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**ENVIRONMENTAL GOODS AND SERVICES
IN THE ESCWA REGION:
OPPORTUNITIES FOR SMALL AND
MEDIUM-SIZED ENTERPRISES**

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PREFACE

This technical paper examines opportunities for small and medium-sized enterprise development in the area of environmental goods and services. It does so in the context of the environmental challenges of the region. Innovation in the region is highlighted alongside detailed analysis of opportunities and constraints. Two country case studies are presented as illustrations of both enterprise creation potential and enhanced environmental protection. A series of recommendations are made at the macro, meso and micro levels, with a view to helping decision makers in Government and entrepreneurs engage more productively in the green economy.

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ABBREVIATIONS

ACWUA	Arab Countries Water Utilities Association
AFDC	Association for Forest Development and Conservation
ASEZA	Aqaba Special Economic Zone Authority
ASTF	Arab Science and Technology Foundation
AUS	American University of Sharjah
bcm	Billion cubic meters
CIDA	Canadian International Development Agency
COAE	Center of Organic Agriculture in Egypt
COAP	Center of Organic Agriculture in Palestine
CWM	Centre of Waste Management
CSP	Concentrated solar power
EAD	Environment Agency Abu Dhabi
EGS	Environmental goods and services
EPP	Environmentally preferable products
EQI	Environmental Quality International
ETS	Emissions Trading Scheme
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign direct investment
GAFTA	Great Arab Free Trade Area
GAP	Good Agricultural Practices
GCC	Gulf Cooperation Council
GDP	Gross domestic production
GIS	Geographic information systems
GIZ	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i>
IFC	International Finance Corporation
IRENA	International Renewable Energy Agency
JAER	Joint Arab Economic Report
LCEGS	Low carbon and environmental goods and services
LDC	Least developed country
LDCF	Least Developed Country Fund
LGBC	Lebanon Green Building Council
MDG	Millennium Development Goal
MENA	Middle East - North Africa region
MIT	Massachusetts Institute of Technology

ABBREVIATIONS *(continued)*

MSW	Municipal solid waste
mWs	Megawatts
NBI	Nile Basin Initiative
NEPCO	National Electric Power Company, Jordan
NGO	Non-governmental organization
NREA	New and Renewable Energy Authority
OECD	Organisation for Economic Co-operation and Development
PPP	Public-private partnership
PV	Photo-voltaics
R&D	Research and development
RSCN	Royal Society for the Conservation of Nature
SLA	Sustainable livelihood approach
SME	Small and medium-sized enterprise
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation
UNWTO	United Nations World Tourism Organization
UV	Ultra-violet
WTO	World Trade Organization
WWF	Worldwide Fund for Nature

Executive summary

The ESCWA region faces many environmental challenges, and environmental goods and services (EGS) are needed to help address them. This technical paper explores how small and medium-sized enterprises (SMEs), which are the backbone of economic development, can play a more prominent role in developing a greener economy. The paper also identifies areas where Governments might further the development of EGS in the private sector. It is argued that growth of EGS can help to spur employment creation in the region; contribute towards achieving the Millennium Development Goals (MDGs); and help to address environmental issues vital to the future prosperity and health of the region's rapidly growing population.

The environmental problems of the region of the Economic and Social Commission for Western Asia (ESCWA) include water scarcity, which gives the region much of its desert character; increasing desertification; pollution; adverse impacts of climate change; land degradation; generally poor waste management and waste accumulation; poor urban air quality and the negative effects of rapid population growth. Nevertheless, SMEs in the ESCWA region are resilient and enjoy traditions of craftsmanship and enterprise that date back thousands of years: they have the potential to deliver solutions to many of these problems through EGS, and can help build a greener economy.

A growing recognition of the need for production to be more sustainable, and the requirements of international conventions, greener Government policies and increasing consumer interest are driving demand for EGS: SMEs must react to this demand. Strengthened environmental regulations and standards can act as a particular stimulant. The environment will benefit from this engagement.

However, we must recognize the existence of barriers in the region that hinder SMEs from further developing EGS activities. These barriers include the following: a shortfall in technical knowledge and a variable quality of management and marketing skills; difficult business environments; limited investment in training and research; a high dependence on imported EGS and strong international competition for their supply; the high cost of basic utilities in some countries; limited trade partnerships; and variable Government support.

Despite these weaknesses it is noted that, in some EGS areas, the ESCWA region is already at the forefront of innovation and some ESCWA member countries currently have the added benefit of oil wealth to invest in green technology: these are considerable strengths to be built upon.

The following EGS opportunities are highlighted and explored further in the paper:

- Solar and wind power;
- Natural-resource-based EGS;
- Green building technology and green transport;
- Waste management, recovery and recycling;
- Water management and wastewater treatment;
- Green agricultural products.

The areas of solar power and water conservation provide particular opportunities for EGS-based SMEs in the ESCWA region, building on innovation. Innovation is also noted in the area of green building technology. In all ESCWA member countries, efforts have been made to address solid waste issues at policy, legal, institutional, operational and financial levels. Although many challenges persist, important opportunities for SMEs in the areas of waste management, recovery and recycling are emerging. Similarly, SMEs can play a stronger role in water management and wastewater treatment, particularly as better regulated private-public partnerships (PPPs) evolve.

Two detailed case studies that demonstrate evidence of leadership and innovation in the region as well as the reach of EGS value chains, and that have led to the expansion of the SME sector, are presented as follows:

- Waste management in the United Arab Emirates;
- Natural-resource-based enterprise creation through ecotourism in Jordan.

Based on the above, the technical paper presents a number of recommendations at the macro, meso and micro levels, including recommendations for further research. Amongst these is the opportunity for SMEs to adopt green strategies built around greening their own operations and monitoring the growing market for EGS, in order to enter the market, build market share, and become internationally competitive. Collectively, SMEs can be assisted in developing EGS activities by a growing network of support centres, green finance and tax incentives, and through peer support.

The role of Governments is highlighted, especially in regard to stimulating demand for EGS by strengthening environmental legislation and green procurement policies, encouraging greater public awareness of environmental issues, and responding to rising worldwide consumer demand for a greener environment. Arab Governments have the opportunity to play a key role in facilitating a more productive SME sector in the region, leading to job creation in a greener economy, poverty reduction and a better environment for all.

Introduction

People in the Economic and Social Commission for Western Asia (ESCWA) region¹ have been developing ingenious solutions to address environmental challenges for thousands of years: their survival has depended on doing so. Today, the complexity and scale of environmental problems is growing, and traditional methods of working with the environment are being lost. New approaches (and sometimes a re-working of traditional approaches) are needed. Interesting case studies are emerging that provide evidence of the continuing innovation of the region, and also of the scale of its challenges. This study forms part of ESCWA activities aimed at increasing the use of environmentally sound technologies by member countries in order to enhance the competitiveness of SMEs and to improve sustainable development.

Small and medium-sized enterprises (SMEs) are the lifeblood of economic development and sustainable job creation in the region. Economic growth is not explicitly targeted in the Millennium Development Goals (MDGs) of the United Nations, but economic data is widely used as an indicator of poverty, health, and education. Enterprise and SME development are key tools in poverty alleviation. Hence, stimulating the production and consumption of EGS through SME development in the context of enhancing livelihoods in a way that helps the environment can only benefit member countries. In addition, ongoing environmental degradation in the region is a significant obstacle to achieving the MDGs and must be addressed.

The region faces many environmental challenges due to its growing population, scarce water resources, poor waste management practices and threatened biodiversity. The Arab Human Development Report 2009² points out that water scarcity, a problem exacerbated by the spread of water pollution, is one of the most significant challenges. The region is also one of the most vulnerable in the world to climate change, with predicted impacts ranging from increased droughts to land degradation and desertification, and responses including mass migrations. Rapid population growth and urbanization will continue to create significant challenges for Governments, including water demand, pollution and waste management, in addition to the need for jobs and greater freedom.

This paper identifies selected opportunities for SME development in the context of the region's challenges, and reviews the context in which EGS might be further developed.

OBJECTIVES OF THIS TECHNICAL PAPER

The objectives of the technical paper are as follows:

- To outline the main environmental problems and priorities in the ESCWA region and the characteristics of regional SMEs;
- To examine the size and characteristics of different EGS subsectors;
- To examine the main market barriers and drivers for EGS;
- To identify possible opportunities for EGS-based SMEs in the ESCWA region;
- To present relevant case studies.

¹ The ESCWA region is made up of fourteen countries: Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, the Sudan, United Arab Emirates and Yemen.

² UNDP Regional Bureau for Arab States (2009).

I. THE ENVIRONMENTAL AND SME CONTEXT

A. MAIN ENVIRONMENTAL PROBLEMS AND PRIORITIES IN THE ESCWA REGION

The most obvious environmental issue that has affected much of the ESCWA region throughout its history is water scarcity. Because of water scarcity, the related challenges of addressing desertification, water pollution, and climate change are especially important. Air pollution is another underlying cause of climate change. Rapid population growth, increasing urbanization and increasing economic activity in coastal zones and other fragile ecosystems are major contributors to environmental pressure. Land degradation has also been identified as a significant environmental threat.³

1. *Water scarcity*

Water scarcity gives much of the ESCWA region its desert character, and water harvesting is a skill critical to survival. Many cities developed around oases or along the banks of major rivers. At present, technology has enabled increasing reliance on fossil water resources from underground aquifers, but these are mostly a finite resource. Access to water resources has always been a critical asset in much of the region, and today water is becoming a political issue, affecting its security.

Water scarcity varies somewhat across the region but is a common challenge. International rivers are the prime resource, often shared with countries beyond the region. The Nile, for example, is vital to Egypt and the Sudan, but it is shared by seven other riparian States and water distribution rights are a controversial issue.⁴ The Tigris and the Euphrates are both shared by Iraq, the Syrian Arab Republic and Turkey; the Orontes (or Assi) is shared by Lebanon, the Syrian Arab Republic and Turkey; the Jordan is shared by Jordan, Palestine, Israel and the Syrian Arab Republic. Whilst access to oil is one of the most controversial issues driving global conflict, tensions regarding access to water are increasing. Finite underground water reserves are being harvested, often with cross-boundary repercussions: Over-pumping from groundwater reserves is increasingly carried out in response to rapid population growth, agricultural needs and those of industry. Such over-pumping damages the viability and productivity of aquifers and, when done near the sea, may result in infiltration of salt water into freshwater aquifers. Unfortunately, wasteful water use and poor distribution networks in which much water is lost due to leakage characterize many ESCWA member countries. Groundwater is often located far from areas of consumption, requiring major pipeline investment, or the use of diesel-driven water tankers covering long distances. Much vital fresh water is lost due to ageing or poorly maintained distribution. This results in a lack of clean water for much of the population and waste of significant amounts in the agriculture, industry and tourism sectors.⁵

2. *Desertification and land degradation*

The extent of desertification varies greatly within the ESCWA region. Bahrain, Kuwait, Qatar, Saudi Arabia, the United Arab Emirates and Yemen are the most affected countries and together form the most desertic area in the ESCWA region. In contrast, the Syrian Arab Republic is the least desertic. The most apparent impacts of desertification are drought, shrinking forest areas, and the loss of soil fertility. Forest degradation is being caused by felling and burning, cattle raising and over-grazing by goats and other

³ ESCWA (2007).

⁴ The Nile Basin Initiative (NBI) is a partnership among the Nile Riparian states that “seeks to develop the river in a cooperative manner, share substantial socio-economic benefits, and promote regional peace and security”. It was formally launched in February, 1999 by the water ministers of nine countries that share the river - Burundi, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, the Sudan, Tanzania and Uganda.

⁵ UNDP Regional Bureau for Arab States (2009).

livestock.⁶ Human activity (population growth, irresponsible agriculture, and the demise of traditional nomadic lifestyles) is a significant cause.

The amounts of land ravaged and threatened by desertification vary greatly from one country to another. The Arab Organization for Agricultural Development has attributed the causes of desertification in the Arab countries to the following:

- The enormous growth in population, its mounting needs, its increasing use of modern technologies and methods in cultivation, and the overexploitation of the various resources of the earth;
- The changing social situation of the population, particularly in arid and semi-arid areas, where nomadic or semi-nomadic lifestyles are disappearing, putting severe pressure on settled areas;
- New agricultural methods that have largely failed to meet the needs of the growing population - modern agricultural tools and technologies are often inappropriate for arid and semi-arid lands, as they cause soil to decompose and disintegrate, rendering it vulnerable to erosion.⁷

3. Water pollution

Water pollution in the region is primarily attributed to increased use of chemical fertilizers, pesticides, and horticultural and veterinary medical treatments that leave long-lasting traces that eventually find their way into water.⁸ The influx of domestic and industrial wastewater has also raised levels of water pollution considerably. Poor access to clean water, a resource already constrained by general water scarcity, is a major issue for the poor. Access to clean water for domestic or economic purposes reflects power relations; tourists and the rich have an ample supply but the poor do not.

4. Air pollution

With the exception of some Gulf countries and major cities, the Arab region has relatively low carbon dioxide emission levels, mainly because industrialization has been limited. Even so, carbon dioxide emissions in the ESCWA region are increasing at one of the fastest rates in the world. Carbon dioxide emissions vary between Arab countries, with the highest, in general, found in the oil producing and exporting countries, particularly those of the Gulf, as well as the countries with the largest economies, namely, Saudi Arabia and Egypt. Within ESCWA member countries, carbon dioxide emission rates vary considerably between cities and the countryside. Methane and nitrogen oxide emissions vary in the same way.

5. Solid waste management

Although there have been some improvements within the region, solid waste management and safe disposal of hazardous wastes are significant challenges in most parts of the region. With increasing populations, the growth of consumer lifestyles, and fragile ecologies being harmed by landfill and other means of disposal, this is an area of major concern that Governments are trying to address.

6. Climate change

The ESCWA region is one of the closest in the world to becoming a direct victim of climate change.⁹ The Stern Report¹⁰ predicts spreading drought, reduced water levels in rivers, stunted agricultural production,

⁶ Ibid.

⁷ Quoted in UNDP (2009).

⁸ Ibid.

⁹ Ibid.

¹⁰ Stern, N (2007).

and incursion by sea water that will force many millions of people to emigrate, particularly in the Nile River Delta and coastal areas of the Gulf.

7. Population growth

Population growth is and will continue to be one of the main factors affecting the region's environment. Current United Nations World Population Prospects data indicates that by 2050 Egypt's population will have increased from 84 million (2010) to 129.5 million; Iraq's population will more than double to almost 64 million, as will Yemen's, from 24 million to 53.6 million.

TABLE 1. ESCWA AREA PROJECTED POPULATION GROWTH, 2000-2050
(Thousands)

Country	2000	2010	2030	2050
Bahrain	650	807	1 085	1 277
Egypt	70 174	84 474	110 907	129 533
Iraq	24 652	31 467	48 909	63 995
Jordan	4 853	6 472	8 616	10 241
Kuwait	2 228	3 051	4 273	5 240
Lebanon	3 772	4 255	4 858	5 033
Oman	2 402	2 905	4 048	4 878
Qatar	617	1 508	1 951	2 316
Saudi Arabia	20 808	26 246	36 644	43 658
Syrian Arab Republic	16 511	22 505	30 560	36 911
The Sudan	34 904	43 192	60 995	75 884
United Arab Emirates	3 238	4 707	6 555	8 253
Yemen	18 182	24 256	39 350	53 689

Source: United Nations Population Division (2008 revision).

Note: Palestine is not included in 2008 revision; medium variant used.

These increases in population will result in greater environmental burdens, and it is essential that ESCWA country Governments harness their available resources to accommodate increased demands on the environment, ecosystems and natural resources. These resources include the enterprise and ingenuity of indigenous SMEs. SME development and good governance are needed to sustain economic prosperity and increases in living standards. At the same time, if living standards can be boosted more than is presently forecast, they are likely to result in a slowing in the region's birth rates and bring total population levels below current projections.

8. The way forward

Most studies highlight the need to improve infrastructure-related EGS such as water and sanitation systems or waste disposal. This is usually seen to require large investments and access to technology and management practices. In general, countries in the region acknowledge the potential benefits of private sector participation and foreign direct investment (FDI). The proposed United Nations Green Climate Fund is also being anticipated. There is, however, a pressing need to develop adequate regulatory frameworks in order to ensure that environmental, social and development objectives are respected. There are also concerns about the social implications of the eventual privatization and liberalization of basic environmental services, such as water and sanitation, and about access by the poor to such services at affordable prices. Nevertheless, there is little doubt that SMEs must be a significant part of the region's overall solutions to environmental challenges. This paper explores the role that SMEs might play, and where the opportunities for enterprise in a greener economy lie.

