of Renewable Energy application in Egypt.
- Egypt will main supplier of solar systems for African & Middle East countries

Outputs

- Design of incentive schemes & policies to promote local manufacturing of solar systems.
- Capacity building for local Egyptian small & medium industries in the field of manufacturing of solar systems.
- Development of standard specifications for manufacturing of solar systems for hotels & hospitals sectors to ensure its high quality and performance
- Design innovative financing package for financing of solar systems.

Indicators:

Execution Indicators:

- Design of incentive schemes to promote local manufacturing of solar systems.
- Capacity building for local Egyptian manufacturing of solar systems.
- Development of standard specifications for manufacturing solar systems for hospitals & hotels sectors to ensure its high quality and performance
- Design innovative financing package for financing of solar systems.

Impact Indicators

Promotion and dissemination of renewable energy application in the hospitals & hotels sectors in Egypt

PROJECT # 22

Utilizing Solar Energy Cooking & Heating Modules in Egypt's Residential Sector in Rural Areas

Presented by:

Ministry of Energy and Electricity (MoEE)/New and Renewable Energy Agency (NREA)

& Egypt National Cleaner Production Centre (ENCPC)

Cross Cutting Sectors:

Renewable Energy Application in the Residential Sector

Solar Energy Applications for Water Heating and Cooking Purposes

Project Rationale/Background

The rationale of this project is to support the replacement of high electricity and natural gas consumption by renewable energy sources, notably solar energy. In this respect, Egypt's National Strategy for Renewable Energy aims to satisfy 20% of the generated electricity by renewable energy sources by 2020. Given the policy orientations of the Egyptian government to decrease the subsidy of traditional sources for fossil fuel, it is becoming mandatory to look for new sources and alternatives sources of clean energy, which are environmentally friendly and which can positively improve sustainability of natural resources use.

Accordingly, the use of solar energy for water heating and for cooking is an accepted cost effective technology. On the one hand, Heating for cooking is considered as one of the most common processes in the residential sector and in the main while is one of sources for producing Co2 emissions. On the other hand, individual water heating market is still dominated by electrical cumulus followed by the butane and natural gas water heaters also called wall-boilers. According to statistics, the water-heaters' market traded about 300,000 units in 2010 with an average annual increase of 7% per year. Electrical water-heaters are increasingly prevailing with a 50% share of the market in 2010. Its share has progressively grown at the expense of gas-operated boilers (25% in 2010 for butane and 25% for natural gas) although it is cheaper in terms of investment cost and operation fees.

Additional challenges include the lack of financial products by local banks especially for the-bottom-of-the-pyramid market segment. There is also a lack of subsidy or incentive programs adopted by government to support buyers acquiring SWH and solar cooking units. In addition, the high initial cost of the SWH prolongs the return-of-investment period that makes this financial product not attractive for national banks in the future.

As such, the objective of the project is to develop the market environment for the local manufacturing of solar cooker systems & solar water heaters (SWH) for the residential &

SME sectors in rural areas. The project focuses on deployment of solar cookers & water heaters in rural and remote areas by introducing sustainable heat systems using solar energy replacing the traditional rural cookers which depend on agriculture wastes or kerosene, and other traditional forms of water heating dominated by traditional technologies using different types of fossil energy including electricity, diesel, butane and natural gas.

The project will also support the local manufacturing of quality components of the solar cooker and SWH systems. Local manufacturing provides the local market with low quality, but high price Solar technologies, low quality deepens the problem more through high maintenance costs and short lifetime. Imported solar energy technologies make the situation even harder, Chinese products started cheaper but with a capillary effect with the European products prices and the deterioration of the value of the local currency, it is raised to reach the edge of 5000 EGP. These challenges result not only in solar technologies with unaffordable price, but also in the limited ability of most of the imported solar units to withstand the local conditions and operate efficiently. Thus, threatening the reputation of the technology especially when bottom-of-the-pyramid market segment is concerned.

The expected outcomes of this project are the production of certified prototypes, a pilot production facility, training program for installers and manufacturers, production and quality manual, a business plan, and credit scheme serving the-bottom-of-the-pyramid segment. The project will have direct impact on the environment by reducing the total CO2 emission by about 24,000 tons. Also, the project will have an economic impact on the society by saving around 2.4 Million EGP in governmental annual subsidy in the first year. Finally, the social impact of the project lies in the improvement of the quality of life of the-bottom-of-the-pyramid segment which is deprived of access to hot water.

Project Components:

Description:

The different components of this project target the production of a prototype for a low cost solar water heater (SWH) & cooking units with 80% local manufacturing share for the bottom-of-the-pyramid market segment in Egypt. The methods used to achieve this objective include the design and manufacturing of the prototypes, the development of the supply chain, testing validation and certification of the prototypes. Also, the preparation of the infrastructure necessary for a pilot production unit and training of human resources necessary for disseminating the project. In addition the projects seeks to undertake market development and stimulation for the developed prototypes. As such, the projects targets 2 main approaches:

Technical Approach:

- Support the deployment of solar thermal technologies for cookers and heaters for residential application.
- Enhance the local manufacturing of solar energy components for heating and cooking.
- Build the Capacity of technical staff designing, developing and servicing solar cookers and solar water heaters.

Financial Approach:

- Development of innovative financial package for solar energy technologies to be extended with more fund from other interested donors

Project Objectives:

Project Objective

Promotion of Renewable Energy application in Egypt's Residential Sector in rural and remote areas by producing a prototype for low cost solar water heaters (SWH) and cooking units with 80% local manufacturing share.

