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Green entrepreneurship

A promising path towards a sustainable future in Tunisia and elsewhere

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Preface

Green entrepreneurship – a response to the challenge of achieving compatibility between economic prosperity and environmental protection

'Economic growth' and 'environmental sustainability' are the two key pillars of the conditions essential for life in human societies. Striking a balance between the two requires a high degree of entrepreneurial spirit and acumen. This applies to both individuals and the societies in which they evolve. Economic activity, or the level of economic activity, depends on a number of factors, including decent housing, good diet, adequate clothing, a safe environment and access to clean water. Broadly speaking, these are the basic conditions of human life in general and of human interaction and interdependence with the elements of the natural world, such as plants, the sun, water, the climate, light, other living beings and mineral resources and the radio waves of the electromagnetic environment. The economic activity of individuals and society has a direct impact on the environment, and the environment plays a role in the development of individuals and society as a whole.

This is also true in the case of Tuni¬sia, where some regions could face serious threats from tidal and storm surges caused by climate change. According to the World Bank study, 'Adapting to climate change and preparing for natural disasters in the coastal cities of North Africa', these threats put the highly urbanised and industrial areas along the coast at risk (see http://www.econostrum.info/).

Since the early 1970s, following the publication of the Club of Rome report, analysts have constantly warned that the balance between these two elements of human life – the economy and the environment – is under threat. What has happened? Anything that could upset this fragile balance poses a serious threat to our future. What are the determining criteria for adjusting the relationship between the economic and environmental dimensions of our societies? What form should this relationship take and where should we start?

Reasons for the dichotomy

Societies have always carried out business activities to meet the physical needs of their members. They put their 'factors of production', which include labour, land and natural resources, to use and then, with the income generated, purchased and consumed goods, gradually establish-

ing the standard of living of communities and states. A country's standard of living depends on its ability to produce services and goods. The economic structures and business models adopted by society have evolved over time.

Since industrialisation ushered in the extensive organisation of the economy for the purpose of mass production, natural resources have been exploited in an unsustainable manner. Agribusiness was developed on an industrial scale, with single-crop farming and the use of heavy machinery, chemical fertilisers and pesti¬cides. One of the results of this agricultural mechanisation is the destruction of biodiversity.

Later, economic growth came to be largely driven by financialisation, and natural resources were rendered down to become a financial instrument, meaning that investments increasingly had little to do with real life. The growing dominance of financial leverage and a pattern of accumulation in which profit-making occurs increasingly through financial channels rather than through trade and commodity production have undermined the reciprocity between 'economic growth' and 'environmental sustainability'.

Today, there is an excessive burden on the planet's biocapacity, natural resources are overexploited and waste production is far greater than can be safely absorbed. We have lived beyond our means in ecological terms. Humanity's ecological footprint has outgrown planetary limits, which means that we have now reached the boundaries of economic growth in terms of 'bigger' and 'more'.

Towards quality growth

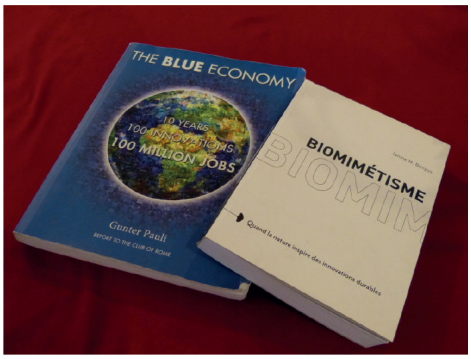
While there would seem to be no 'natural' incompatibility between entrepreneurship in pursuit of economic growth and environmental sustainability, there is a human-related incompatibility. Humankind and entrepreneurs therefore have a duty to invest in finding a way out of the impasse facing us today. Breakthrough criteria are required to reconnect the economic and environmental dimensions of human development.

Being constrained by limits means that special attention must be paid to the choice of crops, the place where they are grown and the identity of the final consumer. The term 'economic growth' can mean many different things. Simply stating that the economy is growing tells us nothing about the 'quality' of that growth. For example, the allocation of financial resources to prisons and weapons boosts gross domestic product (GDP) in the same way as spending on hospitals and schools. In many places around the world, there are disadvantaged sectors of the population whose physical needs are not always met, which means that there is still a need to produce more goods and services. The crucial question for humankind is the same today as it was in the past: how can we create a way of life that allows humankind to thrive and societies to flourish? This question raises an underlying constraint: how can this be achieved without having to depend on limited natural resources? Finding the right answers to these questions would represent a real breakthrough in overcoming the dichotomy between economic growth and

environmental sustainability, and a strong entrepreneurial spirit will be required to achieve this.

Pioneers of green entrepreneurship

Today, some answers are being provided by entrepreneurial pioneers who are a creating a subtle and complex economic system of maintenance, qualitative improvements and shared frugality. These pioneers, emerging mainly in the most advanced economies, are developing an economic approach based on 'better' rather than 'bigger'. Examples of this development include multinationals operating in the photocopying and transport sectors and some small and medium-sized enterprises whose products and services are the result of eco-innovation and eco-design.