B. SMALL AND MEDIUM-SIZED ENTERPRISES IN THE ESCWA REGION

1. Overview

SMEs are vital to the world economy. In the ESCWA region as in other parts of the world, the definition of what constitutes an SME varies. The 2002 review by ESCWA of SMEs¹¹ points out that in Yemen a medium-sized enterprise is one that employs up to seven people, but in Jordan the threshold is between ten and twenty-five. This study expands on a 1999 ESCWA study of strategic support systems for SMEs.¹² ESCWA itself has adopted a range of 5-250 for medium-sized enterprises. Table 2 illustrates these differences.

TABLE 2. REGIONAL DEFINITIONS OF SMEs

Country	Definition	Other criteria
Bahrain	Small: 5-19 workers Medium: 20-100 workers	
Egypt	Small: 1-49 workers	Capital between 50 000 Egyptian pounds to one million Egyptian pounds
GCC countries	Small: 1-29 workers Medium: 30-59 workers	Invested capital not more than US\$2 million Capital invested between US\$2 million and US\$6 million
Iraq	Small: 1-9 workers Medium: 10-29 workers	Invested capital circa 100 000 dinars
Jordan	Small: 2-10 workers Medium: 10-25 workers	
Kuwait	Small: 1-9 workers Medium: 10-50 workers	Capital does not exceed 200 000 dinars
Oman	Small: 1-9 workers Medium: 10-99 workers	Invested capital less than 50 000 riyals Capital between 50 000 riyals and 100 000 riyals
Saudi Arabia	Small: 1-20 workers Medium :21-100 workers	Invested capital does not exceed 20 million riyals
The Sudan	Small: 0-9 workers	
Yemen	Small: 1-4 workers Medium 5-9 workers	

Source: Arab Labour Organization (2008).

SMEs in the ESCWA region are mostly privately owned family enterprises often relying on family capital. They are found extensively in traditional sectors of light industry including food processing, textiles, furniture making, minerals and metals, and in construction projects. In the service sector, SMEs are the main economic entities with strong regional expertise in technical professions such as engineering, architecture and petrochemical-related consultancy. In major industries like tourism, locally owned businesses consist almost exclusively of SMEs. Geographically, SMEs cluster around traditional centres of industry, such as Cairo, Damascus and other urban centres, but they also exist in rural areas, although to a lesser extent.

In a recent study on the competitiveness of Arab SMEs,¹³ it is pointed out that SMEs make up 90 per cent of companies in the majority of economies worldwide and provide the main source of job opportunities, in addition to contributing significantly to gross domestic production (GDP). In the Arab region, SMEs constitute 99 per cent of non-agricultural businesses in Egypt and sustain 90 per cent of the private workforce in Kuwait. In Lebanon and the United Arab Emirates SMEs make up more than

¹¹ ESCWA (2001b).

¹² ESCWA (1999).

¹³ Alasrag, H. (2010).

95 per cent of total enterprises. They account for 75 per cent of GDP in the United Arab Emirates and 96 per cent in Yemen, 59 per cent in Palestine and 25 per cent in Saudi Arabia.¹⁴ The merits of SMEs include the following:

- They are more labour-intensive than large-scale enterprises;
- They help even out income distribution making society more equitable and stable;
- They play a crucial role in ensuring successful transitions from declining agrarian economies;
- They are key to reducing poverty and achieving the MDGs;
- They often have very strong local roots making them a robust foundation for resilient economies;
- They foster economic cohesion through linkages with larger companies;
- They strengthen the role of the private sector in the economy and help to provide social and political stability;
- Their role in innovation can also be significant.

The role of SMEs in contributing towards achieving the MDGs of the United Nations is significant, particularly in the area of poverty reduction. One of the MDGs calls for full and productive employment for all, especially the young and women. In addition, the MDG on providing safe drinking water for all has significant EGS-related implications. Agricultural improvements and actions to address environmental sustainability are also needed.

Across the region, the entrepreneurial profile of SMEs is changing, with older generations passing on the reins to younger ones. New owners are more likely to be university-educated and have wider global experience. Market linkages vary: many SMEs are dependent on location-related linkages (for example, they are close to a city or to a mineral deposit or tourist destination). Intermediaries remain an important part of the value chain. More often than not, Internet and general marketing skills still require development. Knowledge of the emerging green economy needs to be built up. Overall, however, the characteristics of the SME sector today are similar to those found in the 1999 ESCWA study.¹⁵

In the past, protectionist Government policies have helped to support SMEs; however, since the widespread adoption of World Trade Organization (WTO) agreements, SMEs in the ESCWA region have had to adapt to new economic realities that are continuing to evolve, especially increased imports of competing products. In order to survive, SMEs must take advantage of liberalizing markets and, in particular, of new technology.

Although the extent of SME development varies considerably across the ESCWA region some general characteristics have been noted in reports by ESCWA and others.¹⁶ Table 3 illustrates differing rates of economic growth, but for the most part, these are significantly higher than the world average for the same period.

¹⁴ Ibid.

¹⁵ ESCWA (1999).

¹⁶ UNCTAD (2004).

TABLE 3. INDICATORS OF ECONOMIC OUTPUT GROWTH
(Selected countries)

Country	Average annual percentage growth in GDP, 1990-2000	Average annual percentage growth in GDP, 2000-2008
Egypt	4.4	4.7
Iraq		-11.4
Jordan	5	7.2
Kuwait	4.9	8.4
Lebanon	4.2	4.0
Qatar		9
Saudi Arabia	2.1	4.1
Syrian Arab Republic	5.1	4.4
United Arab Emirates	4.8	7.8
Yemen	6.0	3.9
World average	2.9	3.2

Source: World Bank (2010).

2. SME strengths, weaknesses, opportunities and threats

Though it is difficult to generalize in such a large and diverse region, with GDPs varying so widely (as seen in table 3), the following points have been noted:

(a) Strengths

- SMEs in the ESCWA region are resilient and enjoy traditions of craftsmanship and enterprise going back thousands of years;
- An entrepreneurial approach makes businesses flexible;
- Generally SMEs are family firms with strong roots in local communities and loyal customer networks;
- Good industrial relations generally prevail;
- Many languages are spoken (Arabic, English, French, Armenian, etc.);
- There exist distinguished centres of learning and evolving modern university and vocational training programmes;
- There is a tradition of hospitality;
- There is a growing network of SME support services, including business advisory services.

(b) Weaknesses

A general lack of benchmark information undermines the ability to pin down weaknesses to specific performance data; however, published reports cited have identified the following issues:

- Variable quality of management skills;
- Lack of technical skills in EGS;
- Limited investment in training and research;
- Limited marketing including poor image-related marketing to Government and the media;
- High dependence on imports;
- Often low margins and productivity;
- Poor record for innovation;¹⁷

¹⁷ The World Economic Forum's 2011 *World Competitiveness Report* does not rank any ESCWA member country in its top 20 innovator countries (Saudi Arabia is number 26 and the United Arab Emirates is number 35).

- Inefficiencies in the use of plant;
- Legacy of State control in some ESCWA member countries;
- A steady decline in manufacturing in Arab countries over the past four decades;¹⁸
- Insufficient marketing and web-related skills;
- High cost of basic utilities in some countries;
- Limited trade partnerships;
- Customs duties and limitations on movement of goods and services within the region, compared to major trade areas such as the European Union;
- Limited linkages with emerging markets (India, China);
- Limited 'green' financing at SME level;
- Skills shortages may already be hampering SME development, and with the economic downturn from 2009, many bought-in skills are being lost;
- Excessive and inflexible regulation in some countries;
- Lack of effective Government policy support in the past.

In addition, there is also a general lack of knowledge about the green economy and EGS specifically.

(c) *Opportunities*

The ESCWA study *Enhancing the Productivity and Competitiveness of SMEs through Clusters and Networks*¹⁹ called for the development of specialist clusters capable of pursuing international niche markets “with competitive muscle, and make a useful contribution to the growth of domestic markets”. Many ESCWA member countries responded to the economic effects of the financial crisis by announcing fiscal packages geared toward job creation.²⁰

Apart from the growing regional market, fast access to Europe (and for some ESCWA member countries²¹ to the United States of America through free-trade agreements) is an opportunity. The region is also undergoing a period of political and structural change that may open up opportunities to improve the business environment.

Opportunities for SME development in the field of EGS are discussed in detail in chapter II.

(d) *Threats*

External threats to SME development include the following:

- High input costs, for example, through rising oil prices (though rising oil prices will also stimulate demand for EGS);
- Financing problems due to a poor image on international capital markets;
- Aggressive entry to the market by external competitors, for example, China;
- Unstable political situation and armed conflict.

¹⁸ Arab countries were more industrialized in 1970 than they were in 2007 (UNDP [2009:103] *Arab Human Development Report: Challenges to Human Security in the Arab Countries*. New York).

¹⁹ ESCWA (2003).

²⁰ ESCWA (2009b).

²¹ Bahrain, Jordan, Oman.

II. ENVIRONMENTAL GOODS AND SERVICES

A. DEFINITION

There is no internationally agreed definition or classification for EGS. It is one of the most dynamic sectors of the global economy, and both the products it includes and the concepts it covers are evolving all the time. The WTO Committee for Trade and Environment is currently conducting a process to define environmental goods. The Organisation for Economic Co-operation and Development (OECD) has defined the EGS industry as follows:

The environmental goods and services industry consists of activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use.²²

The Worldwide Fund for Nature (WWF)²³ proposes that EGS should include the following:

- Climate regulation;
- Nutrient and waste management;
- Flood control;
- Coastal protection;
- The provision of food, freshwater, fuel, medicines, building materials, fertile soils, and breathable air.

In its policy paper,²⁴ the OECD defines the three main areas of EGS as follows:

(a) Prevention: The pollution management group of activities, goods that help clean up air pollution, manage waste and wastewater, clean soil, surface water and ground water, reduce noise or manage environmental monitoring;

(b) Improvement: Cleaner technologies and products, such as solar power;

(c) Control: Goods for resource management and energy control, such as double glazing and disaster-management equipment.

Discussions at the WTO, on the other hand, consider both:

- Conventional environmental goods: Those which have demonstrably served to address pollution (air, water, or soil pollution);
- Environmentally preferable products (EPPs): Industrial or consumer goods that have environmentally preferable characteristics (e.g. organic as opposed to ordinary agricultural products, chlorine-free paper, biodegradable rather than plastic materials, cleaner technology, and renewable energy).

²² OECD (2005).

²³ http://wwf.panda.org/what_we_do/how_we_work/protected_areas/arguments_for_protection/goods_services/.

²⁴ OECD (2005).

In the past, only producers of the final environmental good or service were considered EGS producers. This definition excluded the producers providing components of an environmental technology or product to the main producer, when these components are not for exclusive use in environmental technologies. It also excluded activities related to the sale of already produced goods to final consumers (distributors). In recent years, however, a new, more wide-ranging approach has emerged: EGS are now seen to include activities within the broad environmental supply chain, as well as activities across the full environmental value chain. Thus, contemporary definitions of EGS encompass research, design and development, installation, manufacturing, supply, distribution, retail, maintenance, operations, consultancy and support services, in addition to related sales and marketing activities. The broader new definition may also include low-carbon, sometimes referred to collectively as low-carbon and environmental goods and services (LCEGS). Renewable energy technologies such as hydro, wave and tidal power, geothermal, wind and biomass are also included, as are such emerging activities as reducing emissions from within the transport and construction sectors, energy management, carbon capture and storage and carbon finance.

The challenge in categorization is that in reality, there is an indefinite number of goods that could be classified as EGS, and that the sector is dynamic with products constantly evolving. For the purposes of this paper, ESCWA has classified EGS as either traditional or emerging, as outlined in table 4.

TABLE 4. CLASSIFICATION OF EGS

Traditional EGS	Renewable energy EGS	New/emerging EGS
Air pollution control	Solar power	Natural-resource-related EGS
Environmental consultancy	Wind generation	Green agricultural products
Environmental monitoring	Geothermal	Alternative fuels
Marine pollution control	Biomass	Carbon trading, storage and capture
Noise and vibration	Tidal power	Green building technologies
Contaminated land remediation	Biogas	Green transport
Waste management		
Water supply and wastewater treatment		
Recovery and recycling		

Source: ESCWA based on Innovas Report (2009).

These classifications are discussed further in chapter III.

B. THE EGS MARKET

The global low-carbon and EGS market as a whole is growing steadily, and this trend is likely to continue. The overall sector was valued at US\$3.8 trillion in 2008/09.²⁵ The global sector is estimated to involve 1.4 million companies and employ over 28 million people. The emerging low-carbon sector accounts for 48 per cent of sales, with renewables and the environmental sector accounting for 31 per cent and 21 per cent, respectively. The following ten countries account for almost two thirds of global market value: Brazil, China, France, Germany, India, Italy, Japan, Spain, the United Kingdom of Great Britain and Northern Ireland, and United States of America.

In 2008, Asia accounted for 38 per cent of the total market, Europe 27 per cent, the Americas 30 per cent and the Middle East one per cent.²⁶ Growth rates varied across the 23 subsectors but were higher for most renewable energy subsectors. This creates new market opportunities in all global economies. Growth

²⁵ Innovas Solutions Ltd in partnership with K Matrix (2010).

²⁶ Innovas Solutions (2009).

in demand for EGS is forecast to continue, despite the downgrading of growth forecasts. Firms in OECD countries are estimated to account for about 90 per cent of the global EGS market, with Western Europe, the United States of America and Japan being at the forefront of the import and export of environmental goods and services.²⁷ At the same time, developing countries, in particular China and India, are now seeing strong growth in the sector in response to their environmental problems. Developing countries are expected to see an increase in EGS activity when the United Nations Green Climate Fund comes into play. The ESCWA region needs to respond to these challenges.

Many environmental problems are evident in the ESCWA region, but the response in terms of EGS provision has yet to take off. ESCWA²⁸ has reported that the Middle Eastern market for EGS accounts for 1.6 per cent of the global total in 2010; however, other sources²⁹ suggest that the percentage may be even smaller. The balance of trade in EGS sees the region as a net importer, with most export activity taking place within the region.

In recent years, investment in the EGS sector has increased dramatically in most developed economies. Venture-capital investment in the area of industrial- and energy-clean technology is now overtaking investment in traditional sectors. For example, in North America in 2010, US\$3.7 billion were invested in 267 EGS-related deals. This investment level represents a 76 per cent increase in dollars and a 37 per cent increase in deal volume from 2009 when US\$2.1 billion were invested in 195 deals. Nevertheless, these levels of investment are below the 2008 levels of US\$4.0 billion into 277 deals, reflecting current global economic circumstances. Five of the top ten venture-capital deals in the United States of America went to clean technology, and funding for the sector accounted for 17 per cent of all venture-capital dollars in 2010 compared to 11 per cent in 2009.³⁰

In some economies, such as that of the United Kingdom of Great Britain and Northern Ireland, public procurement is a key source of EGS demand.³¹ In others, like Jordan, privatization is increasingly regarded as the optimum means of delivering EGS. The Jordanian Government's Executive Privatization Commission has acted to privatize medical waste disposal and municipal waste disposal.

The Green Climate Fund is also likely to be a driver of future demand for EGS. The Fund was launched in the broad context of long-term financial support agreed upon at Cancun, Mexico in 2010 and will be administered through the United Nations. Industrialized countries have committed to mobilize jointly US\$100 billion per year by 2020 to help developing countries. These funds are to be raised from a combination of public and private sources and linked directly to actions to mitigate climate change. Negotiations regarding the particulars of the Fund are continuing. It is hoped that the Fund will simplify the complex network of mechanisms and bilateral agreements that currently finance low-carbon and climate-adaptation investment for developing countries.

C. GENERAL EGS DRIVERS AND BARRIERS

This section highlights general EGS production and consumption drivers (including policies, regulations, R&D, etc.) and barriers (including trade), citing examples from the region.

In terms of production, legislation plays a very important role in driving market growth. Waste management is an obvious example, as Governments resort to recycling and other solutions to increasing

²⁷ Bora, B. and Teh, R (2004).

²⁸ ESCWA (2007).

²⁹ Arab Environment Facility, Lebanon. Presentation available at: http://www.slidefinder.net/b/berj_hatajian/2170378.

³⁰ Price water house Coopers (2011).

³¹ UK Centre for Economic and Environmental Development (2006).

volumes of waste. Renewable energy can also be promoted through legislation, for example, by requiring electricity companies to pay a feed-in tariff. With growing awareness of climate change on the international agenda and Kyoto protocol³² commitments, respect for the environment is increasing, as is the pressure on all countries to respond. Legislation relating to EGS promotion is likely to increase, further driving demand.