Specific Objectives

- Promoting of local manufacturing of Renewable Energy Technologies for Residential & SME applications.
- Reduction the use of conventional energy sources in the Residential & SME sectors.
- Promote Job opportunities and creation in renewable/solar energy sector
- Reduction of GHGs and its environmental impact
- Design and manufacture of prototypes for SWH and solar cooking units for residential and SME sectors
- Development of the supply chain for local manufacturing for solar energy prototypes
- Testing validation and certification of solar cooking and SWH prototypes
- Preparation of the infrastructure necessary for the pilot production units
- Training of human resources necessary for disseminating the project concept
- Market development and stimulation

Components:

Component 1: Local Manufacturing

- Design and manufacturing of prototypes for solar water heaters and cooking units
- Development of the value chain
- Development of production training materials
- Design and build a functioning production unit for the SWH (Production Development)

Component 2: Certification and Quality Standard

- Testing, validation and certification
- Production and quality manual
- Quality assurance
- Qualification standards
- Final reporting

Component 3: Capacity Building and Training

- Mobilizing and qualifying of production team

Component 4: Financing and Business Model Development

- Business modeling
- Market stimulation

Solar Water Heaters

The Egypt National Cleaner production Centre (www.encpc.org) (Executing Agency) acting as the Project Management Unit and supporting the national execution of project activities in collaboration with

- Egyptian Organization for Standardization (EOS) (Certification & Quality Assurance)
- American University in Cairo
- Chamber of Machinery and Equipment-Federation of Egyptian Industries
- Small Grant Programme- SGP- UNDP , NGOs (Empowerment of women and youth)

Solar Cooking Systems

- Egyptian New & Renewable Energy Authority (NREA).
- Egyptian Ministry of Local Development.
- Egyptian Organization for Standardization (EOS)
- Federation of Egyptian Industries (FEI)- Chamber of Engineering Industries
- NGOs.
- International Centers of Excellences (China and India)

Possible Funding Model:

Design of an innovative financing scheme of up-scaling and promotion of model in whole sector

Estimated Budget:

986,000 Euros for solar cooking units + 450,000 Euros for Solar Water Heaters

Policy Enablers:

- Development of standard specifications for manufacturing of solar cookers and solar water heaters for the residential sector to ensure its high quality and performance
- Design innovative financing package for financing of solar cookers and solar

- water heaters especially for low-income people by developing financial products via local banks targeting the-bottom-of-the-pyramid market segment according to the segment bank ability
- Support subsidy or incentive programs adopted by government to support buyers acquiring SWH and solar cookers

Expected Results:

Impact

Promotion and dissemination of renewable energy application in the Residential & Small and Medium (SME) Industrial Sectors in Egypt

Outcomes

The project implementation is expected to positively contribute to the following strategic outcomes related to Egypt's energy security:

- Improved wide scale adoption of solar renewable energy applications in Egypt's residential and SME sectors
- Enhanced support for Egypt to become main supplier of solar technology in African & Middle East markets.
- Local SWH cheaper by 40-70% compared with available alternatives are developed
- SWH with 80% local production share are developed
- Enhanced design of incentive schemes & policies to promote local manufacturing of solar cookers.
- Enhanced Financing for the deployment of solar cookers and heaters for the residential sector.
- Strengthened market manufacture, supply and distribution of solar energy components and systems
- Enhanced service provision for solar cookers and heaters is enhanced.
- Strengthened SWH credit scheme serving the-bottom-of-the-pyramid segment.

Outputs

- 8000 concentrated solar cooking units with an average unit cost of 120 $ are produced
- A local production facility that can produce 2000 Solar water heaters annually is established
- Production & quality manual production and quality training curricula are developed
- Local SWH and solar cooking units standards and industrial permit procedure are issued
- SWH and solar cooking units installers qualification standards are developed
- Ten qualified installers/dealers are supported in each sector
- Capacity building for local Egyptian small & medium industries in the field of

- manufacturing of solar cookers
- Development of standard specifications for manufacturing of solar cookers for residential sector to ensure its high quality and performance
- Design innovative financing package for financing of solar cookers especially for low-income people.

Indicators:

Execution Indicators

- Design of incentive schemes to promote local manufacturing of solar cookers and heaters
- Capacity building for local Egyptian manufacturing of solar cookers and SWH
- Development of standard specifications for manufacturing solar cookers and SWH for residential sector to ensure its high quality and performance
- Level of access to innovative financing package for financing of solar cookers and SWH

Impact Indicators

Environmental Impact:

- By the fifth year, the total CO_2 emission reduction will reach 24,000 tons.
- Embodied energy in the produced SWH and solar cookers is significantly decreased, due to eliminating high quality expensive stainless steel or sophisticated treatment technologies, and more production efficiency.

Economic Impact:

- In the first year of the business, this project will result in direct saving around 2.4 Million EGP in governmental annual subsidy, while total saving reaches 20 Million EGP by the fifth year of the business. This saving can be reused in supporting SWH and solar cookers market penetration.
- The economic value of CO_2 emission reduction will reach 3 million by the fifth year of the business.
- Division of labor distributes the benefit along the value-chain.
- Investors will be encouraged to venture in SWH and solar cookers manufacturing as cost of infrastructure is extremely decreased.

Social Impact:

- Awareness of SWH and solar cookers will be raised as a side effect.
- Improved quality of life of the-bottom-of-the-pyramid segment as most of this segment does not have hot water.
- SWH with reliable quality minimizing irritating problems.
- Nineteen direct and permanent jobs will be created in the first year of the business, in addition to fifty indirect job opportunities, growing based on 3.3% annual growth.

PROJECT #23

Industrial Electrical Motor Driven Systems (EMDS) Efficiency Program in Egypt

Presented by:

Egypt National Cleaner Production Centre (ENCPC)

Cross Cutting Sectors:

Energy – Industry

Project Rationale/Background

Electrical motors use over half of all electrical energy consumed. Improving the efficiency of electric motors and the equipment they drive can save energy, reduce operating costs, and improve productivity. Energy efficiency should be a major consideration when purchasing a motor. The annual energy cost of running a motor is usually many times greater than its initial purchase price. Thus, using high energy efficient electrical motors is not an option but it is a direction that must be adopted. As such, the rationale of this project takes into consideration the following elements:

- High increase in energy demand for industrial application
- efficient equipment and high potential for energy savings by application of efficient motors
- Wide range of applications of motors in industry and agriculture, quarrying & mining sectors (e.g pumps, compressors)
- High potential for integrated solution (efficient motors with solar energy application for running of motors)
- Growing potential for energy efficient motors not only for Egyptian market but also for export
- High potential for job creation through the supply chain of motors manufacturing (especially for manufactures, feeding industry, services for maintenance)

Project Components:

Description:

The project aims to enhancing energy efficiency in Egypt due to the following factors:

- Industry consumes 1/3 of the total electrical energy in Egypt
- Approximately 70% of electricity used in industry is on motors
- High Impact Opportunity Area
- Reduced energy consumption leads to multiple benefits, including cost savings, increased competitiveness for industry and a reduced supply load.
- Savings of at least 7-9% of the national electricity consumption.
- Empowering the Local Manufacturers of Motors
- Creating job opportunities, increasing export potential for local industry

- Building on the success of ongoing initiatives
- Addresses opportunities identified within the Industrial Energy Efficiency Project in Egypt, funded by the GEF and implemented by UNIDO

Project Objectives:

Project Objective

Enhancing Energy Security (Savings of at least 7-9% of the national electricity consumption) & Empowering the Local Manufacturers of Motors

Specific Objectives

- Demonstration of efficient electrical motors and its integrated solution practices in about 50 enterprises with reduction in energy total consumption up to 10 % was achieved
- National quality scheme for efficient electrical motors (norms/standards)

Number of Policy measures for promotion of efficient electrical motors

Structure Components	Activities
Conducive Policy Environment & Development of national quality scheme for motors	Support development of quality , testing protocols and facilities
Capacity Building	Build technical capacity of key experts, local producers, vendors and end-users of electric motor systems on efficiency measures
Promotion of Local Manufacturing	Establish a public-private partnership platform to promote investments and joint ventures between international and local producers including feeding industry
Technical Assistance to Technology Demonstration	Conduct detailed motor efficiency audits and implement system optimization measures for motor systems in 50 enterprises
Knowledge Dissemination	Launch awareness- raising campaign; Establish a multi-stakeholder platform for information exchange, cooperation and partnerships

Project Lead & Participating Stakeholders/Partners:

- The Egypt National Cleaner production Centre (www.encpc.org) at the Industrial Council for Innovation and Technology at the Ministry of Industry
- 10th of Ramadan Investors Association
- Cleaner Production Centre in South Africa as an international experienced entity

Estimated Budget:

4.05 million Euros

Policy Enablers:

- Creating accredited motor testing facilities in Egypt
- Creating incentives schemes for promotion of local manufacturing of efficient motors manufacturers or end-users
- Creating national Standards/Norms for motor efficiency
- Design of an innovative financing scheme for up-grading of current manufacturing processes

Expected Results:

Expected Results

- Savings of at least 7-9% of the national electricity consumption.
- Demonstration of efficient electrical motors and its integrated solution practices in about 50 enterprises with reduction in energy total consumption up to 10 %

Outcomes

- Number of Policy measures for promotion of efficient electrical motors
- National quality scheme for efficient electrical motors (norms/standards)
- Raising awareness and capacity building on energy efficient motors achieved
- Local manufacturing and upgrading of feeding industry of efficient motors & integrated solution through its supply chain
- Innovative access to finance for promotion of efficient electrical motors is in place for Egyptian market

Indicators:

Execution Indicators

- Number of Policy measures for promotion of efficient motors was achieved
- National quality scheme for efficient motors (norms/standards) was developed
- Raising awareness and capacity building on energy efficient motors achieved
- Local manufacturing and upgrading of feeding industry of efficient motors & integrated solution through its supply chain was promoted and achieved
- Demonstration of efficient motors and integrated solution practices in 100 companies achieved with reduction in energy consumption up to 10 % was achieved
- Innovative access to finance for promotion of efficient motors is in place for Egyptian market

Impact Indicators

- Savings in the electricity consumption
- Increasing technical capacity of key experts, local producers, vendors and end-users of electric motor systems on efficiency measures
- Incentives schemes for promotion of local manufacturing of efficient motors manufacturers or end-users

PROJECT #24

Promoting Energy Efficiency for Boilers & Utilizing Solar Energy for Industrial Process Heat in Food, Chemicals and Textiles Sectors

Presented by:

Egypt National Cleaner Production Centre (ENCPC)

Cross Cutting Sectors:

Renewable Energy application in the Egyptian Industry with focus on three industrial sectors: Food, Chemical, Textile

Project Rationale/Background

The project's rationale is to contribute to enhancing Egypt's energy security in the industrial sector given the following factors:

- Industry consumes 60 % of the total thermal energy in Egypt
- There is a need to decrease thermal loss in industrial application and improve energy efficiency of boilers in different industrial sectors especially in the food, chemicals and textile sectors.
- Reduced energy consumption will lead to multiple benefits, including cost savings, increased competitiveness for industry and reduced fuel consumption.
- There is a potential to save of at least 30-70% of the national fuel consumption.

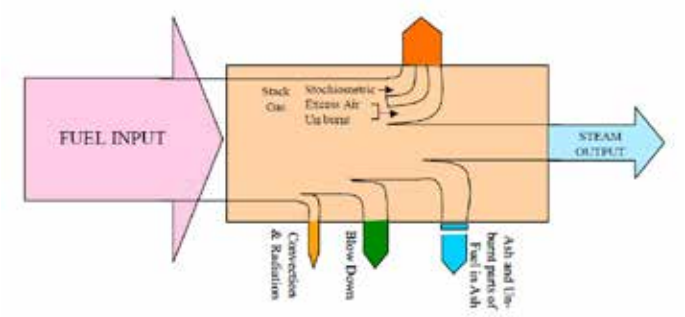
Accordingly, the project is expected to contribute to the following:

- Improve Stack gas losses: Excess air (reduce to the necessary minimum which depends from burner technology, operation, (i.e. control) and maintenance); Stack gas temperature (reduce by optimizing maintenance (cleaning), load; better burner and boiler technology).
- Losses by un-burnt fuel in stack and ash (optimize operation and maintenance; better technology of burner).
- Blow down losses (treat fresh feed water, recycle condensate)
- Condensate losses (recover the largest possible amount of condensate)
- Convection and radiation losses (reduced by better insulation of the boiler).
- Minimizing steam transmission losses from the steam generating plant to the consuming sections
- Minimizing steam leaks in the plant area and periodic monitoring and control of steam leaks
- Condensate recovery and Flash steam recovery.