One case is a famous brand name in the world of photocopying which has turned itself into a 'document management company' and renounced its original mission to sell as many photocopiers as possible. Instead, it now hires out photocopiers and bills clients for the number of copies printed. The company therefore focuses efforts on manufacturing long-lasting equipment to hire out, spearheading what is, in many respects, a new trend. The company goes beyond the concepts of 'eco-efficiency' and 'clean technology' (aimed at reducing adverse environmental impacts), by adopting a circular economy (cradle-to-cradle) approach. This represents a step towards an economy of functionality, which carries out its activities using performance-based integrated service solutions, a move away from the economics of quantity towards the economics of quality and value. There are also other more radical innovations, such as biologically inspired engineering based on the theory of 'biomimicry'. Biomimicry involves mimicking the models, systems and elements found in nature to develop applications in the fields of architecture, new materials, photovoltaics, sensors, filtration, insulation and medicine.

Spreading sustainable business models

The challenge today is to expand these new entrepreneurial types of economy! However, the large-scale dissemination of these business models requires the establishment of optimal distribution mechanisms around the world and accessibility across all social strata based on equity and sufficiency. The commitment of governments is crucial in ensuring the sustainability of the two conditions essential for human life, the economy and the environment. Governments are also faced with growing public unease about environmental insecurity, which is sometimes manifested as health concerns and expressions of civil disobedience. Many governments are compelled to deal with both simultaneously in order to ensure both economic and environmental sustainability.

This creates a window of opportunity for governments to encourage green entrepreneurship initiatives, by allocating less to non-sustainable and therefore non-productive expenditure and defining priorities for providing incentives for sustainable business models. This will ensure access by those requiring assistance for the benefit of all. Promoting and encouraging these pioneers of green entrepreneurship is an endeavour well worth pursuing, with a view to restoring the balance between the economy and the environment and developing a basis for the healthy development of both.

Tunis, October 2014

Holger Kuhle

Programme d'Appui à l'Entrepreneuriat et à l'Innovation (PAEI),
GIZ Tunisia

Introduction

About this report

The purpose of this publication of the Programme d'Appui à l'Entrepreneuriat et à l'Innovation (support for entrepreneurship and innovation – PAEI) is to explain how green entrepreneurship (GE) can act as a positive force for a country's sustainable development. The PAEI is part of German cooperation with Tunisia. It is implemented in partnership with the Ministry of Industry, Energy and Mines and with the technical assistance of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

This publication will contribute to implementing the 'entrepreneurship development' component of the PAEI, with a particular focus on good governance in the promotion of green entrepreneurship in Tunisia, on raising the awareness of relevant actors as to the importance of developing a green entrepreneurship vision incorporating a territorial development approach, and on ensuring good governance in relevant structures. It is therefore intended for Tunisia's public institutions and ministries, independent national consultants advising companies and projects, academics, entrepreneurs and local associations.

The Green Entrepreneurship Project in Tunisia has been carried out to a large extent with the technical assistance of two national consultants and a consortium of Belgian consulting firms and associations, including innergic, ipropeller, Greenloop and AEIDL. The study is largely based on the expertise of this consortium and the outcomes of workshops held with a network of Tunisian actors. This information has been compiled and supplemented by the author. For further information on the PAEI project, please see section 2.2. The report was originally written in French and is available online here: http://www.giz.de/en/downloads_els/EntrepreneuriatVert.pdf. This English translation was made possible with financial support from the GIZ sector project Innovative Approaches of Private Sector Development. In its working area 'green private sector development', this sector project develops, pilots and disseminates relevant approaches, instruments and experiences, including those related to the topic 'green entrepreneurship'.

The consortium providing training in green entrepreneurship for the PAEI in Tunisia is made up of:

The importance of green entrepreneurship

At least since the United Nations Conference on Sustainable Development (Rio +20) held in June 2012, the 'green economy' concept has been on everyone's lips. It is regarded as a solution to pressing environmental problems such as ocean, air and soil pollution and, above all, climate change. Today, humankind's ecological footprint is such that we are using 1¼ planets' worth of resources. This means that we are consuming more than the earth can regenerate. This overshoot is going to restrict the resources available to future generations in all areas. Natural resources, particularly those used to produce energy, will continue to dwindle until they run out completely, jeopardising not only economic development, but also national and international peace.

Sustainable development, as defined for the first time in 1987 is 'development which meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland Report). The energy sector is closely involved in sustainable development, because energy efficiency and renewable energy are ranked among the options most favourable to the environment, particularly in the fight against climate change.