Rapidly rising commodity prices are also a significant driver of growth, particularly relating to energy. Similarly rising land prices make the reuse of contaminated lands more attractive, and there is a significant market for decontamination services. Multilateral and bilateral funding agencies have an important role in determining large scale projects for environmental infrastructure. Industry consolidation, privatization, deregulation, and market saturation in the West are expanding the role of EGS in international trade also. The proliferation of international standards is also facilitating the growth in demand for EGS.

In terms of consumption, Governments sometimes apply 'green' or environmental taxes to stimulate demand for green technology, or to put in place disincentives for unsustainable behaviour. However, changing consumer purchasing patterns is the fundamental issue, as EGS ultimately seek both to improve living conditions and to make a profit. Consumer demand for green products is not as strong as it is in Europe or the United States of America, but there has been evidence of evolving demand in the ESCWA region over the past couple of years. For instance, a recent Lebanon Opportunities conference on green business held in Beirut³³ was met with very strong interest from industry. Awareness is expected to continue to grow. Already consumers are becoming suspicious of 'greenwashing'; (companies pretending to be green), and there is a growing trend towards eco-labelling and certification.

By their very nature, EGS are research-intensive in that cleaner technology and green economy monitoring require a significant investment in research. Developed nations tend to lead in this, but some developing nations have also shown significant interest. A number of ESCWA member countries are developing research centres of excellence for different industries; for example, there are initiatives in the United Arab Emirates in the area of medical research and Jordan in the area of information technology. Saudi Arabia and a number of Gulf States are active in researching innovations in solar power production. Egypt is also exploring wind power and other renewables. ESCWA has established a South-South information exchange centre in Amman, Jordan. Universities must also be active in research. University-targeted competitions are emerging in the region as a way to encourage innovation and entrepreneurship amongst students. The Best Arab Universities Technology Business Plan Competition, organized by the Dubai-based Arab Science and Technology Foundation (ASTF) in collaboration with Intel Corporation, encourages young Arab students and entrepreneurs to merge technological innovations with business opportunities, and connects them with investment and funding opportunities. Winners of the regional competition go on to represent the Arab world at the global finals of the Intel and University of California-Berkeley Technology Entrepreneurship Challenge. Similarly, a partnership between Massachusetts Institute of Technology (MIT) and the Abdul Latif Jameel Group's social programmes division has resulted in the MIT Arab Business Plan Competition, which rewards and recognizes innovative start-ups by students in the Arab world. Despite the fact that neither competition specifically targets social enterprises, three out of nine winners of the MIT Arab Business Plan Competition in 2009 proposed social enterprises in the fields of education, health, and environmental preservation. One of the finalists of the competition was a rice straw company from Egypt that recycles rice waste while generating revenue.³⁴

Despite these initiatives, it will be important to encourage more public-private collaboration and create more space for SMEs to participate in guiding policy development. Many of the more innovative EGS

³² The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas emissions. These amount to an average of five per cent against 1990 levels over the five-year period 2008-2012.

³³ <http://www.opportunities.com.lb/event/defaultPresentationDownload.asp>.

³⁴ <http://www.mitarabcompetition.com/aboutmit.php>.

strategies emerge not from Governments themselves, but from industry-led task forces. *Green Egypt: A Vision for Tomorrow*³⁵ is one example.

The main regulation issue relating to EGS at present is the ongoing World Trade Organization agreement negotiations: With the liberalization of trade, developing countries will lose tariff revenues and face more open competition, and they are lobbying to obtain a greater share of gains from trade liberalization. There is a substantial trade imbalance regarding 'Class A' EGS, whereas for 'Class B', goods are seen as having strong export potential.³⁶

In response to climate change initiatives, including carbon-trading schemes, the monitoring and reporting of EGS is likely to come more to the fore. With the introduction of new codes in the Harmonised System to classify internationally traded EGS, tracking and monitoring will become easier. At present, EGS are usually ex-heading items on trade lists. The United Nations Green Climate Fund may also be a key driver.

Initial research undertaken by ESCWA indicates that there is limited financing available at present to support SMEs in the region, either from Governments or from financial institutions. ESCWA plans to undertake further research in this area. There are some international and regional investment funds for renewable energy, but mostly for larger-scale projects. For example, Egypt and others are now accessing the World Bank's Clean Technology Fund for solar and wind-powered projects, while Jordan is to establish a Renewable Energy and Energy Efficiency Fund to finance energy efficiency and renewable-energy projects. The Least Developed Countries Fund (LDCF) was established under the United Nations Framework Convention on Climate Change (UNFCCC) at its seventh session in Marrakech and is managed by the Global Environment Facility. The fund addresses the special needs of the 48 least developed countries (LDCs), which include the Sudan and Yemen. The United Nations Green Climate Fund will be important in the future.

There is, however, some small-scale community-based funding available through donors and non-governmental organizations (NGOs). On the larger (non-SME) scale, some Government-backed finance akin to that is available in the United Arab Emirates for Masdar City and other flagship projects. It appears that financial houses, banks and other funding institutions in the region are not attuned to supporting SMEs with 'patient capital',³⁷ as is usually required to support investments that serve environmental sustainability. There seems to be a lack of understanding and awareness as to the long-term positive returns that can be achieved from such types of investment.

The following are some examples of recent approaches to funding EGS-related development in the region:

- Abraaj Capital, headquartered in Dubai, is piloting an initiative to develop an ethical framework to guide its portfolio company investments, including areas such as environmental sustainability and social responsibility,³⁸

³⁵ ENCC (2010).

³⁶ Class A: Conventional environmental goods that provide services to address pollution (air, water, or soil pollution).

Class B: Environmentally preferable products (EPPs) are industrial or consumer goods that have environmentally preferable characteristics (for example, organic as opposed to ordinary agricultural products, chlorine-free paper, biodegradable rather than plastic materials, cleaner technology, renewable energy).

³⁷ Patient capital is equity/debt that has a longer period of return for the investor/lender than the average loan.

³⁸ <http://www.abraaj.com/english/List.aspx?mid=33>.

- Environmental Quality International (EQI) is a consultancy firm based in Egypt. It has assisted the development of an inclusive business model for ecotourism, one that meets both social and environmental objectives. EQI has brought sustainable development to the Siwa Oasis, where it has developed three lodges (one of which is an eco-lodge constructed entirely out of natural materials that uses no electricity), a women's artisanship programme, organic farming projects, and community arts projects. EQI has developed these programmes in collaboration with international donors such as the Canadian International Development Agency (CIDA) and the International Finance Corporation (IFC), the private sector arm of the World Bank Group. Through the United States Agency for International Development (USAID) EQI has worked to enhance the capacity of microfinance institutions to extend loans to small and micro-businesses in a commercially viable and financially sustainable manner. Over a period of 16 years, the project made available, through eleven NGOs and one leading commercial bank, well over US\$500 million in credit to close to 400,000 small and micro-entrepreneurs in urban, rural and remote desert areas in different parts of Egypt;³⁹
- The Aga Khan Foundation is exploring the possibilities of supporting green enterprises in water conservation, waste management, composting, and desert farming in Egypt and elsewhere. The Foundation has identified this as a way to contribute to job creation amongst youth and to solving environmental challenges.

Additional research in this area is planned by ESCWA through examinations of selected green value chains and of opportunities for SME development. ESCWA is also researching further opportunities for poverty alleviation through EGS and examining barriers to SME development in rural areas.

³⁹ <http://www.eqi.com.eg/index.php?activemenu=Project%20Showcase&screenid=11>.

III. EGS MARKETS IN THE ESCWA REGION

A. MARKET SIZE

The Innovas Report (2009) on low carbon and EGS has been updated to estimate the size of the global market. EGS sector estimates for ESCWA member countries are presented in table 5.

TABLE 5. EGS SECTOR SIZE, ESCWA MEMBER COUNTRIES

Country	Total sales US\$ millions	Number of companies	Number of employees
Bahrain	1 151	16 942	35 249
Egypt	27 744	10 143	119 563
Iraq	7 699	124 151	212 648
Jordan	2 281	33 972	63 859
Kuwait	4 341	68 126	142 869
Lebanon	1 616	24 853	51 312
Oman	3 108	46 473	91 802
Palestine	64	968	1 894
Qatar	1 805	27 386	53 623
Saudi Arabia	28 347		
Syrian Arab Republic	4 999	74 666	143 725
The Sudan	6 633	97 763	204 250
United Arab Emirates	6 427	2 440	49 706
Yemen	1 373	22 202	42 032

Source: Innovas Solutions Ltd in partnership with K Matrix (2010).

Notes: All figures include supply chain and should be treated with caution. Figures relate to 2008/9. Original report gives figures in Pounds Sterling: \$1= £ 0.610025.

B. SELECTION OF PRIORITY SECTORS

At present, the region is a net importer of EGS, and there is scope for import substitution if products can be developed to match or exceed the quality and price-competitiveness of imported goods. There is also scope for exports where market-competitive products can be developed within the ESCWA region and pioneered in marketing. International partnerships are an important means of doing this.

Three main criteria are applied in selecting which subsectors to examine further in terms of EGS potential in the ESCWA region:

- Firstly and most importantly, ESCWA seeks to focus on those EGS that will have a positive effect on the environmental problems and challenges of the region (as outlined in chapter I), and hence help to work towards achieving the MDGs;
- Secondly, the potential for export to other countries outside the region is considered;
- Thirdly, emerging EGS are looked at to see where the ESCWA region can assume a leadership role. It is recognized that, in some regards (e.g. green cities, solar power), the ESCWA region is in the vanguard, while also inheriting major challenges in 'greening up' twentieth-century urban development.

TABLE 6. SELECTION OF EGS SUBSECTORS

	Environmental importance in ESCWA/MDG impact	EGS export potential	EGS pioneered in region	Total score
Traditional EGS				
Air pollution control	4	4	1	9
Environmental consultancy	4	3	1	8
Environmental monitoring	5	3	1	9
Marine pollution control	5	4	1	10
Noise and vibration	2	2	1	5
Contaminated land remediation	2	2	1	5
Waste management	5	4	2	11
Water supply and wastewater treatment/water remediation	5	4	2	11
Recovery and recycling	5	4	2	11
Renewable energy EGS				
Solar power	5	5	4	14
Wind generation	5	4	1	10
Geothermal	3	1	1	5
Biomass	1	1	1	3
Tidal power	2	1	1	3
Biogas	1	1	1	3
New/emerging EGS				
Natural-resource-related EGS	5	4	3	12
Green agricultural products	4	5	2	11
Alternative fuels	1	1	1	3
Carbon trading, storage and capture	5	3	1	9
Green building technologies	4	4	4	12
Green transport	5	3	3	11

Source: ESCWA.

Notes: 1 = some opportunity; 5 = major opportunity.

Based on this simple matrix, the following products rank highest and warrant further analysis:

- Water supply and wastewater treatment;
- Solar and wind power;
- Natural-resource-based EGS;
- Green building technology and green transport;
- Waste management, recovery and recycling;
- Green agricultural products.

C. SELECTED EGS SUBSECTORS

1. *Water supply and wastewater treatment*

There are seven major shared surface watercourses in the ESCWA region, and ensuring access to shared water resources is becoming increasingly contentious and is the subject of various international initiatives. Because over 66 per cent of water resources in the Arab region originate from outside the region, there is a real sense of the urgency of SME development in the areas of water monitoring (quantity and quality); efficient use of water, conservation, water metering and treated wastewater reuse. The introduction of the United Nations Green Climate Fund will also play a part.

The ESCWA region also has a number of shared aquifers, which contribute significantly to the freshwater resources in the region; however, only 12 per cent of these are renewable resources.

Ensuring the quality of these resources in the face of increasing groundwater pollution again requires increased emphasis on SME development in the area of monitoring, purification, filtering and supply efficiency systems. As the use of these surface and groundwater resources is increasingly unsustainable, water is a critical concern for the ESCWA region. ESCWA has intensively studied water issues in the region⁴⁰ and has identified key issues to be addressed. Most of these are SME development opportunities, as follows:

- Building better systems for monitoring supplies and collecting, analysing and disseminating relevant water resource data;
- Building a comprehensive and reliable database for data exchange systems, and using mathematical models for various applications when deemed important;
- Developing geographic information systems (GIS) for surface and groundwater resources to better monitor water availability, discharge, control structures, wells, along with all the relevant information;⁴¹
- Increasing and developing non-conventional water supplies by using the latest innovative technologies;
- Improving the efficiency of water use in the agricultural sector by using modern irrigation methods such as the sprinkler irrigation system;
- Reducing the amount of water unaccounted for in water supply networks by minimizing leakage in pipe networks;
- Protecting freshwater and marine water resources from pollution through improved sanitation and treatment of effluents generated by the industrial and services sectors;
- Formulating effective water policies and strategies;
- Increasing the availability of adequate financial resources;
- Encouraging stakeholder participation in water management issues;
- Achieving better water allocation among water consuming sectors;
- Updating and enforcing water legislation;
- Enhancing capacity-building;
- Achieving regional cooperation on shared water resources.

(a) *Products and services for the testing and treatment of water*

The present situation regarding water quality in the region creates a demand not just for treatment facilities at the municipal and industrial levels, but also for water sampling, testing and analysis equipment services that can be supplied by SMEs. The negative knock-on effects of poor water treatment are evident in health and in exports, as many fresh and processed food products sometimes fail to meet international standards due to the presence of water-borne contaminants.

⁴⁰ ESCWA (2002).

⁴¹ The Arab Countries Water Utilities Association (ACWUA) is involved in providing training to water utilities on the way to use GIS for improved monitoring and management of information regarding consumer consumption patterns and tariff payments (including non-payment of tariffs in order to support improved tariff collection records).

There are clear business opportunities in the manufacture and sale of equipment and services related to the testing and treatment of water through chlorination, ozone and ultra-violet (UV) systems. All ESCWA member countries need to address these issues and to do so in coordination with the private sector.

Constraints include a lack of clarity regarding required standards and their enforcement. Greater education regarding drinking water safety issues is also needed.

(b) *Products and services for water storage and water harvesting technologies*

There is a regional need for advice and action on water conservation relating to contour bunds, contour barriers (vegetative and stone), contour trenches and contour stone walls to prevent soil erosion and obstruct the flow of runoff water. Obstructed water will increase soil moisture and recharge the groundwater in an area; check dams will impede soil and water loss; percolation ponds are multipurpose conservation structures that store water for livestock and recharge the groundwater; irrigation tanks are also needed.⁴² All of these products need to be supplied or built locally and maintained regularly.

In the region, water tanks are also found in every household and are primarily constructed, installed and maintained by SMEs. There are stainless steel water tanks that are fabricated for household use and as reservoirs for commercial and industrial use, as well as polymer (plastic moulded) tanks. These can be made from recycled material. Smaller tanks are used for households, and larger tanks for commercial purposes. There is also a regulation in some Gulf Cooperation Council (GCC) countries that requires households to have a water reservoir on the property that has the capacity to store water for one to three days in case of disruption of water supply. In Jordan, Lebanon and Palestine where piped water is sometimes only available once or twice a week or only for a few hours a day, household and commercial water-storage tanks are a standard fixture for storing water for cleaning, domestic use and sometimes even for drinking if potable water cannot be purchased from another source.

Water tanker trucks that deliver water to households are also a big SME sector in the countries of the region that do not depend upon desalination. These environmental services are often provided by small-scale SMEs; in addition, there are SMEs that provide drinking water in containers. However, it is important to take into account the carbon footprint of such services, in order to ensure that their products are in fact environment-friendly. Household water purification systems are also common SME supply opportunities. Moreover, household water desalination units are becoming increasingly common.

Constraints to EGS development in this area include an unwillingness to change long established habits in agriculture and limited educational and demonstration projects. Much greater awareness of water conservation issues is needed.

(c) *Water-use efficiency products and services*

There is no unique definition of water-use efficiency, but it relates to mechanisms and techniques used to minimize over-watering and wasteful consumption. A simple technique to improve water-use efficiency, for example, is to irrigate at night when evaporation is reduced.

In industry, adopting water-efficient technologies and practices that reduce consumption has good economic potential for commercial, industrial, and institutional water users. New systems and technologies can be used to stretch limited water supplies, save businesses money, reduce energy consumption, improve water quality, and protect local and regional ecosystems. The introduction of new systems will involve multiple SMEs in those countries that decide to adopt greener approaches to water consumption. Multiple production opportunities exist in areas such as pipes, valves and fittings, membranes and filters, pumps (including solar pumps), hydrological and geophysical instruments and irrigation systems. SMEs can also

⁴² Sivanappan (n/d).

provide technical support for the development and sale of locally adapted GIS software and systems, operation and maintenance of systems, as well as consultancy services in water monitoring and efficiency.