Project Components:

Description:

The objective of the project is to develop the market environment for the diffusion and local manufacturing of solar energy systems for industrial process heat. The project focuses on improving the energy efficiency of the industrial process heat system and the introduction of solar thermal technologies mainly in industrial companies with a high fraction of low and medium temperature heat demand in three industrial sectors, namely the food, chemical and textiles sectors. Further the project will support the local manufacturing of quality components of the solar systems. The combustion process in a boiler can be described in the form of an energy flow diagram. This shows graphically how the input energy from the fuel is transformed into the various useful energy flows and into heat and energy loss flows. The thickness of the arrows indicates the amount of energy contained in the respective flows.



Project Objectives:

Project Objective

Promote renewable energy applications in the Egyptian industry by enhancing energy efficiency for boilers (saving at least 30-60 % of the fuel consumption in the boiler) & empowering the fuel switching from fusel fuel (Matzo) into Natural Gas for boiling system

Specific Objectives

- Promoting of local manufacturing of Renewable Energy Technologies for industrial application in process heating.
- Reduction the use of conventional energy sources in the industrial sectors especially: Food, Chemical and Textile.
- Creation of jobs & promotion of entrepreneurship for application of renewable energy technologies in industrial sector.

Reduction of GHGs and its environmental impact

The project implementation is expected to influence five main areas:

- Policy instruments promoting the use of low carbon technologies & solar energy for industrial applications of process heat in 3 sectors developed
- Mobilizing financing for the deployment of solar energy for industrial heat and the development of innovative financial packages for solar energy technologies with 2 million USD to be extended with additional funding from other interested donors
- Support the deployment of solar thermal technologies for multipurpose

- applications in industrial and commercial application. Enhancing the local manufacturing of solar energy components for heating processes. Build the Capacity of technical staff designing, developing and servicing solar heating systems.
- Technical capacity of the system designers, developers, facility managers and service providers for solar energy utilization for industrial process heat enhanced.
- Adequate monitoring and evaluation mechanisms are in place, facilitating smooth and successful project implementation and sound impact

The different project components are:

- **Inventory of companies**

  Select the required companies for the project by side visit for three industrial sectors (food, textile and chemicals).

- **Measuring and evaluation**

  Measuring the boiler efficiency for selected companies to evaluate if it useful to join the project.

- **Capacity Building**

  Build technical capacity from selected companies to establish energy efficiency units for the project.

- **Energy Audits:**

  Including technical assistance and recommendations for boiler efficiency audits history report for a certain time of the project and finding implementation options.

- **Knowledge Dissemination:**

  Launch awareness raising campaign and establish a multi-stakeholder platform for information exchange, cooperation and partnerships

Estimated Number of Target Companies who can implement the technology:

Energy Efficiency (EE) Technologies in Industry	Estimated Number of Target Companies who can implement the technology			Estimated investment (US$)
Type of Technologies:	Total Number of Companies	Large enterprises	SMEs	
Boiler Efficiency &Steam Line Insulation (replacing the burner or high efficient boiler)	16,300	12225	4075	105,000,000

Project Lead & Participating Stakeholders/Partners:

The Egypt National Cleaner production Centre (www.encpc.org) at industrial council for Technology and Innovation at the Ministry of Industry which host the Project Management Unit (PMU) in cooperation with:

- National Authority for Renewable Energy (NAREA)
- Egyptian Organization for Standardization (EOS)
- Federation of Egyptian Industries (FEI)- Chamber of Engineering Industries
- International Centers of Excellences (Austria, China and India)
- Universities and Academic Institutions (Outreach and hub for knowledge)
- Industry Associations (Demonstrations, implementation, delivery, sustainability)
- Banking Sector (Financial Mechanisms, strategic Cooperation)

Estimated Budget:

5.8 million Euros

Policy Enablers:

- Development of standard specifications for manufacturing, installation& operation of solar thermal technologies for industrial sector to ensure its high quality and performance
- Design innovative financing package for financing of solar heating project in industrial.
- Creating accredited boiler testing in industrial facilities in Egypt
- Creating incentives schemes for promotion of efficient boiler systems
- Creating national Standards/Norms for boiler efficiency monitoring & measuring
- Design of an innovative financing scheme for up-grading for boiler rehabilitation if required

Expected Results:

Expected Outcomes

- Savings of at least 30-70% of the national fuel used in industrial sector consumption
- Promotion of Renewable Energy application in the Egyptian Industry with focus on three industrial sectors: Food, Chemical, Textile
- Support the greening of industrial heat processes in terms of: Policy measures, Incentives measures, local manufacturing measures, quality and standers and demonstration of pilot project.

Outputs

- Design of incentive schemes & policies to promote local manufacturing of solar heating technologies
- Demonstration of pilot projects for using solar thermal technologies for heating processes- 100 pilot projects
- Capacity building for 200 local Egyptian experts in the field of manufacturing & operation of solar power technologies used for heating in industrial applications

- Development of standard specifications for manufacturing, installation& operation of solar thermal technologies for industrial sector to ensure its high quality and performance
- Design innovative financing package for financing of solar heating project in industrial.
- Improve national policy for monitoring & measuring for efficient boilers.
- National quality scheme for efficient boilers (norms/standards).
- Raising awareness and capacity building on energy efficient boiling system in industrial applications
- Innovative access to finance for promotion of rehabilitation of installation of new boiler in industrial sector.
- Improve fuel switching for boilers to improve environmental requirements

Indicators:

Execution Indicators

- Design of incentive schemes & policies to promote local manufacturing of solar heating technologies
- Demonstration of pilot projects for using solar thermal technologies for heating processes- 100 pilot projects
- Capacity building for 200 local Egyptian experts in the field of manufacturing & operation of solar power technologies used for heating in industrial applications
- Development of standard specifications for manufacturing, installation & operation of solar thermal technologies for industrial sector to ensure its high quality and performance
- Design innovative financing package for financing of solar heating project in industrial sectors (Food, Textile and Chemical)
- Review measurements energy & environmental measures for the boilers in selected companies for a certain time period
- Compare the energy bill for thermal energy consumption (NG, fusel fuel) with previous consumption
- Periodic meeting with energy unite in selected factories to discuss the recommended options for the thermal system.