However, neither sustainable development nor the development of the green economy are processes that will move forward under their own steam; they require a vehicle, which the promotion of green entrepreneurship could provide. 'The green economy could be a very important source of jobs and in order to take advantage of this, the employability of young people and women should be improved by providing targeted, up-to-date training in the new skills required in the green economy and by creating incentive mechanisms to encourage green entrepreneurship.'[1]

Green entrepreneurship is not only important because it provides new opportunities to young entrepreneurs, but also because it may become a powerful force to mainstream a new paradigm of responsible business.[2] Entrepreneurs play a key role as drivers of change in market-based economies, as it is they who introduce new products, services and solutions. They play a crucial role in the ultimate adoption of green business practices by the wider business community, because of the lead they provide to other companies. By demonstrating the economic benefits that come from being greener, ecopreneurs act as a 'pull' factor, encouraging other companies to proactively go green, in contrast to the 'push' factors of government regulation and stakeholder or lobby-group pressure.[3]

Going green has clear benefits for companies. First and foremost, extensive empirical studies clearly show that establishing an environmental management system is a competitive factor and that companies pursuing strategies to prevent pollution, reduce waste and increase energy efficiency actually cut costs and increase profits.[4] This is also true for small and medium-sized enterprises.[5] Large and well-established corporations often associate green innovation primarily with 'green labels' and corporate social responsibility, intended to avoid risk and enhance public reputation. Newcomers to the market, on the other hand, are more likely to focus on investing in R&D in order to launch innovative and more resource-efficient products with high return potential.[6] Just as the creation of shareholder value requires performance on multiple dimensions, the global challenges associated with sustainable development are also multifaceted, requiring changes in our way of life and our way of doing business. [7] Green entrepreneurship is therefore much more than the responsible management of a company in a given sector. Section 1.1 examines the different meanings of the terms 'green entrepreneurship' and 'green economy' in greater detail and explores the different types of green innovation.

Doing things differently

The concept of 'green innovation' is often associated with renewable energy. However, the shift to a post-carbon economy needs a watershed on several levels, from innovation in lifestyle to innovation in investment and governance.[8]

Or, as Albert Einstein said, 'Insanity: doing the same thing over and over again and expecting different results'. New corporate trends seeking to address this challenge advocate a shift:

1 GIZ Algeria (2012b), p. 16.

2 Regional Activity Centre for Cleaner Production (CP/RAC) (2011).

3 Schaper (2002), p. 27.

4 Hart and Milstein, p. 60. Refers to the work of Christmann (1998) and Sharma/Vredenburg (1998).

5 Clemens (2006).

6 Farinelli et al. (2011), p. 44.

7 Hart and Milstein, p. 58.

8 Farinelli et al. (2011), p. 44.

- from financial profit to social impact;
- from an exploitation model to cooperation and sharing;
- from linear processes to circular processes;
- from a top-down to a bottom-up approach (focusing on the community);
- from consumer to prosumer (producer and consumer);
- from a global approach to a 'glocal' approach (decentralised, but related to the challenges existing globally).

This study puts forward different approaches to driving the innovation of business models, such as biomimicry (section 1.2), and the promotion of green entrepreneurship based on a territorial development approach (section 1.3).

GIZ believes that the territorial development approach is a good option for Tunisia and other developing countries. This approach, similar to the one used in German cooperation programmes in different countries, is explained by the Chair of the Management Board of GIZ, Tanja Gönner, in the following way: 'The local particularities of a specific region remain the central focus of consultancy on starting up a business. Does a particular region have its own natural resources? Do specific economic sectors already exist? What about infrastructure? By answering these questions, it is possible to identify niche markets in the short and medium term with a potential for growth in different economic regions. With a view to encouraging and developing such niches, GIZ establishes a network of funding bodies'.[9]

The overview of the concept of green entrepreneurship and the detailed examination of these two approaches and others is followed by an analysis of the current situation of green entrepreneurship and the opportunities available in Tunisia, the country chosen as an example for the study. This analysis maps the initiatives undertaken by different national and international actors and public institutions in recent years. The focus is on German cooperation initiatives (PAEI) and other projects currently in progress.

9 Tanja Gönner quoted in Europäischer Wirtschafts Verlag (2013).

1. Green entrepreneurship – a positive force for sustainable development

1.1. What we understand by 'green entrepreneurship' repreneurship – a response to the challenge

Ecopreneurs

A green entrepreneur or '**ecopreneur**' is an actor in the green economy that embodies the marriage of economy and environment, taking into account the human factor and social development. The scientific community has not yet agreed on a more specific definition, largely owing to a lack of empirical analysis. In the absence of a clear definition, the term is defined in different ways depending on the entrepreneurial approach (initiative, risk-taking, creativity) and environmental awareness. The definition used in this study is the one established by the main stakeholders in the Green Entrepreneurship Project implemented in Tunisia (GIZ PAEI): Green entrepreneurship (GE) is a concept that gives rise to new economic opportunities, job creation and environmental innovation. The notion of 'innovation' is particularly interesting in this context, because green markets are in the process of developing, and it is innovation that creates jobs and business opportunities.

The definition of **green economy** established by the United Nations Environment Programme (UNEP) is 'a system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks and ecological scarcities'. It is not a question of creating a new vision to replace sustainable development, but rather of endeavouring to revitalise sustainable development and minimise the risks posed by climate change and the degradation of natural resources.[10]

Two definitions of 'green economy'

Within the concepts of green economy and green entrepreneurship, a distinction is made between two categories. On the one hand, there are activities that produce environmental goods and services in the **strict sense** of the term, the aim of which is to protect the environment and manage natural resources efficiently.[11] A green business carrying out activities of this kind can be considered to belong to the green sector – the green economy in the strictest sense.