Modern irrigated agriculture and urban landscaping are responsible for major inefficiencies. The introduction of drip technology and trench less technology in place of sprinklers or inundating irrigation can address this, and involves SME investment and product supply. Modern hydroponic technology was introduced in a pilot in West Asia. Changing agricultural practices to improve soil-moisture retention by adopting ‘no till’ techniques and mulching requires inputs from trainers and peer groups. A variety of essential soil-moisture and water conservation technologies must be promulgated amongst SMEs to reduce the cost of irrigation, extend it, and promote sustainable small-scale irrigation on an unprecedented level.

A general lack of awareness and a lack of motivation to change systems are the major constraints. Building standards relative to water-conserving appliances also need to be updated and enforced.

ESCWA initiative on water-efficient *zaatar* production

Zaatar seedlings are particularly delicate cultivations that are sensitive to soil saturation and mould in instances of over-irrigation. Manual irrigation systems are labour-intensive and would require significant coordination and allocation of responsibility of labour among the various participants in the pilot project since irrigation cycles may run as frequently as every 15 minutes. An integrated and automated irrigation system is thus required to prevent the risks associated with human error.

The specifications for the automated, integrated irrigation system supplied by SMEs for the greenhouse are as follows:

- An integrated irrigation system for a greenhouse enclosure of the aforementioned dimension that includes a water tank, a water pumping station, micro-sprayers (mist atomizers), pipes, valves and fittings with a compatible electrical control system;
- An automated irrigation system with a loop cycle that allows for effective programming and management of the irrigation system. The timer, water pump and associated electricity system should be integrated components of the network in order to ensure their compatibility with the system and thereby avoid malfunction;
- Electrical centrifugal water pump operating at 1.0 HP (monophase) and associated pressure tank with pressure switch and associated waterproof connectors and electric cables;
- Back-up UPS (220 volts/1100 watts) to ensure the proper functioning of the timer and water pump during periods of power failure;
- Associated electrical components, including control cables and waterproof connectors;
- Water tank (2000 litres capacity);
- Micro-sprayers (160) that are suspended from the top of the greenhouse to ensure even and efficient distribution of water during irrigation, including associated steel cables for mounting the system;
- Technical support to ensure that the irrigation network does drip water in order to prevent over-saturation of soil;
- Delivery and installation of irrigation system by 5 March 2006, including water tank and electrical components;
- Guarantee on services and materials provided (under normal conditions);
- Budget: US\$2,000.

Source: ESCWA.

(d) *Wastewater treatment and water reuse technology*

Most countries of the region have programmes for reusing treated wastewater in irrigation. The treatment of wastewater is generally a public service that is linked to a water supply and sanitation service provider, and it may be operated publicly or privately. Agriculture is the main user of water by far (using up to 90 per cent of the supply in the Syrian Arab Republic for example).⁴³ However, few countries have adequate institutional guidelines for regulating the reuse of treated wastewater. The reuse of wastewater in industry, for recreational areas, in forestry, landscaping, gardens, to reduce land degradation and desertification along urban peripheries, and to meet the needs of golf courses seems to be more economical, and could also lead to more efficient use of wastewater. This could contribute to increasing the efficiency of overall water use.⁴⁴ The full use of treated wastewater has been pioneered in Jordan and the Gulf, giving the region a leading edge.

Although the installation of wastewater treatment systems is often a large-scale endeavour, there are multiple SMEs involved, including engineers, construction companies and equipment suppliers. Biological wastewater treatment and reverse-osmosis technologies can also involve regional SMEs, as can the development of smaller systems for villages and urban areas.

Constraints exist in the areas of building regulations and awareness of current technology amongst planners, architects and hydro-engineers.

2. Solar and other renewable energy products

The global market for renewable energy⁴⁵ is being driven by rising oil prices, lower priced and more efficient renewable energy equipment, consumer demand, legislation and competition. Carbon trading as established under the Kyoto Treaty and the European Union's Emissions Trading Scheme (ETS)⁴⁶ is also giving impetus to renewable energy projects. In the ESCWA region, the realization that oil reserves are finite is also a factor.

Consumers of renewable energy range from national grids to small-scale, stand-alone domestic units in remote areas. There are multiple needs in terms of product: equipment and services are needed for generation, collection, storage and transmission, as well as installation and supply of appliances. SMEs can play an important role in the supply chain, especially when it comes to smaller units. At present, however, most renewable energy equipment is imported from China, Germany and India.

Nevertheless, the ESCWA region is a testing ground of considerable innovation, and this is an opportunity to be seized. Some of the most important innovations are as follows:

- The United Arab Emirates has numerous green initiatives, ranging from green cities (Masdar) to solar-powered recycling bins and electric Segway litter patrols along Ras al Khaimah's corniche. Masdar City, as one of the world's leading zero-carbon and zero-waste initiatives, is of considerable significance (further detail on page 36);

⁴³ AHT Group AG (2009).

⁴⁴ Choukr-Allah, R. (2011).

⁴⁵ Renewable energy, according to the official statutes of IRENA, includes solar, wind, hydropower, geothermal, tidal, wave, biomass and biofuels.

⁴⁶ The European Union ETS is one of the largest carbon trading schemes in the world and was created to operate apart from international climate change treaties such as the pre-existing United Nations Framework Convention on Climate Change (UNFCCC) or the Kyoto Protocol that followed it. The European Union subsequently agreed to incorporate Kyoto flexible mechanism certificates as compliance tools within the European Union ETS.

- Egypt is the only ESCWA country to be currently ranked in the top 15 countries with a commitment to renewable energy, according to Ernst and Young's May 2011 *Renewable Energy Country Attractiveness Index*.⁴⁷ This report ranks countries based on a range of nine renewable-energy indicators including wind, solar, biomass and geothermal. Egypt has a number of PV and concentrated solar power (CSP) installations developed by the New and Renewable Energy Authority (NREA) as well as several other Government, non-government, and private entities. These projects generate electricity in part for water pumps, desalination, and rural electrification and stimulate SME activity in installation and maintenance. There are also large-scale wind energy initiatives underway in Egypt;
- Jordan's new Renewable Energy Law encourages the engagement of SMEs in renewable energy production. Businesses with solar energy systems or wind turbines will have the right to sell excess electricity back to their electricity provider at the full retail rate. The law also requires the National Electric Power Company (NEPCO) to purchase all electricity generation from utility-scale renewable energy projects. Jordan's National Energy Strategy calls for the Kingdom to derive seven per cent of its electricity from renewable energy sources by 2015. The 2020 goal is ten per cent. To meet these objectives, the Government envisages installing 600 megawatts of new wind generation, between 300 megawatts and 600 megawatts of new solar-power generation capacity, and 30 to 50 megawatts of biomass projects;⁴⁸
- In Doha, the Qatar Foundation has announced a joint venture with Solar World, based in Germany, to produce polysilicon, the main ingredient in solar panels, at a US\$500 million plant in the northern part of the country. While this itself is not an SME initiative, it will stimulate opportunities for ESCWA region SMEs to become more involved in the supply and distribution chains for environmental products;
- The Syrian Arab Republic's target is for renewable energy to make up 4.3 per cent of primary energy demand by 2011, and it has two wind farms (100 MW and 30 MW) in planning, with two locations being opened up for investment by Syrian and foreign companies.⁴⁹ A new plan for Syrian energy, entitled 'Master plan for Energy Efficiency and Renewable Energies' is being drawn up together with Germany's *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) and will cover the period 2011 to 2030.⁵⁰ Demand for electricity in the Syrian Arab Republic has increased by 75 per cent over the past decade, and the Government predicts it will triple in the next 20 years.

The region receives 3,000 to 3,500 hours of sunshine per year, with more than 5.0 kilowatts per square meter of solar energy per day. Egypt, Oman, Jordan, Saudi Arabia and the United Arab Emirates all have on average over 9.3 hours of sunshine each day. According to a recent Al Masah Capital report,⁵¹ renewable-energy generation in the region will be important for keeping energy exports steady, with solar-power generation increasing as oil reserves decline. Solar energy has the potential to equip the region with ample sustainable, clean electricity. Not all electricity production needs to be large-scale; there are multiple opportunities for SMEs in the supply, fitting and maintenance of small-scale solar-power electricity and heat-exchange devices. As technology for renewable energy develops, there are major opportunities for ESCWA member countries, including the oil-rich Gulf States, to use solar, wind and other forms of renewable energy to offset their energy requirements, to export surpluses, and to stimulate SME development. Solar heaters

⁴⁷ Ernst and Young (2011).

⁴⁸ Luck, T. (2011).

⁴⁹ Ibid.

⁵⁰ Braine, M. (2011).

⁵¹ Quoted at: <http://www.greenprophet.com/2011/02/top-five-solar-energy/>.

are an obvious example of renewable-energy EGS that could reduce dependence on oil. Although most of the materials required to manufacture solar heaters are available locally, a very high proportion are imported at present.

Wind power tends to rely on imported equipment, especially from Denmark, Germany and more recently India. Biomass has potential in the Sudan. Traditionally, biomass energy has been widely used in rural areas for domestic purposes. Since most of the region is arid and semi-arid, the biomass energy potential is mainly contributed by municipal solid wastes, agricultural residues and agro-industrial waste. Municipal solid wastes represent a potential source of biomass, and the processing of biomass to convert it into energy would be an SME opportunity. High rates of population growth, urbanization and economic expansion are accelerating the generation of municipal waste, a high proportion of which is organic at present. The problem of competition for land between food crops and energy crops arises, but could be mitigated if biomass used for energy generation is derived from agriculture waste and residues and is facilitated by Government.

ESCWA has examined the potential for biogas from the livestock and dairy industries, and for biofuels from olive oil residues and from the sugar industry, in a detailed technical paper. The technical paper⁵² points out that member countries, in particular the Sudan, are rich in potential biogas sources. With the fluctuating prices of oil and gas, the paper recommends that biogas from organic waste in general and dairy farms in particular be tapped. The following recommendations have been made on ways to help SMEs:

- Providing tax breaks for equipment imported and manufactured for the purposes of biogas plant construction;
- Providing electricity purchase prices to producers that at least meet the national cost of electricity generation rather than the subsidized cost;
- Removing energy subsidies that, while having an adverse effect on the poorer population in the short term, will encourage the use of all renewable energies and benefit the community as a whole in the long term;
- Exempting all of the biogas plant operations from taxes for the start-up or duration of the project;
- Implementing stricter environmental laws prohibiting open disposal of solid and liquid wastes from dairy farms;
- Providing tax incentives or preferential treatment for plants installing organic waste digesters.

Further research is needed on geothermal potential, particularly along the Rift Valley extension. However, solar power is the clear potential area of specialization for the ESCWA region, and SME development opportunities in the area of solar heaters, PV and other solar options need to be explored further.

Lack of technological know-how, a limited regional research base and high up-front investment costs are barriers to SME engagement in supplying renewable energy. Laws and incentives need to be changed to facilitate the engagement of more SMEs in electricity supply, including through PPPs and feed-in tariffs. To address these issues, there are several centres of excellence in the region, including the recently established ESCWA Technology Centre in Amman, which will work to ensure South-South cooperation and technology transfer sharing. Abu Dhabi is the headquarters of the International Renewable Energy Agency (IRENA) established in 2009. With 149 countries signed up,⁵³ one of the main activities of the Agency is the collection, generation and sharing of knowledge about renewable energy. IRENA will advise members on

⁵² ESCWA (2009c).

⁵³ <http://www.irena.org/menu/index.aspx?mnu=cat&PriMenuID=13&CatID=30>.

the financing of renewable-energy projects. It will also build a global database of policies to promote renewable energy.

Renewed commitment to wind farms in Egypt

Egypt's transition Government aims to push ahead with stalled plans to build new wind farms in the Gulf of Suez. A tender process has been initiated to select companies to build two of the four wind farms planned in the Gulf of Suez. Each facility is expected to have a total output of 250 MW when completed.

Under the Government plan to construct four wind farms in phases, investors will finance, build and operate the power facilities for a period of 20 to 25 years. They will sell the power generated by their wind farms to the State-owned Egyptian Electric Company at prices approved by the Government.

In 2008, the country approved an ambitious plan to produce 20 per cent of its total energy requirements from renewable energy sources by 2020, including a 7,200 MW contribution from wind turbines. To achieve that goal, the government has earmarked 7,600 square meters of desert land for wind energy parks. In addition to the Gulf of Suez, areas with large wind potential are along the Nile River, desert regions both to the east and west of the river and parts of the Sinai.

Existing wind farms currently contribute less than 1 per cent to Egypt's energy mix. In mid-2010, the World Bank agreed to lend Cairo US\$220 million to build infrastructure that would connect wind farms to the national grid and to support some of the other wind farm projects planned in the country. According to the Egyptian Wind Energy Association, the country is set to introduce a feed-in-tariff in 2012. Egypt currently has a total electricity capacity of about 23,500 MW. The Government hopes to increase it to 58,000 MW by 2027.

Source: <http://www.renewableenergyworld.com/rea/news/article/2011/04/wind-in-egypt-presses-on>.

3. Natural-resource-related products

(a) Forest technology and reforestation services

In the ESCWA region, forest resources are generally limited; hence, their contribution to SME activity and the environment is often overlooked. However, forestry's contribution to managing natural resources and the environment is significant and should not be underestimated. The Food and Agriculture Organization of the United Nations (FAO) has pointed out⁵⁴ that it would be to the advantage of all countries in this region to study their common technical problems and to exchange the findings of their research and work together. This process is underway through initiatives like the United Nations Convention on Biodiversity, the Convention to Combat Desertification and the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD).⁵⁵ SME development opportunities include the following:

Forestation and reforestation: Forestation and reforestation are urgently needed to establish new forests and rehabilitate existing ones. They can provide steady employment and help counterbalance the unemployment caused when grazing is limited in the interests of forest and soil conservation. Trees will be needed for the planting of windbreaks and shelter belts. The shortage of tree nurseries in the region is a serious impediment that must be addressed, especially in relation to the reintroduction of native species. More demonstration areas are needed, and the role of the State versus the role of the private sector in forestry needs further exploration. The whole complex problem of afforestation, soil conservation, and water conservation needs further study. FAO is investigating this issue, and work is ongoing under the United Nations conventions cited above and UN-REDD, of which the Sudan is a partner country.

⁵⁴ FAO non-thematic issue paper (u/d).

⁵⁵ The UN-REDD programme is run by the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

The use of forest products: The entire region suffers from a chronic shortage of wood and it is very important that the limited output be used to the greatest advantage. Opportunities exist to improve methods of utilizing existing supplies of wood, particularly of such deciduous trees and of native timber. Improved charcoal manufacture must also be studied, to ensure that it can be sustainable in terms of wood supply. Table 7 illustrates a broad interpretation of the environmental services that forests provide. The list features opportunities for SMEs, particularly in the area of provisioning.

TABLE 7. FOREST ENVIRONMENTAL GOODS AND SERVICES

Goods	Services
Timber products (i.e. wood)	Knowledge banks
Fuel	Education
Genetic resources	Recreation
Bio-chemicals	Ecotourism
Non-timber products	Aesthetic benefits

Natural environmental services

- Pollination
- Seed dispersal
- Climate regulation
 - Pest control
 - Disease regulation
- Protection against natural hazards
 - Erosion regulation
- Water purification and fresh water production
 - Provision of habitats
 - Nutrient cycling
 - Soil formation and retention
- Production of atmospheric oxygen
 - Water cycling
- Maintenance of genetic resources as key inputs to crop varieties and livestock breeds, medicines, etc.

Source: ESCWA based on Millennium Ecosystem Assessment (2005).

Generally speaking, there is a limited supply of forestry technicians and experts in this region, and this dearth is a significant constraint. Other constraints include a lack of political and public awareness of the importance of forestry, and the need for funding mechanisms that address the generally long payback period between the planting and the harvest of timber. Increasing aridity, changing lifestyles and desertification also expose surviving forests to fire, as has been the case in Lebanon in recent years.⁵⁶

Protecting forests in Lebanon

From ancient times, Lebanon has been the main regional source of timber, but centuries of exploitation have left little indigenous forest cover remaining at present. In recent years, fires have destroyed significant areas of Lebanon's limited remaining forests, making the use of the term "Green Lebanon" questionable in tourism marketing. Accountability and legal proceedings against arsonists are significant challenges. Gradual desertification and the massive urbanization of the coastal areas have further contributed to a decline in arable land and forest area.

⁵⁶ The Association for Forest Development and Conservation (AFDC), a Lebanese NGO, is working to address this issue through the training and equipment of civil defense units and conservation volunteers, available at: <http://www.afdc.org.lb/home.php>.