Impact Indicators

- Savings in thermal energy consumption
- Increasing technical capacity of key experts in the selected company (Energy Managers)
- Incentives schemes for promotion of efficient boilers from stockholder
- Promotion and dissemination of renewable energy application in the industrial sectors in Egypt with focus on chemical, food and textile sectors

6: SCP Component for Solid Waste Management

The working groups proposed 4 projects under this component

PROJECT #25
Reducing Plastic Bag Consumption

Presented by:

NSWMP

Cross Cutting Sectors:

Waste – Tourism – Retail – Industry

Project Rationale/Background

In recent years with the rise of consumerism, the rate of using plastic bags has risen exponentially, while it has come to the attention of the world the harmful environmental impact of burning these bags as a means of disposal emits dangerous toxic gases. Most consumers dispose of these bags right away without reusing them. The indefinite period of time that it takes for the average plastic bag to breakdown can be literally hundreds of years. There is a need to support more sustainable usage of plastic bags. This issue has been previously addressed through small-scale pilot projects spearheaded by organizations and NGOs. Within the sustainable consumption and production framework this project aims to significantly reduce single-use plastic bags consumption in order to protect Egypt's natural environment and resources. Plastic bags consumption in Egypt is extremely high and unrestrained and behavioral change in this area needs to be induced. Plastic bags are littering Egypt streets and waterways including the Nile, the Mediterranean and the Red Sea. Plastic bags take hundreds if not thousands of years to decompose this unrestrained consumption is leading to the destruction of Egypt's marine environment, blocking its waterways and littering its cities.

The issue has economic and social dimensions that need to be well understood and then addressed. There have been two main international approaches to address the issue which include a total legal ban on plastic bags usage (command and control approach), the other is about enforcing a levy on purchasing the plastic bags' which is a form an economic tool to incentivize people to stop buying or start using other alternatives. The project at hand, calls for introducing a mandatory levy scheme as an economic instrument, which will be additionally imposed on the final price of the plastic bags. The incurred monetary gain from this proposed levy can be used to support creativity and innovation to find local alternatives to plastic bags and support entrepreneurs. This requires public awareness, R&D and active public decision-making. Egypt is also a touristic country and the haphazard disposal of plastic bags pollutes waterways and the sea, which could have a negative impact on tourism. The government will be responsible for introducing and then enforcing this scheme. There

are enabling policy considerations including access to information, public awareness regarding the harmful impact of plastic bags on environment and health. Simultaneously, the government has to invest in awareness and research to find alternatives. The project also doesn't require a high level of funding, rather it requires planning and serious government efforts.

Project Components:

Description:

The project aims to achieve this behavioral change through a levy to be enforced on plastic bags and charged by retailers at the point of sale. This levy would be accompanied by a national awareness campaign to raise awareness about the adverse impact of plastic bags consumption on the environment and the available alternatives. A fund created to collect levies charged by retailers would be created to fund innovation in alternatives to plastic bags, marine life conservation and awareness campaign as well as other environmental protection programmes.

As such, the rationale of the project is built on the following elements;

- Egypt's natural environment is one of its most important assets. Plastic bags littering is contributing to the destruction of this asset with tremendously negative environmental, social and economic impacts.
- The consumption of plastic bags in Egypt is extremely high and unrestrained because there is no value attached to its consumption.
- International experience demonstrates that a levy on plastic bags could lead to significant reduction in its consumption.

Project Objective

To reduce single-use of plastic bags usage through the imposition of plastic bag levy to protect Egypt's natural environment and human health.

Specific Objectives

- Protection the environment from non-degradable plastic bags
- Protection the marine environment from the adverse effects of plastic bags littering.
- Boosting tourism and promoting eco-tourism
- Awareness to consumers of the detrimental impacts of increased plastic bags consumption
- Study on the potential social environmental and economic impacts of a plastic bag levy.
- Public consultation process with retailers, producers of plastic bags, consumers, and government entities

Project Phases

Phase 1

- Consultation process with retailers, consumer protection agencies and government entities on the amount of levy, method of collection and utilization purposes.
- Study on the potential effects of a levy on markets, consumers' behavior and availability of alternatives.
- Implementation of awareness campaign on the adverse impacts of plastic bags.
- Implement the pilot in collaboration with a retailer/hyper market

Phase 2

- Implementation of a national awareness campaign on the adverse impacts of plastic bags.
- Cleanup Campaigns conducted in 3 areas in Egypt (Nile, Mediterranean and Red Sea).

Project Lead & Participating Stakeholders/Partners:

Ministry of Environment – NSWMP

Estimated Budget:

90,000 Euros

Policy Enablers:

- Introduction of a plastic bag levy (1EGP/bag) and oblige all retailers to charge consumers this levy for plastic bags
- Establishment of a fund for the levies collected and utilizing this fund for environmental campaigns and innovative projects to produce bags from alternative material.

Expected Results:

Outcomes

- A reduction in plastic bags usage in Egypt by 60%.
- A growth in the market of bags from alternative material (paper) by 20%

Outputs

A study on the extent of the problem of plastic bags usage in Egypt, the impact of the levy on the market and the available alternatives for plastic bags is conducted.

- A national awareness raising campaign is developed and implemented.
- A consultation process with retailers, consumer representatives and concerned government entities is implemented.
- 3 clean up campaigns are carried out, one in the Nile, one in the Red sea and one in the Mediterranean to clean the waterways from plastic bags and other forms of litter.

- An increase in the production of bags using alternative material which is more sustainable with less adverse impacts on the environment.

Indicators:

Execution Indicators

- Reduction in the use of plastic bags by x % from. /year to. /years
- X number of awareness campaigns conducted
- X number o cleanup campaigns conducted
- X number of projects from funded by the newly established fund
- Increase in the production of bags from paper and other alternative material.