In a **broader** interpretation of these terms, they also include companies that do not have an environmental motivation at the core of their business, but endeavour to reduce their negative impact on the environment. In this

10 Definition formulated by Dr Detlef Schreiber, Advisory services and projects; head, GIZ centre of competence; see GIZ Algeria (2012a).

11 According to the National observatory of green economy employment and jobs established in France in 2010; GIZ Algeria (2012a), pp. 9 -10.

case, the aim is to produce, deliver or reduce the cost of environmentally-friendly goods and services. Therefore, enterprises operating in all sectors of the economy can be classed as 'green' on the basis of the technology used for production.

The approach adopted by the German Federal Ministry for Economic Cooperation and Development (BMZ) to the green economy is based on the social market economy (social Marktwirtschaft in German). The notion of green economy is incorporated into the concept of sustainability, with the creation of a space to discuss the limits of growth while stressing the importance of taking account of the interactions between the economy, society and the environment.[12]

A kind of social entrepreneurship

Strictly speaking, green businesses produce goods and services to limit or correct environmental damage in a non-polluting, resource-efficient and socially inclusive way.[13] It follows that green entrepreneurship is a form of social entrepreneurship which assumes responsibilities beyond the normal social ones. A social entrepreneur uses economic efficiency to achieve a social objective. The costs are covered by the revenue generated by the company, but the profits are, in part or in whole, reinvested in its social mission.

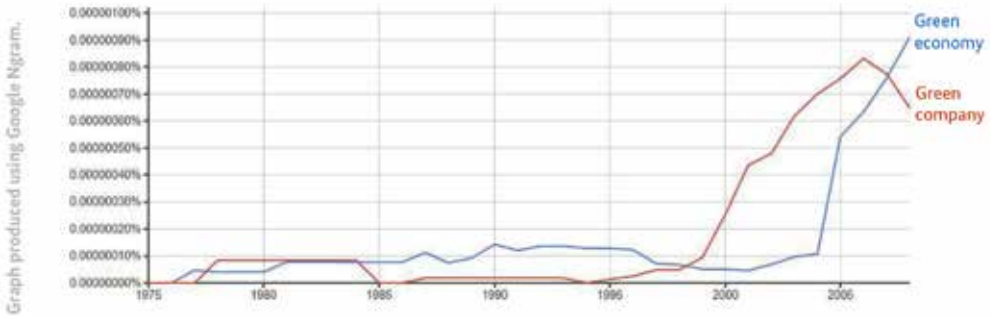
For ecopreneurs, the social purpose is at the core of their business model: they want to have a positive impact on the planet and the lives of present and future generations. They do not confine their efforts to reducing the negative effects of their activities, to polluting the environment less, to reducing their consumption of energy, water and other resources or to producing environmentally-friendly goods and services; they manage their business with systemic awareness in such a way that all its elements are environmentally responsible.

Ideally, the social/green entrepreneur has the capacity to innovate and question the status quo. In the pursuit of their goal, they participate in local development, create jobs and try to change the social and economic system. Additionally, they involve stakeholders, adopting an approach that is collective and inclusive.

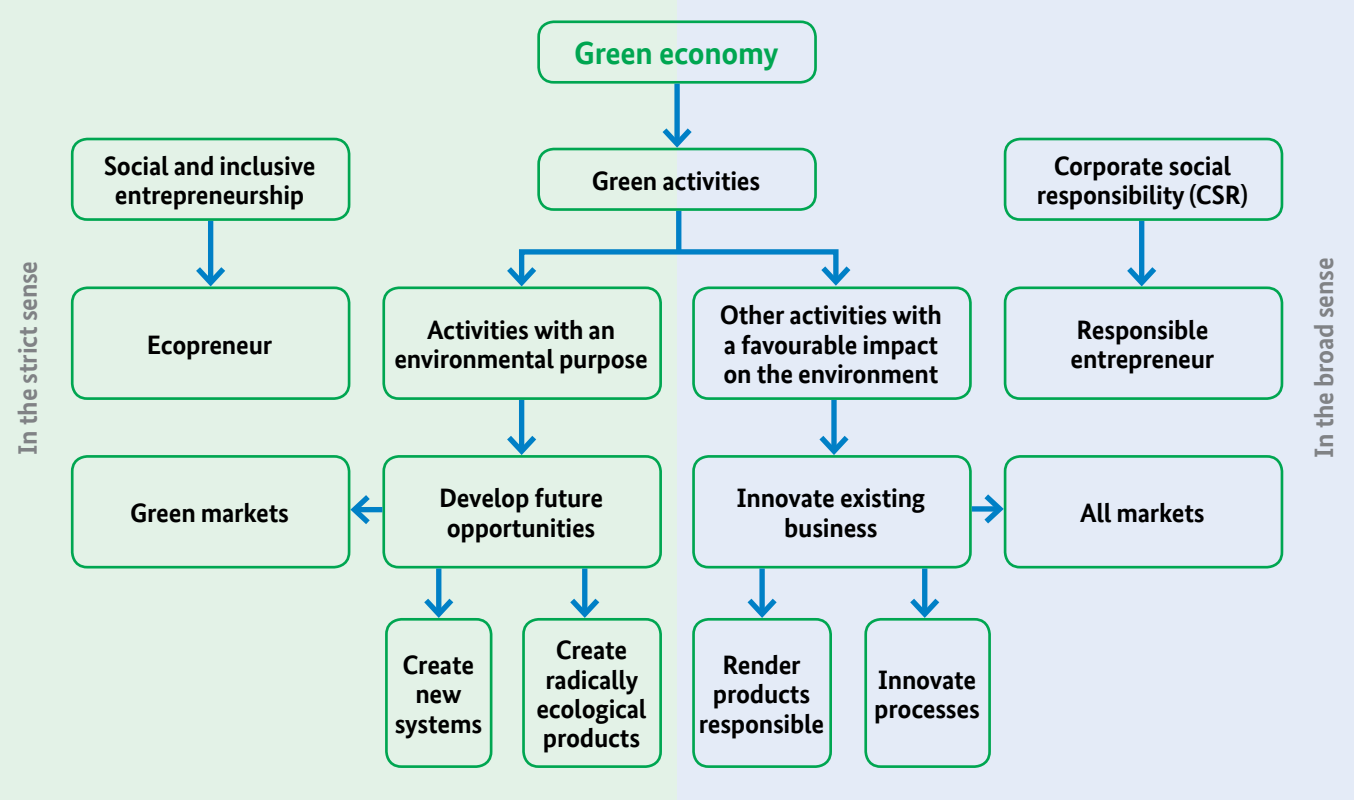
This collective approach can be classed as 'inclusive', as low-income households are included. Development organisations and trainers talk about inclusive entrepreneurship when the entrepreneur includes this