The bulk of Lebanon's forest area consists of oak and pine stands. Planted forests cover 10,500 hectares (ha), most of which are introduced species *Pinus pinea* (7,776 ha). Other planted species are local conifers (species of *Cupressus*, *Juniperus*, *Pinus* and, of course the Cedar of Lebanon, *Cedrus libani*). Unusually for the region, Lebanon's forest land is mostly owned by private entities including religious and tribal communities (97,600 ha), while public ownership extends to only 37,400 ha. The main EGS and income-generating activity is the collection of non-timber forest products such as pine nuts, carob pods (for the production of edible molasses), aromatic and medicinal plants and edible berries, mushrooms and honey. Rural communities, in southern Lebanon in particular, still depend on fuel wood for heating and cooking. The current expansion of ecotourism is leading to an increase in the significance of forests as an economic as well as an environmental resource, and 2011 is being celebrated as the United Nations International Year of Forests. In recent years, different public institutions, NGOs and private companies have undertaken a number of forestation projects, most of which have been funded by foreign donors including through FAO and UNDP.

In 1992, the forest around the small village of Ramlieh in Mount Lebanon went up in flames. To replant the forest, a student-led group was formed. Out of this small initiative, the Association for Forest Development and Conservation (AFDC) has emerged as an important NGO covering all of Lebanon. Today, AFDC is making significant progress in developing training programmes to combat forest fires and encouraging large-scale forest replantation. The Lebanese National Reforestation Initiative was launched in 2008 under the auspices of the Ministry of Environment covering 20 years with the objective of increasing Lebanon's green cover from 13 per cent to 20 per cent. The project initiated "Integrated Forest Fire Management" within a national campaign to combat forest fires. This project was funded by the Lebanon Recovery Funds and implemented by the Ministry of Environment, FAO and AFDC. The main goal of the project was to create for the Government of Lebanon an environment conducive to addressing forest conservation and expansion. The project included the following activities:

- Training workshops;
- A national public awareness campaign;
- Tree nursery in Akkar;
- Fire-fighting equipment for civil defence and the Lebanese Air Force;
- Rehabilitation and reforestation;
- Fire-management assessment and management plans.

AFDC is also encouraging the planting of pine nut forests (*Pinus pinea*), the characteristic 'umbrella pine' or 'stone pine' of the Mediterranean basin, introduced to Lebanon in ancient times. Each hectare of healthy pine trees yields 7,288 kilograms of white pine nuts in a year. One kilogram is currently sold at a price between US\$32 and US\$40. The return per hectare is US\$230,400 over 25 years or US\$9,216 per hectare per annum, based on a price of US\$32 per kilogram.

Source: AFDC (2011) personal communication, 5 June.

(b) *Ecotourism*

Tourism is a growing consumer of natural resources, and the sustainability of this consumption depends on how well tourism and its growth are managed. There are a number of innovative examples in environmental enhancement emerging, such as those of the Royal Society for the Conservation of Nature (RSCN) in Jordan (see case study on page 41). If managed well, tourism can be sustainable, but if left to its own devices, tourism can quickly damage the resource upon which it feeds. The case of the Wadi Rum Protected Area in Jordan is a pertinent example. An increasing number of visitors has put pressure on the fragile desert landscape, particularly due to the use of four-wheel drive vehicles in the desert ecosystem; grazing by goats also threatens regeneration as nomadic lifestyles gradually disappear. The Jordanian authorities are making efforts to better manage this situation, and a visitor centre to control access, together with zoning, and restrictions on the activities allowed in each zone have been put in place.

Most, but not all, ESCWA member countries have in place tourism master plans that include ecotourism to some extent. Advice has often been provided by the United Nations World Tourism

Organization (UNWTO). Yemen has recently produced a guide to ecotourism development, and Jordan regards ecotourism as a main element of its national tourism promotional policy. In some major tourist destinations, such as Saudi Arabia, where tourism is driven by religious visits, domestic tourism is also growing rapidly in importance. Egypt's tourism industry, a vital element of the country's economy, boasts many examples of ecotourism, for example, in the Siwa Oasis and through the NGO-led ecotourism initiative 'The Other Egypt', which seeks to encourage sustainable tourism in new areas and ecotourism specifically.⁵⁷ Domestic, interregional and international tourism all present many opportunities for ESCWA member countries, especially in relation to employment in locations close to tourist attractions.

There are major opportunities for SME development in the ecotourism supply chain, as there are in making mainstream tourism-sector SMEs more responsible. A wide range of opportunities exists if the landscape (and marine environment) can be protected. These include the following:

- Accommodation developments such as eco-lodges;
- Day attractions, particularly those that interpret the landscape;
- Hiking trails;
- Eco-friendly activities, nature study, horticultural tours;
- Specialized activities such as scuba-diving and rock-climbing;
- Catering businesses;
- Craft production and sale;
- Tour guide services and tour operations;
- Educational projects such as cookery and language schools.

Facilities associated with national parks and reserves also present many opportunities for SME development.

Constraints include the overwhelming dominance of mainstream mass tourism in the region's most popular tourist destinations, and in the thinking of tourism investors and developers. These destinations include Saudi Arabia with its enormous religious tourism appeal, Egypt and Lebanon. Although the tourism sector is a major employer in many ESCWA member countries, linkages between tourism and poverty alleviation are generally under-developed, with few responsible tourism initiatives in the region. The major impediment to the development of tourism and ecotourism is, of course, the region's political instability, which is exaggerated further in the minds of potential visitors from outside the region, together with generally weak environmental and planning controls.

4. *Green buildings, green transport and related products*

(a) *Housing policies and green construction methods*

The increased costs of energy and building materials, higher regulatory standards and greater consumer interest in general are causing the green building market to grow and expand in many countries. However, apart from Government-driven initiatives (such as the incorporation of greening measures into building codes in the United Arab Emirates) and some inspired developers, there is not a very widespread trend towards green buildings in the ESCWA region at present.

The Egyptian National Competitiveness Council's substantial report, *Green Egypt: A Vision for Tomorrow*,⁵⁸ highlights the need to introduce green building technologies in the region. The report defines green construction as including planning, design, construction and maintenance, thus including, potentially, a

⁵⁷ http://www.utlcairo.org/turismo/turismo_en.htm.

⁵⁸ Egyptian National Competitiveness Council (2010).

substantial body of SMEs active in different areas that could be encouraged to be more eco-friendly and engage in EGS production.

Given the demographic certainty of future population growth in the ESCWA region, new housing and even new cities will be needed. Abu Dhabi in the United Arab Emirates is pioneering new 'green cities' for the future. Saudi Arabia has similar plans. The private sector also has some leading players in green technology. The Orascom Group in Egypt has been developing the resort city of El Gouna on the Red Sea along eco-friendly lines for the past twenty years, and the success of this development in terms of consumer demand is evident. The resort's green credentials have been recognized by such eco-labelling initiatives as Green Star (for Egyptian hotels) and Green Globe, one of the more prominent international eco-labelling organization.⁵⁹ The development of 'medical tourism cities' in Jordan and the United Arab Emirates (one is also proposed for the Greater Delta region of Egypt) will result in the development of specialist clusters and should lead in creating SME opportunities in the area of green building, because medical facilities are major consumers of energy.

Barriers to green building persist, including the inability to deliver green projects at modest prices, a lack of technical know-how amongst architects and builders, and an absence of environment-friendly building regulations. There is a role for the development of consultancy in this area, in which some NGOs are actively involved. For example, in Lebanon, the Lebanese Green Buildings Council (LGBC) is an organization that promotes and helps to implement high-performing construction concepts that are environmentally responsible and profitable.⁶⁰

Green cities

Masdar, a green city in Abu Dhabi planned to be the world's first zero-carbon and zero-waste city in the world is nearing first stage completion after a three-year journey. This car-free zone is being driven by Abu Dhabi's Future Energy Company and will be home to the company's headquarters and a new university. The project was unveiled at the Cityscape conference in Abu Dhabi back in 2007. The land around the city will be home to wind and photovoltaic farms as well as research fields and plantations so that the city is completely self-sustaining, but skepticism about Masdar's ability to succeed has trailed the project. The Masdar Institute is due to welcome its first residents this September but it has been no easy road. The project is currently facing its first review. The project was rebranded from "zero-carbon" to "carbon-neutral" and the parent company recently cut its work force. A piece on Greentech chronicles some of the difficulties, which have included sand storms that limited the solar capacity.

The US\$22 billion carbon-neutral Masdar City project is still planned to provide seven per cent of the United Arab Emirates' power with renewable energy sources by 2020 even though the project is behind schedule. In a statement, Lord Forster of Foster + Partners said that "Masdar has far-reaching significance as a test-bed and an integrated urban research project of unprecedented scale and ambition". Whatever happens with the project is a learning experience not just for Abu Dhabi but for a world trying to go green.

Source: <http://www.luxist.com/2010/08/03/masdar-abu-dhabis-green-city-prepares-for-first-residence/>.

(b) Green transport

Cities are growing all over the world. According to United Nations estimates, over 50 per cent of the world population will be living in urban agglomerations by 2025.⁶¹ Transport management in the major cities is already facing significant problems due to non-sustainable transport and the attendant high local

⁵⁹ <http://www.elgouna.com>.

⁶⁰ <http://www.lebanon-gbc.org/Component/Static/FAQlgbc.asp>.

⁶¹ <http://www.prb.org/Educators/TeachersGuides/HumanPopulation/Urbanization.aspx>.

levels of air pollution, noise, and congestion even outside peak traffic times, in addition to decreasing safety levels for non-motorized road-users.

As a result, more and more cities in developing countries are launching public procurements for public transport projects and introducing compulsory shared private transport schemes. Public procurement can be an important source of business for SMEs, but Governments have to ensure that such firms are not hindered in competing for contracts that they could perform effectively. Encouraging productivity, bringing financial discipline and providing patient capital to entrepreneurs can dramatically improve the overall performance of SMEs and deliver enormous returns to investors, shareholders, and indeed to the wider stakeholder community.

Increasingly, public-transport projects in developing countries are contracted as PPPs and led by consortiums, as was the case with the city of Dubai, which is a pioneer in implementing sustainable transport solutions in the ESCWA region.

In 2009, Dubai launched a driverless metro network that is described as the world's longest fully-automated metro system to be completed in one phase. The purpose of this project is to ease the Emirate's congestion, reach all strategic areas and develop a transportation network that will carry 1.8 million passengers per day. As the city is constantly transforming its transport infrastructure system by incorporating new sustainable systems, a green shift is becoming a reality.

The metro and tramway are beginning to generate important social and environmental benefits. SMEs are also beginning to invest in smarter mobility. Ecological urban planning can be taken a step further with interesting new sustainable public and private transport solutions such as bicycle transit systems (Vélib in Paris), electric car-rental systems (Zipcar, GoGet, Car2GO Autolib, Auto bleue) for short journeys and car sharing or car rentals for long distances. The development of card payment systems for the whole public-transport network, dedicated bus lanes to improve the speed of the buses, and car-rental schemes are also providing employment opportunities for local contractors and SMEs such as call centres for vehicle reservations, maintenance and cleaning jobs.

Cairo is the largest urban centre in the ESCWA region and has major environmental problems caused by industry and transportation. The city has a metro service that is being expanded, but overall is in dire need of more green public transport, increased investment and private transport-sharing schemes. Alexandria has one of the oldest tram systems in the world. Beirut in Lebanon had an urban tram system by 1908, but in the 1960s the service stopped operating as private cars were given priority over public transport. The reintroduction of expanded tramlines and light rail would make a lot of sense, and more pedestrianization of urban centres will create enterprise opportunities and improve air quality. However, major investment in green public transport is already taking place in Saudi Arabia and the United Arab Emirates, and in Amman a metro system is being planned.⁶²

Apart from large-scale public sector or PPP investment projects, there are many green transport initiatives that could involve SMEs. The ongoing conversion of some of Cairo's fleet of over 80,000 taxis to natural gas is one example. Similarly, the compulsory vehicle testing of cars for road worthiness and acceptable levels of vehicle emissions is another, resulting in EGS employment in testing services and vehicle maintenance. If these testing systems throughout the region are strengthened, in terms of operation, rigour and emissions levels, a significant contribution could be made to improving the environment, and to implementing the United Nations Decade for Action on Road Safety. Lebanon, Saudi Arabia and the United Arab Emirates are members of the International Motor Vehicle Inspection Committee, which works to harmonize vehicle-testing standards.⁶³

⁶² <http://amman-metro.com/>.

⁶³ <http://www.cita-vehicleinspection.org/LinkClick.aspx?fileticket=gYoycv0YDL0%3D&tabid=76>.

The main constraint is a lack of political will to address this issue, and the generally high costs involved. Few cities in the region have introduced bicycle lanes, bus lanes, car pooling or other traffic reduction measures. In most ESCWA member countries, electric and hybrid cars are discouraged due to a lack of recharging facilities, tax incentives, and public awareness campaigns. Green transport initiatives require Government commitment, study and public awareness programmes: It appears to be a significant weak area in the region. Even Masdar's ambitious plans for a network of electronic 'pod cars' appear to have been shelved. There is a need for Governments, professional organizations, NGOs and civil society groups to reengage with this challenge.

5. Recovery and recycling

Waste management

Waste management is a very important environmental and health issue for all countries in the ESCWA region. In a recent review of solid waste management in the Arab Maghreb and Arab Mashreq regions,⁶⁴ it was pointed out that municipal waste collection is a major challenge and that waste collection coverage varies considerably, with almost complete coverage in some countries (such as Lebanon, the Syrian Arab Republic and some Gulf countries). The proportion of organic materials in the solid waste stream remains high, indicating opportunities to stream waste for recycling. The safe disposal of municipal waste is also a problem for some of these countries.

During the last decade, all ESCWA member countries have witnessed efforts made to address their solid waste management issues at the policy, legal, institutional, operational and financial levels:

- At the policy level, many countries have developed their own strategies and national programmes for addressing the municipal solid waste management;
- Waste management and cleanliness laws are needed in some ESCWA member countries;
- At the operational level, there is a marked improvement in the level of cleanliness of most major cities, resulting from better collection and street sweeping. However, despite efforts to establish sanitary landfills, municipal waste is generally being disposed of at open dumps, a practice that has major environmental and health implications;
- At the financial level, the central Government remains the major financier of municipal waste sector, providing large subsidies. Partial cost recovery has been established in Egypt, the Syrian Arab Republic, Jordan and Palestine, though not yet in Lebanon and Yemen;
- At the level of public communication, the media and NGOs have become more active in conveying public concerns, and in reporting on solid waste management activities;
- Littering and illegal dumping remain very visible concerns, particularly affecting watercourses and the marine environment close to cities, with negative implications for health and tourism;
- There are still flaws in environmental legislation, which is beset by legal inconsistencies and missing rules and regulations, making this an uncertain area for SMEs to invest in.

The problem of hazardous industrial and medical wastes has not been properly addressed, as hazardous waste production, storage and disposal arise mostly in urban and suburban areas where the population is concentrated and where water and land resources are scarce. There are opportunities for private sector intervention here, as has been illustrated by Jordan's privatization of disposal of medical waste.

⁶⁴ Arif, S. (2010).

In general, the countries from the MENA and ESCWA regions are moving toward integration of the waste management system but have not yet achieved an integrated waste management that is sustainable. The essential actions for moving towards sustainability will involve multiple SMEs in the following areas:

1. Consultancy:
 - Developing communications strategies and piloting community interaction in specific cities;
 - Completing and updating municipal waste management plans;
 - Developing missing policies laws and regulations;
 - Designing a solid waste management information systems.
2. Training:
 - Enhancing the institutional framework based on clear responsibilities and accountability;
 - Focusing on technical, managerial and administrative skills.
3. Promoting private-sector development with a clear regulatory context that contains incentives and gradually adopting a gradual financial and cost-recovery framework based on full accounting techniques.
4. Site management and cost recovery.
5. Specialized services, such as industrial or medical waste servicing.
6. Financing investment priorities for expanding waste management coverage in peri- urban and rural areas.
7. Establishing waste facilities that are affordable and technologically proven, rehabilitating old dumps and collecting and disposing of hazardous health-care waste.
8. With regard to recycling, establishing recycling companies in order to engage responsibly.
9. Biodegradable plastics.

Despite progress, problems at institutional, legal, financial, environmental and social levels persist within all the dimensions of the solid waste management systems in the region.⁶⁵ Waste reduction remains low and at-source separation is practically non-existent. Households have few incentives to separate waste and the composition of recycling materials is low. This is a major opportunity and could spur the establishment of SMEs to provide recycling services. Socio-cultural aspects are being neglected; there is a prevalent lack of public awareness and communications with stakeholders, and the level of community interaction in all aspects of waste management is all but absent in the region. There is a need for informed SMEs to develop public-awareness campaigns.