Impact Indicators

- X number of consumers shift to using bags used from alternative material.
- Reduced accumulation of plastics in Egypt's waterways by x amount

PROJECT #26

Egypt's Marine Litter Extraction Project

Presented by:

NSWMP

Cross Cutting Sectors:

Waste – Tourism – Health – Trade

Project Rationale/Background

Egypt's marine environment is seriously threatened by plastic waste littering. At a time when we need to be boosting our tourism industry our natural resources which attracts such tourism is deteriorating and hence we are losing a most valuable asset. Marine debris also cause an estimated 1.27 billion in fishing and vessel damages annually. After being absorbed by fish these plastic debris start accumulating in our food chain causing serious health hazards including cancer.

Marine litter especially that formed by plastic bags is having detrimental impact on Egypt's marine life. As a country that relies on tourism particularly our red sea coast Egypt must find the means to clean up its seas in order to preserve the natural environment and the tourism sector. Existing efforts on this front while laudable has remained on a small scale and focusing on manual collection of plastic on the shores. The abundance of plastic waste that has reached the deep-sea killing corals and various species of marine animals remains beyond the reach of such clean-up efforts. It is estimated that worldwide one million seabirds and one hundred thousand marine mammals die each year due to plastic pollution.

Project Components:

Description:

This project will set up a research program on advanced marine litter extraction technologies to find innovative, large scale and cost effective technologies for marine litter extraction. This will be complemented by awareness campaigns and other preventive measures such as a plastic bag levy.

Project Objective

Establish a research program and facilitate access to information and research whereby innovative, technologically sound and cost effective solutions for marine litter extraction are identified and developed.

Specific Objectives

- Cleaning Egypt's marine environment from plastic debris
- Raising the level of awareness about the dangers of plastic marine litter.
- Protecting and preserving the tourism industry in Egypt.

- Reducing exposure to hazardous material entering our food chain through plastic debris eaten by fish.

Project Phases

Phase 1

- Identifying key stakeholder working in the field of Marine litter from Academia, governmental organizations, NGOs, etc.
- Conducting awareness on the environmental and economical effect of Marine litters
- Implement a pilot clean up campaign in coastal area.

Phase 2

- Development of innovation technological solutions for marine litter extraction.
- Testing on a pilot scale the solutions identified
- Conducting awareness and clean up campaigns in our coastal zones.

Project Lead & Participating Stakeholders/Partners:

Ministry of Environment/Ministry of Tourism

Companies for recreational tourism in the red sea (e.g. diving companies)

Estimated Budget:

4.5 million Euros

Policy Enablers:

- Establishing the research program and facilitating access to information and research.
- Banning the use of plastic bags in coastal zones.

Expected Results:

Outcomes

- X area of Egypt's seas are cleaned
- X amounts of marine debris are removed

Outputs

- A research program focusing on marine litter extraction technologies is established
- A baseline study on marine litter in Egypt's coastal zones is conducted.
- 3 marine clean up campaigns are conducted through the participation of various stakeholders
- At least one innovative solution is tested on a pilot scale.

Indicators:

Execution Indicators

- Research program is established and is operational
- Study on marine litter in Egypt's coastal zones conducted.
- 3 cleanup campaigns conducted.
- 25 technicians trained on marine conservation and debris removal.
- X amount of clean up campaigns conducted

Impact Indicators

- X amount of marine plastic debris removed from Egypt Seas.
- Plastic bags usage in coastal zones reduced from x to y

PROJECT #27

Extended Producer Responsibility (EPR) Pilot- E-Hub Project

Presented by:

NSWMP

Cross Cutting Sectors:

Waste – Energy

Project Rationale/Background

"EPR is an environmental policy approach in which a producer's (producer and importer) responsibility, Physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle. There are two related features of EPR policy: (1) the shifting of responsibility (physically and/ or economically; fully or partially) upstream to the producer and away from municipalities, and (2) the provision of incentives to producers to incorporate environmental considerations in the design of their products." (OECD Definition).

The consumption of electronic products in Egypt is exponentially growing every year as the lifetime of products is in continuous decline. The number of mobile phone subscribers has reached 115% of the population and the number of PC consumption is also in continuous rise. It is estimated that there is around 50-60 tons/year of WEEE generated in Egypt. The informal sector working in the sector is fragmented and working under hazardous and conditions affecting their health and livelihoods as well as the overall environment. Most of the WEEE contain hazardous substances which if not collected and disposed of in a sound manner would have detrimental health and environmental impacts.

Most of the initiatives that have been undertaken to take back products by large producers of EEE have not been sustainable mainly due to high cost of logistics and the fragmented supply chain. This proposal hence seeks to provide this missing link by providing the necessary financing mechanisms to finance the logistical operation and to connect the many small-scale collectors to a logistical hub that would link them with the producers and international markets. The Hub would provide the necessary integration between the upstream and downstream ends of the e waste supply chain.

EPR has the dual benefit of supporting both sustainable consumption as well as production. EPR sends signals to producers to change the products design and production methods to make products which are more amenable to reuse and recycling. On the other hand EPR would promote sustainable consumption in that it would encourage consumers to reuse their products and bring back their products to the producers for recycling.

Project Components:

Description:

This project seeks to establish a logistical hub that would link the informal recycling sector for E waste with the producers of electronic products. The E-HUB would provide a missing link within the supply chain for e waste, which is the accumulation of sufficient quantities to allow for the high transportation costs. Existing E Waste Recycling entities have been struggling to receive the high volumes needed to make their projects viable and sustainable. The fragmented market and the existence of small-scale collectors does not enable the larger scale recyclers such as ITG and Recyclobekia to collect and/or dismantle sufficient quantities. These recycling companies have found it much easier to deal upstream with producers (Cisco, IBM etc..) than to deal with the large number of small and fragmented informal operators downstream. Initial investment for establishing the logistical Hub would be provided by producers of EEE and seed money would also be provided by a donor agency. The sustainability of the hub would depend on producers bearing the full cost of its operation within 2-3 years. The donor contribution would be used to cover price differentials and allow the dismantling of e waste in a n environmentally sound manner rather than the current practices which are hazardous and detrimental to health of workers in the sector and the environment in general.