12 GIZ Tunisia (2012a).

13 Definition presented by Mourad Turki at a GIZ (PAEI) workshop, based on the definitions of Issak (1998) and Taylor and Walley (2003).



Since the early 2000s, there has been an increase in references in books to the terms 'green economy' (blue line) and 'green company' (green line).



Source: compiled on the basis of the various definitions referred to in the text.

sector of the population in the value chain as consumers or producers.[14]

Why is the inclusive approach considered essential to green entrepreneurship in the strict sense of the term? Focusing on environmental protection and the conservation of resources to the exclusion of the poor can lead to political resistance and create obstacles to the implementation of environmental business models. On the other hand, inclusive business models without greening can lead to pollution, ecosystem decay and the depletion of natural resources, all of which ultimately harm the most disadvantaged sectors of society.

For example, a growing demand for biofuels can lead to higher land-use demands and rising food prices. Similarly, charging market rates for public goods, such as water, is often seen as a way to promote the rational use of natural resources. However, the financial burden often falls disproportionally on the poorest households, which already spend a higher proportion of their income on basic services (the poverty penalty). Such households are often forced to tap water connections illegally, causing high levels of inefficiency and losses.

Furthermore, including the weakest members of society in green business models can support the implementation of environmental projects. For example, providing them with alternative income opportunities can prevent practices harmful to the environment (such as hunting, fishing and lumbering), which many communities rely on as a basis for their livelihoods. [15]

14 This is the definition given by the United Nations Development Programme (UNDP), for example.

15 For more on this subject, see UNGC-DCED (2012).

Green markets and jobs

The markets of the green economy are diverse. Typically, the main markets are:

- clean energy;
- sustainable transport;
- building energy efficiency and eco-construction;
- sustainable manufacturing activities;
- circular economy/waste management;
- green services;
- sustainable land use (sustainable farming and forestry);
- sustainable water management.[16]

Jobs and entrepreneurs that can be classed as 'green' are even more diverse than the green markets referred to above if a very broad definition of green economy is adopted. A study commissioned by GIZ Algeria established a distinction between 'green jobs' and 'greening jobs'. Whatever sector they are in, 'green jobs' are those with functions and skill sets for measuring, preventing, limiting and correcting negative impacts on and damage to the environment. Examples include technicians who measure water quality, environmental lawyers and eco-industrial plant supervisors. A 'greening job' is an occupation in which the ultimate objective is not environmental, but which does incorporate new skill sets to take account of environmental issues in working practices in a significant and quantifiable manner. Examples include plumbers installing heat pumps, roofers installing photovoltaic panels and bricklayers fitting external thermal insulation in buildings.[17] Green entrepreneurship should initially be classified as an entirely separate category, based on activities, results and business models.

An analysis of green entrepreneurs based on their level of education also adds to the picture of green entrepreneurship. In Germany, where green markets are relatively well developed for various reasons, a study on people employed in the renewable energy sector revealed that a large proportion were highly qualified.[18]

Types of green innovation

Having defined green entrepreneurship as an 'innovative activity', it is important to take a look at what green innovation actually means. Green innovations can be divided into two categories: those seeking to green existing businesses and those seeking to develop opportunities for the future.[19] The first are associated with activities with a favourable impact on the environment, and the second with activities with a specifically environmental purpose (environmental goods and services).