6. *Green agricultural products*

(a) *Agribusiness*

In general, and in locations where water is available, the agribusiness sector has excellent potential for growth thanks to favourable growing conditions, proximity to key global markets including Europe, and strong regional demand. The food processing business can produce high-quality, competitively priced products that are attractive to global markets. In Egypt, for example, there are 8,060 companies operating in

⁶⁵ As noted by Arif (2010).

agribusiness, accounting for 12 per cent of total exports and making the sector one of the nation's top exporters. Egypt has the largest agribusiness workforce in the region, with an estimated 6 million employees, representing 30.2 per cent of the country's total labour force. The majority of agribusiness exports are aimed at the Arab world, with the leading export destinations being Saudi Arabia, Gulf countries, the Libyan Arab Jamahiriya and the Sudan. According to the Egyptian Ministry of Agriculture, the broadly defined agribusiness sector is expected to bring in more than US\$21 billion in annual revenue and create some 500,000 new jobs by the year 2020. (Egypt aims to convert 1.3 million ha of desert land into farm land by 2020). With an annual growth rate of over 34 per cent, the food processing subsector – the largest under the agribusiness umbrella – is one of the most dynamic and rapidly-growing sectors in the country. The large domestic market's high growth potential has attracted multinational investors who both cater to the local market and use Egypt as an export hub.⁶⁶

The opportunity to 'green' this sector and make it more environmentally-friendly is a critical challenge that includes ensuring the efficient use of water. Targeting agri-processing SMEs and making them more aware of global trends towards demand for natural and organic foodstuffs is an opportunity, as these organizations have considerable influence through their purchasing power. At present, water supply for agriculture is often subsidized or free in the region, and this leads to many inefficiencies. In some cases, the use of fertilizers and pesticides is excessive and at times dangerous, and these are all areas that a greener agricultural sector would need to address.

Areas where SMEs could play a major role in developing a greener agricultural sector include:

- Supply of agricultural inputs: seeds, organic fertilizers, organic pest-control systems, energy, etc.;
- Development of drought-resistant crop varieties;
- Training and consultancy;
- Production: crops (wheat, vegetables, fruits, etc.), livestock (poultry, eggs, cattle, milk, etc.), forestry/flowers, fishing, and other new crops and new crop production techniques;
- Crop-monitoring systems including satellite technology;
- Supply and operation and maintenance: machinery, irrigation technology, greenhouses, silos, boats, etc.;
- Solar and wind-powered equipment;
- Processing: dairies, canning, wineries, breweries, bakeries, meat processing, juice processing, tobacco processing, etc.;
- Distribution: transport, storage, packaging and sorting (grading and handling), distribution;
- Marketing: design, intermediaries and campaign execution;
- Services/advisories: crop choice, appropriate technology or techniques, management and agri-business.

Constraints include a possible unwillingness at the political level to address such controversial areas as subsidized or free water, and the need to invest further in training, research, marketing and demonstration projects.

⁶⁶ Invest in Egypt (n/d).

(b) *Organic agriculture*

FAO identifies three different driving forces for organic agriculture.⁶⁷

- Consumer or market-driven organic agriculture, which relies on clearly identified organic certification and labelling;
- Service-driven organic agriculture. In countries such as in the European Union, subsidies for organic agriculture are available to generate EGS. The need to reduce groundwater pollution and create a more biologically diverse landscape must be recognized by Governments;
- Farmer-driven organic agriculture. Some farmers believe that modern agricultural production methods are unsustainable and have reverted to traditional or alternative modes of production to improve their family health, farm economies and/or self-reliance; in other cases, such as in some developing countries, organic agriculture is simply the way things have always been done, and the produce does not attract a premium price.

The market for organic agriculture, in contrast with mainstream agriculture, is small. According to FAO the market share of organic foods was around one per cent of total food sales in 2000⁶⁸ but is growing. However, organic products can, when attractively presented to the market, command a premium price.

Organic agriculture is becoming quite widely practiced in the ESCWA region, often with NGO support in remote rural areas. The benefits of organic agriculture include better soil retention, which is important for combating desertification, and on an economic level, farmers can often ask higher prices for organic produce. Incorporating soil-retention technology into agricultural and other rural activities is a regional challenge, and a body of regional training expertise is being built up. In Palestine, the particularly harsh circumstances of rural life have brought about considerable innovation. Rooftop gardens that use simple soil-creation technology illustrate that there are organic means of ‘making the desert bloom’. This subject is explored further in the technical paper authored by ESCWA on the sustainable livelihood approach (SLA) to development.⁶⁹ Factors critical to success in the organic food value chain are credible organic certification to inspire consumer confidence, distribution and marketing (including branding). These areas present opportunities for SMEs.

SME development opportunities are similar to those for mainstream agriculture and include the following:

- Supply of organic inputs: seeds, organic fertilizers, organic pest control systems, energy, etc.;
- Organic certification;
- Training and consultancy;
- Distribution: transport, storage, packaging and sorting (grading and handling), and distribution;
- Marketing: design, intermediaries and campaign execution.

Constraints include the need to educate farmers about the opportunity and to boost consumer awareness and demand, especially from within the region. Further investment in training, research, marketing and demonstration projects is also required.

⁶⁷ <http://www.fao.org/organicag/oa-faq/oa-faq1/en/>.

⁶⁸ International Trade Centre, FAO (2001).

⁶⁹ ESCWA (2011).

Making olive oil more marketable

Olive production in Palestine has a very significant contribution to the national economy and many vulnerable Palestinian families depend on olive oil production for their income. However, the majority of them lack marketing skills, and some practices in olive tree cultivation negatively affect the quality of the Palestinian olive oil which is naturally a premium product. The project “Increasing Marketing Competitive Abilities for the Palestinian Olive Oil” was funded by the European Union and started in 2008. It centred on the income and living standards for vulnerable rural populations through applying profitable environment-friendly and sustainable agricultural techniques. Through organic farming the project aimed to benefit 1,300 farmers through capacity-building activities and focus on SMEs such as seven existing cooperatives for olive oil and production, and seven mills for olive oil. Extensive training in organic techniques was undertaken.

In order to obtain a high quality-certified olive oil the project worked on preparing all farmers, cooperatives and mills for organic certification. In cooperation with the Center of Organic Agriculture in Palestine (COAP) processes of documentary preparation, registration, farmers’ files, internal audits, non conformity follow up, and external inspection were carried out. Details were sent to the Center of Organic Agriculture in Egypt (COAE) in order to finalize the certification process.

Cooperatives targeted by the project needed to develop and implement effective quality management systems in order to obtain international good agricultural practice (GAP) certification (GLOBALGAP). The seven mills targeted had insufficient capacity to serve all the project locations, so a further ten mills were added to work under the supervision of COAP and they too were awarded the organic certificate confirming the organic production of olive oil pressed in organic certified mills.

The project aims basically at increasing marketing for the beneficiaries’ quality oil production, thus an important part of its activities was the marketing phase. Many successful activities were achieved such as participation in several local and international campaigns and exhibitions, local campaigns including special supermarket promotions and tasting events. Because of the many obstacles faced by Palestinian farmers in marketing their crops, international standards that would improve marketing opportunities were vital.

This project is reported to have had a considerable impact on all those involved. It contributed in building agronomists’ and farmers’ capacities regarding organic farming systems, the GLOBALGAP system helped establish quality management systems for cooperatives, in addition to certification for Palestinian farmers and increasing their income, creating job opportunities, and in founding a highly qualified national inspection and certification team. Unfortunately, the project’s efforts in Gaza and some other locations were seriously undermined due to war and the ongoing difficulties which the Palestinian people face.

Source: Arab Agronomist Association (2009).

IV. CASE STUDIES

A. MUNICIPAL SOLID WASTE MANAGEMENT IN THE UNITED ARAB EMIRATES

1. Introduction

The United Arab Emirates is a large country with an area of approximately 83,000 square kilometres. Covering the south-eastern part of the Gulf, it forms part of the Gulf Cooperation Council and is one of the fastest-developing nations in the region. Oil has driven the country's economic wealth, and with this prosperity has come a wave of challenges and opportunities that have been seized by international businesses. The creation of wealth has been a magnet for labour migration to fill the positions created by the growth of industry, agriculture, services, and other economic sectors. As a result, the population has been growing steadily, and this increase has brought with it the challenge and opportunity of managing municipal solid waste.

The collection of municipal solid waste has traditionally been a basic requirement of and expense for both local Governments and communities. The experience of Governments around the world has proved that what may be seen as a burden can be, with the right approach, turned into opportunity. The United Arab Emirates Government has grasped the benefit to the environment and the economy of a clear policy for municipal solid waste management. The creation of jobs, the expansion of businesses, the proliferation of new products and services, and environmental conservation efforts together transform what may initially be considered an nasty business into a thriving economic sector.

The region as a whole produces 200 million tons of waste every year, of which municipal solid waste (MSW) accounts for 50 million. The United Arab Emirates alone produces approximately 3.8 million tons of MSW. This quantity is a direct result of both high population growth since 2000 and a higher rate of consumption due to favourable income levels. From 2000 to 2008, the United Arab Emirates experienced a period of rapid growth that was a combination of a rise in income levels due to higher oil prices and a property boom that was meant to absorb the incoming tide of residents. Those same residents contributed to the increase in all types of waste including MSW.

TABLE 8. MSW GENERATED IN THE UNITED ARAB EMIRATES, 2010

Emirate	MSW produced (tons)
Abu Dhabi	1 236 453
Ajman	189 873
Dubai	1 307 845
Fujairah	115 443
Ras Al Khaimah	183 038
Sharjah	772 403
Umm Al Quwain	42 532
Total	3 847 587

Source: Bee'ah Environment Department.

Government policies provide the foundation for the successful conversion of MSW into a source of economic gain. Firm, realistic goals targeting key industry deliverables have laid the groundwork for creating a multibillion dirham sector. Benchmarks such as landfill diversion rates have created trickle-down requirements across multiple activities including engineering, consultation, construction projects, manufacturing plants, logistics providers, service providers, traders, and import and export opportunities. Moreover, the influx of skilled and unskilled labour coming to fill the required positions has produced reverberations throughout the broad economy. The effect of a Government policy that is clear and enforced has ensured that the highest standard of participation is expected, thereby making the country more attractive and viable as a base for international investment. The largest emirates have been first in line to implement

these policies. The Centre of Waste Management (CWM) in Abu Dhabi, Bee'ah in Sharjah, and Dubai Municipality are three institutions that have aggressively pushed their mandates forward. The northern emirates have progressed but at a more cautious speed, largely due to the comparatively smaller population.

2. Awareness and education

The inflated amount of MSW produced in the United Arab Emirates (*i.e.* approx 2.1 kgs per day, per capita) is a profitable opportunity for SMEs. However, difficulty in controlling this waste flow arises due to the various cultures and diverse backgrounds of residents. The biggest hurdle to proper management of MSW can be mitigated if the waste generated at source is properly segregated. Therefore, the effort to effectively educate residents on how to properly separate their waste is critical for both those managing MSW, and for those looking to take advantage of the business opportunities that arise from it. This is key, as is the enforcement of laws and regulations.

Government policies

Realizing the opportunity that educating the nation will help in facilitating a smooth process of implementation, expansion and control of infrastructure, services and processes, the federal authorities have taken major steps in initializing education programmes and awareness campaigns aimed at highlighting the benefits to both the community and the environment of proper segregation of waste inside the household. These programmes have been launched in Sharjah, Abu Dhabi and to a lesser extent in Dubai.⁷⁰

In Sharjah, an extensive plan to educate the community on sustainability and environmental awareness was launched through the public-private partnership Bee'ah.⁷¹ Launched in September 2010, the programme is aimed at school children and targets some 150 institutions of all varieties, including public, private, girls and boys schools. The programme consists of a scheme to educate the young generation and the parents and grandparents through it. The curriculum is taught in classrooms by teachers who use both handheld materials and Internet-based digital resources. Other emirates have expressed interest in the programme, and it may be expanded to include the Emirate of Ajman.

Similar efforts have been undertaken in Abu Dhabi and Al Gharbia, where the CWM has mandated in its infrastructure roll-out programme an educational campaign to be run by qualified training staff. The campaign is to provide awareness training, competence training and other waste management training to members of local communities, schools, colleges, universities, organizations and ongoing competence and induction training for staff and workers.

In Dubai, the vision of educating the community and promoting sustainable development is realized through the close involvement of the private sector, which extends the reach of the Government through investments in the community. Companies including Imdaad, DulSCO, Averda, actively educate the community on recycling.

SMEs looking to exploit opportunities in MSW management can be confident in the programmes being planned. The willingness of various Government entities and federal authorities to coordinate as well as swiftly implement their mandates should reassure SMEs; in addition, the effective enforcement of these policies by the relevant institutions will guarantee investors a certain level of conformity.

⁷⁰ Ministry of Education (2004).

⁷¹ Government of Sharjah. Sharjah Municipality. Bee'ah. (2009).

3. Infrastructure

Merely educating residents is not enough. Without the right infrastructure to support the collection, consolidation, segregation, and compilation of MSW, efforts will be wasted. The collection of segregated waste is an example; in Sharjah, a programme by Bee'ah to encourage residents to segregate was launched with the allocation of over 2,000 of 5,000 anticipated pedestrian three stream recyclers distributed in major congested areas and walkways across the city. Combined with the education programme the result was over 80 per cent accuracy in the disposal of trash. Therefore educating and providing the right infrastructure has proved that residents in Sharjah are willing participants in progressive community programmes.

In Abu Dhabi, an electro-hydraulic underground waste collection system was launched by the SWM across an initial 115 locations, this aimed at improving collection, reducing unnecessary traffic, and eliminating scavenging. In Abu Dhabi and Dubai, the waste-hauling company Dulsco has distributed recycling bins across key locations. These types of activities carried out by larger organizations create diverse opportunities for SMEs. In this regard, SMEs are able to support the implementation of infrastructure through supplying of bins or containers to larger organizations. In Sharjah, Bee'ah allowed organizations to sponsor their recyclers. The sale of the space, the print materials and advertising support for this programme were outsourced to local companies.

The Emirate of Ajman has been actively seeking solutions for collection and disposal activities. Innovative waste-management methods have been studied within a limited geographic range. Several organizations have provided solutions, and the municipality has been open to products and services to that end.

The aggressive investment in high-quality roads and highways has not only facilitated the transportation of waste, it has also been an opportunity in itself. The firm commitment to a solid infrastructure and the move towards pioneering innovative solutions have resulted in engineering achievements. Several firms have approached the Roads and Traffic Authority⁷² over the years with different approaches towards road engineering. The use of rubber modified asphalt extracted from recycled tires is one option that has been proven to deliver superior roads. With tests currently underway, the qualification of this standard will provide engineering firms with a new commercial avenue.

Similarly, heavy investments in transfer stations, material-recovery facilities, and recycling facilities across the largest emirates provide a strong supply base for commodities and recycled raw materials. Organizations can depend on reliable local supply for their business, whether it involves trading or value added activities. Across the remaining emirates (Umm Al Quwain, Ras Al Khaimah, Fujairah) opportunities exist for consulting firms and solution providers to approach the relevant municipalities with infrastructure solutions. The challenges in financing have to be considered beforehand; however, the presence of a strong banking sector would support the projects assuming the feasibilities are clearly set forth.

Government policies

The Environment Agency Abu Dhabi (EAD) has set out to ensure “economic, efficient, and environmentally sound and socially appropriate solid waste management” in Abu Dhabi and, once successfully implemented, to export the same policies to other emirates. In addition, the agency wishes to promote significant private-sector participation in order to achieve greater efficiency in the waste management system, higher capital injections, and better sharing of financial, operating, and related investment and service risks. Private haulers such as ETA Zenath, Trashco, Dulsco, Union Paper and Mazaya provide rebates for cardboards, metals and paper.

⁷² Government of Ajman. Ajman Municipality and Planning Department (2010).

In terms of vision, one of the critical facets of the Agency's policies is that they break the link between population growth and the generation of waste. By doing so, they are aggressively promoting awareness on reduction, reuse and recycling. This approach, if successfully introduced, would result in less waste generation per year even with inflated population growth.

The United Arab Emirates has signed and ratified the Basel Convention, which aims to establish a framework for controlling and reducing the movement of hazardous wastes globally. With respect to MSW, there is no defined law or regulation concerning its movement in and out of the country; imports and exports of MSW depend on Government approval, which is required to allow its entry.

Similarly, there are Government policies aimed at bringing equipment and infrastructure up to global standard, their development being enforced through strict standards and specifications for tendered projects. The Agency has also put in place several policies that are promoting the development of infrastructure. Its goal is to achieve 65 per cent landfill diversion by 2014 and 75 per cent by 2020. This is to be realized by means of a tactical plan for the period from January 2011 to January 2013 that will establish transfer stations and recovery facilities throughout Abu Dhabi and Al Gharbia. Future policies to be implemented between 2011 and 2015 include the imposition of a tariff on waste generation, extended producer liability, greener public procurement, and integrated product policy. In March 2011, Abu Dhabi implemented a waste tariff that targets 4,500 waste-generating activities, for a sum ranging from a minimum annual fee of AED225 (per ton) to a maximum of AED 50,000.⁷³

4. Collection

Companies operating in municipal solid waste management in the United Arab Emirates include those listed in table 9.