Project Objective

Collection of electronic waste and establishing an Extended Producer Responsibility System in Egypt

Specific Objectives

- Reducing the number of landfills and their accompanying environmental impacts.
- Reducing the burden on municipalities for the physical and/ or financial requirements of waste management.
- Fostering recycling and reuse of products of parts thereof improving the ease and timeliness of disassembling products for recycling or reuse
- Reducing or eliminating potentially hazardous chemicals in products
- Promoting more efficient use of natural resources
- Improving relations between communities and firms
- Encouraging more efficient and competitive manufacturing
- Promoting more integrated management of the environment by placing an emphasis on the product's life cycle
- Improving materials management.

Project Phases

Phase 1 (6 months)

- Identifying key electronics and electrical equipment producers that want to voluntary participate in the EPR Hub.
- Organizing EPR Success Stories Forum to share knowledge about worldwide case studies for implementing EPR systems and challenges.
- Implement a pilot awareness campaign among producers for the importance of EPR to their businesses.
- Establish a web platform for e-waste exchange on both supply and demand sides

Phase 2 (6 months)

- Continuous training of operators.
- Raising awareness of consumers on the importance of returning their products and diverting it from other waste streams
- Identifying further locations for another logistical hub

Project Lead & Participating Stakeholders/Partners:

- The Ministry of Environment
- Ministry of Trade and Industry/Federation of Egyptian Industries/Chambers of Commerce
- Centre for environment and Development for the Arab region and Europe (CEDARE)
- Informal collectors

Estimated Budget:

300,000 Euros

Policy Enablers:

Regulation requiring producers of electronic products to take responsibility for their products in the post consumption phase. The regulation could also set targets for collection and recovery.

Reducing tariffs and taxes on refurbished products to encourage producers to take back their products

Expected Results:

Outcomes

Replication of the HUB Model to other waste streams where there is active involvement from the informal sector and interest from the producers to retrieve their products e.g waste tyres.

Formalization and improved living and working conditions of the informal sector working

with e-waste.

Booming recycling industry for electronic products in Egypt.

Outputs

Collection of at least X quantities of mobile phones, PCs, Printers

Indicators:

- Execution Indicators
- One Logistical Hub established and fully operational
- Hub becomes economically viable and financial sustainable

Impact Indicators

- X quantities of WEEE collected and recycled
- X number of informal collectors formalized

PROJECT #28

Green Growth: Industrial Waste Management and SME Entrepreneurship Hub in Egypt

Presented by:

Egypt National Cleaner Production Centre (ENCPC)

Cross Cutting Sectors:

All industrial Sectors

Project Rationale/Background

In Egypt, there is substantial potential for the creation of small businesses in the untapped area of waste management. Contrary to agricultural and municipal waste, solid waste from the industrial sector is simpler to manage particularly given that most of the solid waste emanates from some 28,000 facilities nationwide, a majority of which are concentrated in industrial zones. The Greater Cairo region alone hosts almost 50% of all industrial activities, and includes areas such as the 10th of Ramadan industrial zone where huge industrial establishments operate in a variety of sectors known to be intensive generators of industrial waste, such as food processing, chemical industries, building materials, textiles and engineering industries.

The creation of an industrial waste exchange stock market supports efforts to entrench a zero waste policy and clean production, thus supporting a cleaner industrial sectors that could be an element of successful sustainable communities and cities. Industrial waste exchange is an internationally recognized waste reduction concept. It is aims for recycling and reusing industrial waste, thus attempting to link industrial waste generators with waste recyclers or companies that can use 'waste' as a raw material input to their product generating profit and economic benefits for all involved parties.

The proposed industrial waste exchange project will address the lack of an effective industrial waste management system in Egypt, which is essential for realizing the potential of the Egyptian industrial sector as a major contributor to sustainable economic growth. In addition, the project will have a transformational impact as it will contribute in positioning waste management as a new untapped niche market for the creation of innovative small businesses.

Project Components:

Description:

The project aims to develop a sustainable and integrated industrial waste exchange (IWEX) system in one industrial zone, positioned as a Green Entrepreneurship Hub, linking industrial wastes generators, potential users and recyclers to improve cross-industry resource efficiency, promote the development of new innovative SMEs, create green job opportunities, reduce the environmental impact of industrial waste and contribute to the enhancement of lives of Egyptian citizens. The project will address the lack of an effective industrial waste management system in Egypt, which is essential for realizing the potential of the Egyptian industrial sector as a major contributor towards sustainable growth.

The project will also contribute to reducing the adverse environmental impacts from the bad disposal of industrial and hazardous wastes, thereby reducing GHG emissions as well as contributing to the reduction of health related expenditures. As such, this industrial waste exchange project will develop a sustainable and integrated industrial waste exchange system in the 10th of Ramadan industrial city. This will be positioned as a Green Entrepreneurship Hub, linking industrial wastes generators, potential users and recyclers to improve cross-industry resource efficiency, promote the development of new innovative SMEs, create green job opportunities, reduce the environmental impact of industrial waste and improve the lives of Egyptian citizens. Through a collaborative platform such as a digital portal or a designated warehouse with modest membership fees, subscribers post materials available. In turn, Organizations interested in trading the advertised or posted commodities then contact each other directly. The public authority overseeing the market exchange will have drafted Standards of Operating Procedures, guidelines and manuals to manage and facilitate the waste exchange. For example, the company that is posting or advertising the materials should enclose a brief description of the services offered, including the materials available for exchange, how to contact the exchange, and other pertinent information. The Egyptian cleaner production center can develop and assist in the technological and logistical requirements for implementation.

Project Objectives:

Project Objective

To develop a sustainable and integrated industrial waste exchange (IWEX) system in one industrial zone, positioned as a Green Entrepreneurship Hub, linking industrial wastes generators, potential users and recyclers to improve cross-industry resource efficiency, promote the development of new innovative SMEs, create green job opportunities, reduce the environmental impact of industrial waste and contribute to the enhancement of lives of Egyptian citizens.

Specific Objectives

- As a pilot, establish a sustainable trade information system could be a digital platform or a software for 10th of Ramadan industrial city (given the substantial amount of industrial waste generated) that want to post their waste inventory of by-products generated or are interested to purchase by-products posted by others required for the production of their products as inputs.
- Match generators/suppliers with users of waste products and create a gradual operating national framework for waste exchange.
- Promote support for the recycling industry and, thus, help close the industry loop, as one solution to the problem of managing industrial wastes. Existing recycling companies looking for input streams can benefit the most.