The first type of activity aims to reduce the impact that the linear production and consumption system has on the environment. These activities may be carried out in response to legal or corporate requirements associated with corporate responsibility and reputation. Typically, enterprises try to reduce risks and/or costs by optimising processes at the operational level in order to cut down on environmental pollution and conserve natural resources and energy. The main tools are waste management, environmental assessment (carbon footprint, ISO 14001) and energy efficiency measures. The aim is to reduce the negative impact of goods and services. After conducting a life-cycle analysis, examining environmental impact at each stage from the extraction of raw materials to final disposal, companies take

16 Classification based on the Millennium Development Goal Fund study (2012) and the study of the German Federal Ministry of Education and Research (BMBF) (2013).

17 GIZ Algeria (2012b), p. 10.

18 Bühler et al. (2007).

19 According to the consortium that advised the PAEI, in particular Oksigen and Greenloop. The classification is based on Hart and Milstein (2003).

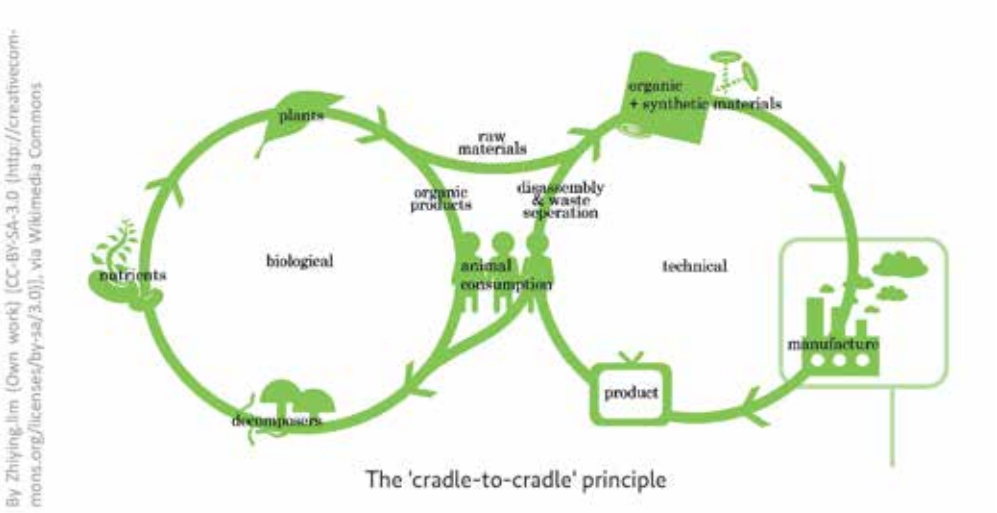
steps to achieve this aim. Some companies decide to go further, switching to fair trade, the organic sector, the second-hand sector or eco-design.

These are peripheral activities and can be carried out in any sector of the economy, but are an indication of the company's degree of greenness. Ecopreneurs, on the other hand, in carrying out 'greening' activities, want to move further towards a green economy in the strictest sense and position themselves directly on green markets with their innovations, such as the invention of clean technologies (mainly based on renewable energy).

These activities can also be disruptive to industry because they introduce 'cradle-to-cradle' innovations that could render many energy and material-intensive industries obsolete. Such activities include nanotechnology, genomics and information technology. They all hold the potential to drastically reduce the human footprint on the planet. Like renewable energy, information technology can be applied in the most remote and small-scale settings imaginable, eliminating the need for a centralised infrastructure and cabling technology, both of which are environmentally destructive.[20]

Innovations with high value for sustainable development are those based on the idea of a collaborative or sharing economy, in which people generate value together by pooling unused resources, goods, services, spaces, etc. and making them available to others. Taking into account that these forms of innovation, aimed at developing activities for the future, have a fairly well-developed vision of sustainability and of a specific green

20 Hart and Milstein, p. 59.



The 'cradle-to-cradle' principle

economy with a shared roadmap, it is often these ecopreneurs who seek an inclusive approach, particularly at the social level, to address both ecological and social challenges.

The next section focuses on new business models based on the principles of cradle-to-cradle innovation, the collaborative economy, the economy of functionality and biomimicry. Biomimicry is addressed in greater detail as it is a global concept of sustainable development and a tool that can guide entrepreneurs towards systemic innovations with the potential to deliver significant economic benefits. The territorial development approach, which is described in section 1.3, is part of this collaborative economy vision.

1.2. New business models

One of the responses to environmental challenges, particularly climate change, is to transform our current energy system, based on fossil fuels, into a system based on renewable energy sources. As the Earth provides us with infinite sources of free energy in the form of solar, wind, geothermal, tidal and hydro-power, this is a very promising path.

However, there are also serious constraints, such as the intermittent nature of solar and wind energy, the rebound effect and the finite reserves of the rare earth elements essential for the construction of the equipment used to harness this energy. In the event that humanity were to meet 100% of its energy requirements with a mix of different renewable energy sources, the reserves of indium, the semiconductor material that is critically important in the manufacture of photovoltaic cells, will have run out in 17 years' time.

The term 'rebound effect' refers to the notion that we tend to consume more (cars, electricity, etc.), when we achieve a more efficient production system, for example, the capture of greenhouse gases. In the end, there is surplus consumption which has an effect that is exactly the opposite of that sought by energy-saving efforts (for example, CO_2 emissions).