TABLE 9. MUNICIPAL SOLID WASTE MANAGEMENT COMPANIES, UNITED ARAB EMIRATES

Company name	Origin	Number of employees*	MSW
1. Averda	Lebanon	100-200	√
2. Bee'ah	United Arab Emirates	500-1,000	√
3. Centre of Waste Management	United Arab Emirates	0-100	√
4. Dulsco	United Arab Emirates	1,000-1,500	√
5. EET	United Arab Emirates/Austria	300-500	√
6. ETA Zenath	United Arab Emirates	200-500	√
7. Imdaad	United Arab Emirates	500-1,000	√
8. Mazaya	United Arab Emirates/India	50-100	√
9. Tadweer	United Arab Emirates	300-500	√
10. Theiss	Australia	500-1,000	√
11. Traschco (Suez Environnement)	United Arab Emirates/France	1,000-1,500	√
12. Veolia	France	100-200	√

Source: Bee'ah Environment Department.

* Numbers constantly changing. Employee turnover, expansion and contraction of business activities will affect size.

The collection of MSW is carried out according to three modalities: municipality-owned and managed, municipality outsourced, and private haulers.

Municipalities across the United Arab Emirates have chosen to carry out the collection of waste through one or a combination of the above. For example, the CWM outsources most of the activities but manages the process by setting aggressive targets. In Sharjah, a PPP between the municipality and Bee'ah

⁷³ <http://gulfnews.com/news/gulf/uae/environment/waste-tariff-for-abu-dhabi-companies-1.772636>.

has mandated collection through the joint venture Tandeef. In Dubai, as in other emirates, the municipality and private haulers collect waste.

Opportunities for SMEs in waste collection do exist; however, it is a niche market. For example, a person can set up a company to collect paper or plastic. Collecting MSW will be quite challenging for SMEs due to the large quantities of waste generated and the correspondingly large contracts offered by municipalities for MSW collection, which will, in turn, require high levels of capital investment. Starting a small document-shredding business, for instance, would require investment in a shredding truck to collect and shred the paper; capital investment for such a business would be around US\$250,000.

The growth of the MSW market has been largely linked with the influx of white and blue collar workers into the United Arab Emirates. Prosperity resulting from favourable oil prices has, in turn, produced a hike in consumption levels and with them an increase in the amount of waste generated, which has risen from 10 to 15 per cent from year to year. An average of 2.1 kilograms of MSW is produced in the United Arab Emirates per day. However, the influence of the factors cited above has, in some cases, pushed the waste generated per capita to 4 kilograms in Abu Dhabi and up to 5 kilograms in Dubai per day.

TABLE 10. MSW, WASTE PER CAPITA, 2010

Emirate	Kgs/Day
Abu Dhabi	2.1-4.0
Ajman	2.0
Dubai	2.1-5.0
Fujairah	2.0
Ras Al Khaimah	2.0
Sharjah	2.1
Umm Al Quwain	1.9

Source: Bee'ah Environment Department.

Nevertheless, MSW management companies are not benefiting fully from the waste generated. The level of illegal collection, also known as scavenging, leads to a loss of up to 65 per cent of recyclables that would usually filter through in the waste stream. The loss of the most valuable commodities such as aluminium, steel, plastic and fibres has adversely affected several waste management companies, and the ability to recoup those losses is significantly impaired by the absence of anti-scavenging laws. Such laws are critical to the success of recycling programmes run by waste management companies. Scavengers have long been free to pick and choose, having originally served as an informal means of reducing waste; however, they now stand in the path of profitability for companies dependent on the waste stream. The scavenging process is very organized. In some cases, the scavengers are actually labourers who are employed by and obtained the irressidency visas from large manufacturing organizations. Their work is vital for the supply of inexpensive feedstock. Working alongside them are organized groups of scavengers, many of whom are illegal residents, who compile their stock and sell it to traders.

Formal efforts to collect recyclables present SMEs with profitable opportunities. Masafi, a beverage company, launched a nationwide programme to collect water bottles directly from companies. Similarly, a multitude of trading companies have concluded formal contracts with supermarkets and grocers to put in place receptacles for the collection of cardboard. In this case, a fixed annual fee is agreed upon.

The collection of recyclables is a lucrative business with a low entry barrier. Commercial establishments present the best point entry, with their retail space and commercial offices providing fertile terrain for investment. There are hardly any collection schemes in place, and in cases where companies have wanted to recycle their waste they have struggled to find an outlet. Recycling receptacles can be found in major locations, albeit in low numbers and only at the disposal of pedestrians. This leaves ample room for aggressive SMEs who can introduce convenient collection programmes that help commercial enterprises recycle. Collected materials have a ready market, with buyers both local and international.

The residential sphere is more complicated for recyclables collection programmes and requires infrastructure and education that is more closely aligned with larger organizations and enforcement of federal policies. There are opportunities to provide larger organizations with support through products and services to that end, including GPS hardware and software for trucks, logistical consultation, recruitment of qualified labour, equipment for collection including bins, and secondary services such as advertising and print materials, clothing and accommodation for labourers.

Opportunities to haul MSW are found in residential and commercial units. SMEs can register with the municipalities and dispatch collection vehicles. Contracts can then be concluded with commercial enterprises, but residential collection requires heavy effort throughout the tendering and bidding process. Commercial collection presents an accessible point of entry into the collection market, one from which companies can work their way up to offering residential solutions. While collection is straightforward, it requires a fair amount of investment in vehicles, equipment and labour.

Government policies

Federal Law No. 24 of 1999⁷⁴ provides waste management companies with clear guidelines on waste collection, handling, disposal and recycling across the United Arab Emirates. The law sets forth the requirements for all operations from the time of generation of wastes to the safe disposal thereof, including collection, storage, treatment, recycling and disposal. The law also covers several critical areas directly affected by these and other activities within the United Arab Emirates. Those areas include responsibilities relating to environmental protection and pollution control as set out for the United Arab Emirates and compliance with regional and international agreements ratified by the Government. It further stipulates compliance with requirements for the protection of society, human health, and other living creatures and considers the potential impact of harmful activities on biological diversity and resources found in the United Arab Emirates. These policies establish the framework for business practices.

The policies are detailed. Restrictions such as those regarding the burning of waste not only ensure environmental protection but also make it possible for waste companies to rely on the structure established by the federal authorities to maintain control of their operations. Residential and commercial outlets conforming to legislative restrictions on proper disposal of waste in order to abide by the laws for protection of water, soil and air create opportunities and provide assurance for companies who intend to provide products and services to meet those ends.

Some emirates have introduced laws that supplement Law No. 24, such as Law No. 21 of 2005⁷⁵ for waste management in the Emirate of Abu Dhabi, which specifies the general requirements for waste management and handling within the Emirate. This law sets forth the responsibilities of waste generators, companies managing storage, treatment and disposal facilities, and all other concerned parties. Similarly Dubai has issued Local Orders No. 115 of 1997, and No. 7 of 2002,⁷⁶ with the aim of further improving the policy framework. The Emirate of Sharjah is also currently in the process of passing comprehensive anti-scavenging laws. That said, although the law defines responsibilities for the waste generator, they do not incentivise the waste generator to reduce or segregate waste.

5. MSW materials

The components of municipal solid waste offer profitable business opportunities. Therefore, the generation of MSW, along with its proper collection, can determine the viability of entering into the business. As collection in the United Arab Emirates slowly progresses towards a responsible waste

⁷⁴ Government of Abu Dhabi. Environment Agency (1999).

⁷⁵ Government of Abu Dhabi. The Centre of Waste Management (2005).

⁷⁶ Government of Dubai. Dubai Municipality (2002).

generator mindset, businesses can predict the supply of materials. The possibility of extracting value depends heavily on the clean separation of waste. The contamination of fibres, plastics and metals by organic materials such as foods and liquids make reuse and handling complicated.

Contamination levels affect the amount of material available. As the waste generators in the United Arab Emirates improve their disposal methods, the volume of recyclables will increase.

TABLE 11. CLEAN MATERIAL TONNAGES, 2010

Material	Tons
Plastic	346 283
Fibre (paper/cardboard)	634 852
Glass	57 714
Metal (ferrous/non-ferrous)	115 428
Organic/Food*	2 423 979
Electronic	53 866
Total	3 632 122

Source: Bee'ah Environment Department.

* When collected free of materials, can be very profitable in compost-production plants.

The overall value of the market for all MSW materials, extracted clean, is over 1.1 billion dirhams. Organizations entering into this sector can gain access to local and international markets. However, with the development of local industry, it is expected that the local market will become the preferred outlet. While traders are currently maximizing the value of materials through export, it is predicted that by 2015, once policies have been fully integrated across federal agencies, the leakage of scavenged materials will be minimal, and local markets will benefit the most.

In the value added market, conversion opportunities are numerous, and innovative new products and follow-through services are being developed every day. Besides the standard conversions, such as washing and flaking plastics and re-processing of paper and cardboard, there have been creative developments in what is termed as 'up cycling'. Innovations in this rapidly evolving sector include biodegradable disposable plates made from betel nut palms that decompose naturally within two months; pencils made from recycled newspapers; straps for packaging material made from recycled plastic; furniture made from plastic and wood mixtures that have a shelf life of over 400 years if kept indoors; and uses for crumb rubber made from recycled tires ranging from jogging tracks; tiles for flooring, and composite material for road modification to applications in civil engineering.

In terms of research and development (R&D) taking place in the United Arab Emirates, Bee'ah funded a R&D project for an air pollution system to be conceived and designed in the American University of Sharjah (AUS) and later tested at the various facilities at Bee'ah. Most of the technology used to collect and recycle MSW is imported from abroad at present. Technical expertise is also imported from abroad; however, there are local talents that are being trained and developed by foreign technical experts.

The market for up cycled products depends on both their marketability and affordability. Targeting the right segment of the community is important. The offering price must also be considered carefully, as the domestic market is still maturing and customers are price-conscious. Even if the qualities of the product are superior to those of competitors, customers' concern about price may deter them from considering an alternative. However, there are customers who are mandated to do so, as in Masdar City, Abu Dhabi. SMEs will find opportunities to supply and support Masdar City administrators as they build the zero-waste destination.

Government policies

All emirates have taken radical steps to promote a responsible attitude towards waste generation. The philosophy of *Reduce, Reuse, Recycle* has been promoted in all major cities. The introduction of three-stream bins for pedestrians has also been influential in addressing public awareness of and compliance with segregation. While residential buildings have historically been built without the environment in mind, new buildings are being designed according to a compulsory green code. In Abu Dhabi, for example, *Estidama* (Arabic for ‘sustainability’) is an initiative developed and promoted by the Abu Dhabi Urban Planning Council to assess the sustainability performance of communities, buildings and villas. An essential tool to ensure the success of *Estidama* is the Pearl Rating System. All new projects must achieve a minimum rating of One Pearl to receive approval from the planning and licensing authorities. A portion of the points awarded in the Pearl Rating System are granted for the management of recycled materials, construction waste management, operational waste management, organic waste management and hazardous waste management.

Development of Government policy in this area is progressive and ongoing. Federal legislation, such as the law banning plastic bags,⁷⁷ has supported the environment and also created business opportunities. Now biodegradable bags, paper bags and other variations of materials to carry goods are being considered for the transition.⁷⁸

The United Arab Emirates has recognized that the waste industry is regulated through clear policies, and that, unlike other industries, in which Government intervention is scorned, such regulation creates clear and stable conditions for control, intervention, regulation and, most importantly, investment.

6. Conclusion

The main business opportunities for SMEs in MSW management are the collection of MSW and the provision of recycling facilities for MSW. The huge quantities of waste generated in the United Arab Emirates per capita, Government support for the development of MSW management projects through public-private partnerships, and the current lack of recycling infrastructure are areas SMEs could explore.

SMEs, on the other hand, will have to address issues of education and community awareness of the advantages of recycling and proper segregation of waste; reduce or eliminate scavenging; and find ways to partner with the Government and organizations partially affiliated with the Government, as they control the MSW management market. Table 12 summarizes the opportunities for SMEs and the constraints they face within the MSW business.

TABLE 12. SME OPPORTUNITIES AND CONSTRAINTS IN MSW

MSW-related business area	SME opportunities	SME constraints
<ul style="list-style-type: none">• MSW collection• Recycling facilities	<ul style="list-style-type: none">• Huge quantities of waste generated.• Government to develop MSW management projects in collaboration with the private sector.• Shortage of actual recycling facilities.	<ul style="list-style-type: none">• Awareness-raising and education.• Scavenging and laws/regulations.• Control of market by Government and Government-affiliated organizations.• Lack of raw material due to improper segregation of waste.

Source: consultant.

⁷⁷ Ministry of Environment and Water (2009).

⁷⁸ Landais, E. (2009).

B. PIONEERING ECOTOURISM IN JORDAN

1. Introduction

Jordan's tourism industry has largely been developed around a heritage theme, principally based on the attraction of the ancient Nabatean city of Petra (added to UNESCO's World Heritage List in 1985),⁷⁹ the Roman city of Jerash, Biblical sites, and the Dead Sea. Business tourism and summer time intraregional tourism is also very important with most accommodation to be found in Amman. Domestic tourists head south to Aqaba, a resort on the Red Sea.

Jordan's Ministry of Tourism and Antiquities recognized the opportunity to broaden Jordan's tourism appeal by highlighting the country's natural sites, both in terms of the Dead Sea's unique appeal as a spa and wellness destination, and the Kingdom's wider environmental and landscape resources. These attributes have been recognized since 1995 when the first Jordanian Environmental Protection Law was introduced. Moreover, an Environmental Police Unit was established in 2006.

Jordan's *National Tourism Strategy 2004-2010*⁸⁰ recognized ecotourism as a potential market-led growth area and sought to strengthen NGOs active in this area, conduct specialist research, develop specialist marketing and promote investment opportunities in eco-lodges and other green initiatives. The new national tourism development strategy (currently being drafted) is expected to place even stronger emphasis on ecotourism as one of Jordan's primary tourism products, re-affirming the positioning of the kingdom as a 'boutique' rather than a mass tourism destination. Jordan's protected landscapes are being increasingly used in tourism marketing as a key element of the country's tourism brand values.

Table 13 illustrates the significant growth in tourism-related employment (89 per cent overall) that has taken place in Jordanian tourism SMEs between 2003 and 2010.

TABLE 13. TOURISM EMPLOYEES IN JORDAN, 2003-2010

Item	2003	2004	2005	2006	2007	2008	2009	2010
Hotels	10 499	10 708	12 884	13 450	13 193	13 994	14 690	15 080
Travel agencies	2 621	2 826	2 774	2 903	3 408	3 680	3 981	4 351
Tourism restaurants	6 367	6 719	9 950	10 720	13 472	15 498	16 517	17 345
Rent-a-car offices	928	1 287	1 357	1 289	1 417	1 500	1 520	1 520
Tourist shops	296	310	385	530	637	732	772	791
Tourist guides	547	601	672	646	686	803	855	988
Horse guides	353	493	613	613	613	713	713	713
Tourist transport companies	499	483	620	758	814	881	879	939
Diving centres		28	32	43	45	45	45	48
Water sports		89	97	111	120	120	120	125
Total	22 110	23 544	29 384	31 063	34 405	37 966	40 092	41 900

Source: Jordan, Ministry of Tourism and Antiquities.

2. The Royal Society for the Conservation of Nature

The Royal Society for the Conservation of Nature (RSCN) has been one of the pioneers of nature conservation in the Arab region. It was founded in 1966 in response to concern over the drastic fall in numbers of animal species due to illegal hunting and general disregard for the natural world. In 1973, RSCN was officially given the responsibility of issuing hunting licenses and establishing hunting patrols to enforce hunting laws in Jordan. The organization, a Jordanian NGO, instigated efforts to replenish the numbers of

⁷⁹ <http://whc.unesco.org/en/list/326>.

⁸⁰ Ministry of Tourism and Antiquities (2004).

endangered species, many of which had reached the brink of extinction due to indiscriminate hunting. RSCN introduced captive breeding programmes, and in 1975, the first nature reserve in Jordan, located in Shaumari near Azraq, was established. Arabian Oryx, gazelles, ostriches, and Persian Onagers were bred in captivity, in order that they might be released into their natural habitats.