The waste exchange information system could also be a venue to provide guidance, information and practical assistance on environmental and waste management issues to businesses and promote improvement and the adoption of best practices.

Activities:

- Mapping of the industrial waste at the enterprise level in the selected pilot area
- Reviewing existing regulations and legislations
- Developing policy recommendations towards an enabling environment for industrial waste exchange in Egypt
- Raising awareness and building capacities of stakeholders on the industrial waste exchange programme
- Green Entrepreneurship Programme Development through the implementation of 1 demonstration project in IWEX in the select pilot area
- Dissemination workshops and capacity building
- Conduct assessment of existing recycling companies that could benefit from the waste exchange system
- Developing the exchange information system

Project Lead & Participating Stakeholders/Partners:

- The Egypt National Cleaner production Centre (www.encpc.org) at the Industrial Council for Innovation and Technology at the Ministry of Industry
- 10th of Ramadan Investors Association
- Cleaner Production Centre in South Africa as an international experienced entity

Estimated Budget:

1.8 million Euros

Policy Enablers:

- Conducting a baseline assessment and feasibility study to design and customize an optimal model for the waste exchange that is suitable for Egypt.
- Compiling international experiences in the creation and operation of waste exchange model to serve as guiding benchmarks when designing the Egyptian model.
- Mapping relevant stakeholders and companies that could be interested in supporting the waste exchange model.
- Having a championing Ministry such as the Ministry of Industry to secure government and public sector endorsement.
- The Ministry could study the possibility of providing incentives for companies to participate.
- Conducting stakeholder meetings and dialogue to harness the opinion of associations, chambers, federation of industries and the private sector to gain valuable input and knowledge contributions.
- Conduct seminars, awareness campaigns and information to gradually introduce the concept, promote its economic benefits and support its successful operation.

Expected Results:

Outputs

- Establishment of sustainable national industrial waste exchange programme in Egypt based on international best practices.
- Promotion of sustainable production methods and waste minimization practices.
- Pollution Prevention.
- Contribution for development of number of policy measures for regulating and monitoring the market for industrial waste exchange formulated & adopted.
- Contribution for SMEs creation and development in the field of industrial waste management in Egypt: Number of cost-effective pilot projects were realized and implemented in three different areas.
- Green Jobs Creation: Number of direct and indirect green jobs created.
- Promotion of public-private partnerships, for example local authorities who operate landfill sites, industries who discharge problematic waste to these sites and waste companies who specialize in waste re-use and recycling.

Outcomes

- Developing and designing an Effective industrial waste management system in Egypt, which is essential for realizing the potential of the Egyptian industrial sector as a major contributor to sustainable economic growth.
- Contributing to positioning waste management as a new untapped niche market for the creation of innovative small businesses.
- Reducing the adverse environmental impacts from the bad disposal of industrial and hazardous wastes, thereby reducing GHG emissions as well as contributing to the reduction of health related expenditures.
- Up-scaling of project to other pilot industrial areas at the whole country (e.g. Obuor, Badr industrial city).
- Creating of sustainable and decent/green jobs in the industrial waste management

Indicators:

Execution Indicators

- Finalizing comprehensive survey for mapping industrial wastes in pilot area
- Establishment of industrial waste exchange system in pilot area that is operational
- Developing a waste database in the pilot area
- Compiling a list of possible benefiting recycling companies
- Identifying possible companies that could be members of the exchange system

Impact Indicators

- The number of Policy measures for regulating and monitoring the market for industrial waste exchange formulated and adopted

- Number of direct and indirect green jobs created
- Numbers of recycling companies and start-ups created
- Number of trainees participating in capacity building activities
- Number of workshop and seminar attendees for information dissemination
- The number of transaction that annually take place through the system
- The quantity of waste posted and exchanged
- The number of companies participating

Developing National Action Plans (NAP) for Sustainable Consumption and Production (SCP) contributes to poverty alleviation, environmental sustainability and the development of a green economy. National SCP-NAPs are considered the first step in a country's response to the 2015 adopted Sustainable Development Goals (SDGs) and in particular Goal 12: Responsible consumption and production.

The SCP-NAP process in Egypt is based on the 2013 "Green Economy Scoping Study" that assessed the potential for Egypt's transition to a green economy and sustainable development. This study focused on water, agriculture, energy and municipal solid waste.

This action plan focuses on demonstrating the importance of creating Sustainable Integrated communities in Egypt with focus on four priority strategic sectors. These include: Water, Agriculture, Energy, and Municipal Solid Waste. These sectors were identified on the basis of the extent of their significance to creating sustainable communities that supports resources efficiency efforts, promotes competitiveness, creates jobs, and promotes environmental conservation, human health and welfare.

Within the overarching direction to support the development of 'Integrated Sustainable Communities", the National Action Plan aims at supporting Egypt's development efforts in achieving sustainable development. The action plan aims to do so by promoting the efficient allocation and use of water and energy resources, promote sustainable agriculture development, as well as waste management including prevention, reduction, recycling, reuse, and recovery.

This annex presents 28 projects from 4 different sectors submitted by 13 different entities. The list of projects has been identified through an open and transparent process, including specialized experts, government representatives and a wide range of stakeholders who actively participated in working groups' meetings addressing the 4 priority sectors: Water, Agriculture, Energy, and Municipal Solid Waste.

UNEP-DTIE as coordinator of the national SCP policy component of the EU-funded SwitchMed program provided advisory services and technical assistance to the national SCP-NAP process in Egypt.

Ministry of Environment (MOE)
Egyptian Environmental Affairs Agency (EEAA)

30 Misr Helwan El-Zyrae Road, Maadi, Cairo, Egypt

Tel: (202) 25256452
Fax: (202) 25256490

E-mail: eeaa@eeaa.cloud.gov.eg
Hot Line: 19808
Public Service: 25266178 - 25256470

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switchmed

www.unep.org

United Nations Environment Programme
P.O. Box 30552 Nairobi, Kenya
Tel.: ++254-(0)20-762 1234
Fax: ++254-(0)20-762 3927
E-mail: uneppub@unep.org

UNEP