The linear economy is based on division, both in terms of product lifecycle and labour at all levels – the family unit, the company, the national economy and, finally, the global economy, with the international division of labour. These are the principles of business and global organisation of the economy that are traditionally taught at universities around the world. The ultimate goal of this paradigm was a fairly noble one: to achieve the highest possible level of wellbeing with available resources. Economists were always aware that resources are, in general, limited, while needs are boundless. However, humankind did not put enough value on natural resources, failing to recognise their limits and therefore to set adequate prices. It is now very difficult to remedy this market, and ultimately human, failing, because it has already had major repercussions, such as global warming and significant biodiversity losses. Climate change continues its relentless march, and efforts to reduce greenhouse emissions have only managed to slow them down and achieve a new stable, tolerable balance.

A paradigm shift is therefore required, that is, it is necessary rethink the vision and prin-

ciples of the ways in which we carry out our activities and of our economic and social system in order to align objectives and measures and find new technologies to add to this vision.

For this reason, it is necessary to change the paradigm of the energy-saving approach, because the system must be understood as a whole. If we let it, nature can show us how to do this. This approach is described below.

Collaborative economy

The collaborative economy is born of people's desire to no longer possess goods, as ownership also entails a burden and environmental responsibility in terms of the sustainability of the goods. Instead of buying goods and services, consumers acquire access to them. Old business models become obsolete and new models develop, primarily because consumers prefer to borrow from individuals rather than corporations.

Exchanges are often carried out through online platforms, because the new technologies make mass opinion public, and this inspires confidence. It all began with eBay, the online auction site. Today, there is an array of websites run by ingenious entrepreneurs, where consumers share practically anything, from their bed, to their dog to their money. You can hire out your car for a day or for a few hours, take people where they want to go in your car (carpooling) or rent out your parking space or garage. Free culture and 'fab labs', where tools of all kinds are shared, fall into this category.

Economy of functionality

Another innovative type of business model, which closely resembles the collaborative economy, is the economy of functionality in which the producer substitutes the sale of goods for the sale of services. For examples, consumers no longer buy tyres, but acquire a service that maintains tyres and ensures they are kept at the right pressure. The well-known principle of vehicle leasing used in the automobile market is also applied in other economic sectors. For example, a telephone company hires out telephones and recovers them to recycle the valuable materials from which they are made. A carpet manufacturer offers flooring systems and related services for a monthly charge, which does away with the high initial outlay. A customer's initial needs are met, and then carpets are renewed periodically and the life of the carpets is prolonged. For a long time now, shops in Tunisia and elsewhere have been hiring out wedding dresses; now the concept is also being applied to other garments such as jeans.

When consumers rent instead of buying, manufacturers must take into account not only the aspects of the sale of a product, but also other aspects relating to the return of the product. As the company continues to own the item, it has an economic interest in developing products that are resilient, long-lasting and easily repairable. Its costs will be lower when the product lasts for the entire rental period. The company has sole responsibility for replacing the product and can recover all the parts at the end of its lifetime (cradle-to-cradle approach).

Principles of biomimicry for building a sustainable economy [21]

The most important principle of sustainable development is not overexploiting the resources on which present and future generations depend. It is a principle that we have forgotten, but one that is applied by all the other animal and plant species that populate the Earth. They observe the laws of nature,

21 The sections on biomimicry are taken from a summary of the training provided by Greenloop, one of the firms that make up the consortium of Belgian consultants.

using only the energy they need, recycling everything, rewarding cooperation and demanding local expertise.

In order to relearn a rational and sustainable way of life on Earth, all humankind has to do is observe and mimic nature, without trying to dominate it, as it has been doing since the industrial revolution. The biomimicry concept takes the know-how of other living beings seriously. One of its advocates, Janine M. Benyus, defines biomimicry as a science that studies nature's masterpieces and then copies these designs and manufacturing processes to resolve everyday problems.[22]

This definition does not encompass the whole vision explained in her book *Biomimicry: Innovation Inspired by Nature*. The concept is far more than just a method for developing technical inventions; it depicts an ideal world in which humans return to the ecological system and follow the path towards sustainable development. Specifically, humans would make fully biodegradable products, using the sun and simple compounds, in the same way as animal and plants do. The economy would therefore be circular, unlike the system in place today, which is linear.

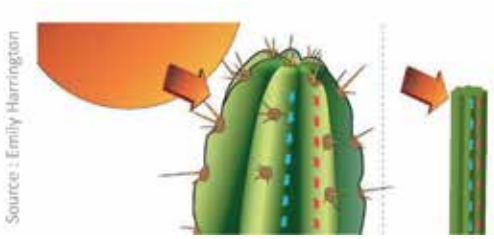
In a mature ecosystem, organisms fit **form to function**. The Peruvian torch cactus stays cool by creating air currents thanks to its vertical ribs, which provide shade and enhance heat radiation.[23] This shows how nature transforms limits into opportunities and does 'more with less'.

Form often performs various functions. An example of this is shark skin, which enables sharks to move smoothly through water and also has antibacterial properties. This multifunctionality illustrates how organisms favour optimisation over maximisation.