Since that time, the Royal Society has seen the establishment of seven protected areas scattered throughout Jordan, covering over 1,200 square kilometres in some of the finest natural landscapes in the country, offering protection to wildlife and ecosystems. RSCN itself oversees the management of many of the country's reserves. The Wadi Rum Protected Area is managed by the Aqaba Special Economic Zone Authority (ASEZA). There are plans to expand the network to incorporate new reserves, including Jebel Masu'ada, a spectacular landscape that will connect Dana and Petra.

In 1994, RSCN established its Research and Survey Section to carry out ecological field research, in conjunction with the establishment of Dana Nature Reserve. After years of concentrated training and fieldwork, the Royal Society's team of experienced researchers is now capable of performing the baseline surveys and providing the raw data needed to develop a nature reserve management plan based on a scientific foundation.

Due to the core need for a fundamental change in people's attitudes and behaviours towards nature, RSCN has focused on helping to create future generations of more environmentally conscious and concerned individuals through environmental education programmes. In 1986, RSCN started its first Nature Conservation Clubs in schools to help children understand the significance of certain environmental issues, while getting them actively involved in conservation projects. Today, there are over 1,000 Nature Conservation Clubs throughout Jordan, which are operated by a network of club leaders who are trained in exciting and innovative methods of environmental education. To spread further awareness, RSCN has also cooperated with the Ministry of Education to include several key conservation concepts within the national curriculum, while providing educational programmes in the reserves.

While the Arab world is currently witnessing the impact of social marketing, RSCN first recognized the substantial power of a people united in 2005, when it launched the Save Jordan's Trees campaign hand-in-hand with several other environmental agencies and a group of volunteers from various sectors. The initiative was very influential in reversing the Government's proposal to amend the agricultural law of 2005, which offered some environmental protection by limiting development on forest land. In order to spur others to action in furthering the cause of nature, RSCN has begun working to institutionalize its efforts in this new but important field, organizing more campaigns and activities to advocate environmental protection, in an attempt to influence the plans of decision makers in the hope of creating a greener and more sustainable future for Jordan. The Royal Society's membership programme in fact dates back to the time of the original founders, dedicated volunteers striving to effect change in any way they could because they believed in people's collective ability to make a difference in protecting that which cannot protect itself.

3. *RSCN and SMEs*

(a) *Dana: a new approach*

In the 1990s, RSCN embarked on a new path to nature conservation in an effort to improve the quality of life of local communities located in and around protected areas and to maintain their support for conservation. In 1994, RSCN established the Dana Biosphere Reserve as a model of integrated conservation and socio-economic development, aiming to meet the needs of both nature and people. By launching nature-based businesses in handicrafts and organic food production, RSCN created many jobs for local community members and assisted the development of environmentally-friendly SMEs, providing improved livelihoods for poor rural communities. Most recently, a candle-making project has been set up. Through an increasing role in genuine ecotourism programmes, locals are benefiting from protecting the integrity of their beautiful

environment, thus increasing their appreciation and support for conservation efforts. This is a significant achievement, reflected in the organization's slogan *Helping Nature: Helping People*.

(b) *Wadi Feynan*

In 2003, RSCN embarked on the construction of a purpose-built eco-lodge at the western gateway to the Dana Reserve. This eco-lodge is located in the remote Wadi Feynan, on the site of an old copper-mining research base, and built with funds provided by USAID. Distant from roads and power supplies, the Lodge represented a brave attempt to create a unique tourism experience in Jordan and bring enhanced economic benefits to the Wadi Feynan Bedouins, who are among the most underprivileged tribal groups in Jordan and whose reliance on intensive goat grazing in the nature reserve is the cause of many ecological problems. Its location was also part of a strategic conservation initiative to use tourism to offset the threat of open-cast copper mining in the Feynan area. There is persistent pressure from Government and private sector companies to rework the extensive, but very low grade, copper deposits surrounding the Lodge (which, ironically, provided the economic base of previous civilizations in the region, from Neolithic to Islamic). The development of tourism provides an alternative and far more environmentally sustainable livelihood option.

The Feynan Eco-lodge is an exceptional, beautiful building. Taking influences from ancient caravanserai and Yemeni architecture, it provides 26 rooms, all organically shaped and different in layout. It incorporates environment-friendly features, including solar power, high insulation, and passive ventilation systems, and, in the absence of mains electricity, it is lit at night by candlelight, which gives a very special atmosphere to the building and creates an unusual attraction for tourists. It was opened in September 2005. By the end of 2006, it had already attracted sufficient visitors to cover its operational costs and make a small profit. In 2010, the initiative was successfully handed over to the private sector for operation as a viable ecotourism business, an achievement worthy of note in a region where private sector enthusiasm for responsible tourism is under-developed, and a milestone in protected-area management.

(c) *Ajloun*

Craft workshops have been developed in the villages of Rasun and Orjan, with a focus on calligraphy, organic foods and traditional soap making.

(d) *Azrak*

In Azrak, in addition to accommodation, a paper-recycling project has been established.

(e) *Wild Jordan*

Wild Jordan was established as the Royal Society's trading arm. It is a branded initiative, responsible for socio-economic development, including all ecotourism operations run by RSCN. Revenues generated contribute to the Royal Society's mission to conserve biodiversity throughout Jordan. Wild Jordan is now a very successful SME, managing innovative income-generating programmes in other SMEs that build on locally available skills and products and on the growing market for ecotourism and green products. The Wild Jordan complex is located in one of Amman's oldest districts. The landmark hillside building has superb views and houses a retail outlet, catering and meeting facilities. Among the products offered by the small businesses created to date are hand-crafted silver jewelry, organic jams and fruit leathers, painted ostrich eggs, sandblasted frames, environmental board games, natural 100 per cent olive oils and nature boxes made out of goat leather. All of these initiatives are tied to a strong promotional concept that uses RSCN reserves and its conservation philosophy as the main selling points.

(f) *Future plans*

RSCN is currently proposing a range of developments in the vicinity of the Ajloun Forest Reserve that will help to revitalize the local rural economy and, at the same time, support and enhance the protection of forests and special landscapes. The project has five main components that work together:

- An Ecotourism and Rangers Academy;
- A second Wild Jordan restaurant and education complex;
- A five-star eco-lodge;
- An organic farm;
- A restored and revitalized local village.

The aim of this major project is to demonstrate that nature protection linked to ecotourism can drive economic development and rural revival in a destination like Ajloun. The project will be phased over several years, according to the availability of funding and investment. The Royal Society's intention is to seek to maximize private-sector investment for a number of SMEs including the eco-lodge; an organic farm to provide fresh vegetables, fruit and flowers for the Academy; the new Wild Jordan restaurant; existing and planned eco-lodges; and the accommodation facilities to be built in Um-al-Yanabee' a Village. The farm will also pioneer the growing of small-volume, high-value organic crops for local and national medicinal and cosmetic uses, such as the soap-making enterprises being developed in nearby villages. In addition, RSCN intends to develop the farm as the first "agro-tourism" project in Ajloun where tourists are encouraged to visit the farm, learn about traditional agriculture and see the crops being farmed and processed.

Other significant RSCN enterprise and nature conservation-based initiatives include restoring the old Ottoman Village of Dana as a lived-in heritage village for tourism and as the principal gateway to the Dana Nature Reserve. RSCN is also working on the development of tourist trails and other en route facilities like campsites between the Dana Biosphere and the UNESCO World Heritage Site of Petra.

4. *Impacts*

RSCN has had its greatest impact in helping to ensure the survival and protection of significant aspects of Jordan's national heritage. Key indicators for economic impact in 2010 were as follows:

TABLE 14. RSCN ECONOMIC INDICATORS, 2010

Activity	Indicator
Visitors to RSCN sites	137 000
Revenues from ecotourism	US\$1.41 million
Expenditure per visitor	US\$10.29
Percentage of protected-area costs covered by ecotourism	50 per cent
Income raised from crafts and other SMEs	US\$845 000
People supported directly or indirectly through RSCN activity	16 000

Source: Chris Johnson, RSCN, personal communication, 22 March 2011.

5. *Regional cooperation in ecotourism*

After years of conservation work, RSCN has much to offer in transferring the knowledge it has acquired to the Arab region. In 1999, RSCN began its first regional training programme, providing training and capacity-building to environmental practitioners and other institutions throughout Jordan and the Middle East in an attempt to empower others in their efforts to protect the environment.

RSCN is actively assisting ecotourism projects in Lebanon, has explored and provided support for projects in the Iraqi marchlands and works closely with biosphere and other reserves in the region. In

Lebanon, ecotourism projects being advised by RSCN include a restaurant and visitor centre in the Bekaa Valley that will support the protected areas of Al Shouf Cedars and the Ammiq Wetlands; and the refurbishment of the guest house in Ramlieh.

An ecotourism and wildlife ranger training academy is being planned for the Ajloun Nature Reserve and will be a US\$3.5 million, purpose-built centre specializing in the training of eco-guides and environmental rangers and in the management of eco-lodges and environment-related tourism services. The development will have the following facilities: training rooms, conference room, library and computer suite, medical clinic, search and rescue training area, equipment room, common room, staff accommodation, showers, toilets, storage areas and staff and trainee dining areas. It will also be integrated with the new Wild Jordan retail and catering complex. Accommodation for students will not be provided at the academy site but instead located in the nearby village of Um-al-Yanabee'a in order to bring revenue and job opportunities to the community.

6. *Conclusion*

The successful development of ecotourism in Jordan illustrates not just the market potential of this environmental product and its important economic and social benefits, but also the importance of delivering on a brand promise through a real commitment to environmental protection. In an age when companies around the world are increasingly being accused of 'green washing' (pretending to be green),⁸¹ Jordan has, through the work of RSCN, developed a model that has important lessons for the region, in terms of both SME development potential and potential to enhance and protect the region's precious ecosystems.

⁸¹ <http://sinsofgreenwashing.org/findings/greenwashing-report-2010/>.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

(a) *Areas of opportunity*

Although the regional market for EGS is small at present, it emerges as a very positive growth area for SMEs. The following areas are found to have the most interesting possibilities for SME development:

- Solar and wind power, particularly smaller-scale solar heaters and PV panels;
- Natural-resource-based EGS;
- Green building technology and green transport;
- Waste management, recovery and recycling;
- Water management and wastewater treatment;
- Green agricultural products.

The areas of solar power and water conservation are viewed as particular opportunities for EGS-based SMEs in the ESCWA region, building on innovation taking place here. Innovation is also noted in the area of green building technology. Although there are still many challenges in the area of waste, important opportunities for SMEs arise in the areas of waste management, recovery and recycling are emerging. Similarly, SMEs can play a stronger role in water management and wastewater treatment, particularly as private-public partnerships (PPPs) evolve.

(b) *Key issues arising*

At the macro level, a need for Government intervention to stimulate selected EGS sectors and to address constraints is apparent. Governments have a key role to play in stimulating demand for EGS through environmental legislation and ensuring transparent certification. Laws, incentives and more effective enforcement are key areas of Government responsibility. The region's strict border controls can still hamper trade corridors despite the creation and development of the Great Arab Free Trade Area (GAFTA).⁸²

In some countries, the political will to tackle some key issues such as non-environmentally sound subsidies, better waste management and public transport appears lacking. Funding for green initiatives is likely to become more easily available for developing countries, so Governments should be planning to take this up. There is a strong case for ESCWA and others to assist in bringing encouragement and examples of best practices to the attention of policymakers. Examples of good practice do exist within the region, and these will be easier to replicate than outside interventions.

At the meso level, there is a need for more North-South and South-South exchange and research, and a strengthening of industry support networks in EGS would be desirable. Industrial development agencies need to foster existing limited trade partnerships, both within and outside the region. There is a lack of information on green financing options for SMEs, and more accessible green finance initiatives, such as the lending of capital by oil-rich nations to other Arab countries would seem to be needed, not just at Government-to-Government level but also available to SMEs. The general skill shortage across the region requires collective action involving educational institutions and capacity-building partnerships.

ESCWA advocates a cluster-based approach for developing EGS, building on current skill bases through the development of industry networks. Centres for knowledge exchange and industry capacity-building are valuable assets, and ESCWA has established a South-South information exchange centre in Amman, Jordan for the region.

⁸² GAFTA was declared within the Social and Economic Council of the League of Arab States as an executive programme to activate the Trade Facilitation and Development Agreement that has been in force since 1 January 1998.

At the micro level, a general lack of benchmark information makes it difficult to generalize weaknesses; however, the following barriers are seen to exist:

- Variable quality of management skills;
- Lack of technical skills in EGS;
- Limited investment in training and research;
- Limited marketing including poor image-related marketing to Government and the media;
- High dependence on imports;
- Often low margins and productivity;
- Poor record for innovation;
- Inefficiencies in the use of plant;
- Legacy of State control in some ESCWA member countries;
- Insufficient marketing and web-related skills;
- Limited green financing options;
- Limited linkages with emerging markets (India, China);
- Skills shortages hamper SME development, and with the economic downturn from 2009, many bought-in skills are being lost;
- Excessive and inflexible regulation in some countries;
- Lack of effective Government policy support in the past.

B. RECOMMENDATIONS

(a) *Governments*

ESCWA country Governments have a vital role to play in facilitating growth in SMEs through EGS. This situation of growth and job creation can be brought about by introducing stricter environmental laws, regulations, incentives and enforcement in areas like waste disposal, water quality, electricity generation and air quality. Encouraging well-regulated PPPs in areas of environmental service delivery will also help.

Better communication is needed between Governments and the private sector, and between industry and research, to improve the rate of technology transfer and enterprise innovation. Industry needs a stringer role in developing Government policy. Governments can work to encourage more research and development in EGS, as the region needs to re-assert its role as an innovator in finding solutions to the problem of resource scarcity. Capacity-building and technical upgrading of all stakeholders is needed. Governments need to put in place strategies that will deliver this. More market research must be conducted on integrated approaches to resource supply and demand planning and management, and it is up to Governments to take the lead in this area. Moreover, Governments must attend to raising the awareness of EGS among all, from school children to end-users and decision makers. Regulations need to be used to stimulate demand for EGS rather than to hamper enterprise. This will require careful review of regulations affecting business by each country.

Practical measures that Governments can take to assist SMEs in EGS include developing regulated feed-in tariffs to encourage private-sector green electricity production, making green Government procurement policies compulsory, introducing tax holidays for significant or strategic EGS investment, recognizing the need for full-cost pricing for water (reduced subsidies), introducing regulated waste-disposal charges, and reducing fuel subsidies. Green business enterprise parks and demonstration projects are of the

essence. Other necessary measures include assisting training and research in EGS; encouraging industry organizations to facilitate knowledge transfer and information exchange; encouraging banks and universities to focus more on EGS; putting in place fiscal regimes and procurement policies that are clearly pro-environment, and ending environmentally unsound subsidies.

Through ESCWA, Governments can work together more closely to find common solutions to environmental challenges and encourage greater engagement with the private sector.

(b) *SMEs*

All SMEs can immediately start to 'go green' in response to current trends and consumer demand. They can start small by start concentrating on using energy and raw materials efficiently, choosing renewable energy, seeking to reduce and recycle waste, greening transport-related operations, using alternative energy sources like solar power instead of electricity, and generally favouring action that prevents negative environmental impacts. There is not a 'one size fits all' formula to going green, and small steps are enough for SMEs to make a start. A green strategy will help cost savings through efficiency or productivity gains, in addition to increasing the marketability of products and brands.

SME development organizations and support centres need to highlight this opportunity to their members, and to move towards a situation where 'green' becomes the norm, and irresponsible practices the exception. Upgrading skills in SME management throughout the green economy area is needed, and this is in itself a significant opportunity for training companies and institutions. Quality candidates need to be attracted to the region in order to enhance the region's skill pool.

SMEs should seek to meet the growing regional demand for EGS, as at present there is a significant trade deficit and a preponderance of imported EGS products. SMEs should work towards replacing imported EGS with local ones of higher quality. Better SME linkages with both markets and competitor suppliers are needed.

SMEs need to work closely with R&D departments and universities to build upon the region's proud heritage of innovation and find new market opportunities in a rapidly evolving and growing global market place for EGS.

(c) *Financial institutions*

There is a need to foster awareness and understanding of EGS and the green economy amongst the region's banks and investment funds. International best practice needs to be brought in. Financial institutions can play a key role in stimulating a green economy.

(d) *Educational institutions*

Education at all levels is the pathway to a more responsible future. Educational institutions need to be encouraged to research EGS opportunities, and to create greater awareness at all levels regarding environmental challenges and opportunities.

(e) *ESCWA*

Further research might be undertaken by ESCWA to examine the following areas:

- Green finance and fiscal initiatives;
- Addressing barriers to SME development, particularly in rural areas;
- Institutions for sustainable development;
- Green value chains and opportunities for regional clustering;
- EGS in the region and their role in addressing poverty and the MDGs.

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