The concept of 'form fitting function' is apparently what appeals to us most, as a visually driven species, and has given rise to numerous innovations over the centu-

22 Benyus (2011), p. 15.

23 http://www.asknature.org.



ries. Out on a walk one day, the inventor of velcro, George de Mestral, found that it was difficult to remove cockleburs from his trousers. He examined them and discovered the possibility of attaching two materials simply and non-permanently. He promptly developed the fabric hook and loop fastener and patented his idea in 1951. He called his invention 'velcro', combining the French words 'velour' (velvet) and 'crochet' (hook).

A more recent innovation that draws inspiration from the movement of the fins of fish is a facility that generates power from tidal currents.[24] The facility captures and uses energy in the same way as fish do, with high conversion efficiency and viability and without polluting the environment or depleting natural resources.

Velcro

As a general rule, flora and fauna manage energy very sparingly, on account of the Second Law of Thermodynamics, and have done since long before this law was formulated by French engineer Sadi Carnot in the 19th century. It establishes the irreversibility of certain physical phenomena, as energy is converted to heat in the process of doing work. Therefore, nature uses only the energy it needs, preferably sunlight. The leaves of plants work in the same way as solar panels, following what is certainly the most important principle for life on Earth: photosynthesis.

Another good example of energy management in the plant kingdom is the way trees draw water from their roots to the uppermost leaves using two processes: capillarity and evaporation.

All species use organic materials such as bone, wood, skin, tusks, antlers and muscles. They get what they need locally, taking only as much as they require and using the waste of others as resources for themselves. Everything is recycled and biodegradable, based on a modular design resembling Lego bricks.

Nature makes things with the basic building blocks of life, that is, common, freely available chemical substances such as carbon, calcium and water. Furthermore, nature manufactures materials in environmentally-friendly conditions that respect the location and its limits: in water, on land, at ambient temperatures and without harsh chemicals or high pressures. And the results are spectacular: the inner shell of the abalone is twice as tough as our high-tech ceramics.

Image of Lego by Kailen Nordhausen, Noun Project.

With each epoch of civilisation, we seem to have distanced ourselves further from life-derived materials. Today, we produce large quantities of non-organic materials which create plastic garbage patches floating on our oceans, one of which is the size of Central Europe.[25] In order to apply

24 Biostream, www.biopowersystems.com.

25 Known as the Great Pacific Garbage Patch.

the principles of sustainable development found in nature to materials and processes, entrepreneurs need to:

- minimise the use of energy and water and recycle them;
- use renewable energy and ecological materials;
- refrain from using toxic substances;
- procure supplies locally;
- regard waste as a valuable resource;
- regenerate biodiversity.

Nature is based on **systems**. A system can be defined as a set of elements interacting according to certain principles and rules. Systems are also determined by a common goal and limits constituted by the criteria for belonging to them. For members of the same species, living within a system favours survival and reproduction. Ants form a self-organised system with a simple set of behavioural rules, multiple interactions and decentralised control, enabling them to always find the shortest and most efficient path.

Nature rewards cooperation, and it can be seen that symbiosis between two species, as opposed to competition, coexistence, parasitism and commensalism, is the relationship most often found in nature. 'Using cooperative strategies, organisms spread out into noncompeting niches and basically clean up every crumb before it even falls off the table. This diversity of niches creates a dynamic stability; if one organism drops out of the network, there's usually a backup, allowing the web to stay whole'.[26]

An extraordinary symbiosis discovered recently is that established between plant roots and certain soil fungi. These beneficial fungi are called mycorrhizas. This form

26 Benyus (2011), p. 352.

CASE STUDY: LUSH

Lush is a green company that produces completely natural, handmade, mostly solid cosmetics. Two-thirds of the products are sold unpackaged, and the remaining products are packaged using recyclable materials. One bar of solid shampoo replaces three plastic bottles of liquid shampoo. The company opted to go fair trade and does not use palm oil. The value proposition is that its products are not only good for human health and the planet, but also a delight to use. Lush stores welcome their customers with a wonderful olfactory experience, striving for a traditional delicatessen feel. Customers appreciate the complete transparency it maintains in relation to the ingredients of its products and manufacturing processes. The company, founded in 1994, opened its first retail store in the United Kingdom and now has over 830 stores in 51 countries.

Sources: www.lush.com; Greenloop; www.wikipedia.org.

of cooperation allows plants to absorb optimal amounts of soil nutrients and water and, in return, the plant supplies the fungus with up to 20% of the sugar it produces by photosynthesis. These sugars are essential for the development and survival of the fungus.[27]

We must study plant forms and materials to discover their 'secrets'.

Thinking like a forest, where all the trees, bushes and fungi form a system of collective intelligence, is the key to a successful company. Cooperating with other entrepreneurs, even rivals, partnering with customers and suppliers to formulate a common goal and drawing on local expertise results in a sustainable system that is much more than the sum of its parts.

Each element of a system has its own set of knowledge and skills, both in ecosystems and human societies. Organisms take advantage of the diversity of knowledge and **information**. They capitalise on this diversity to achieve greater resilience. Honey bees always compete with each other for the best flower patches to optimise nectar influx. This information flow and feedback mechanism has been adapted by an internet hosting centre in response to its need to find an algorithm that deals rapidly with unpredictable service requests. The new algorithm has proved to be highly competitive compared with benchmark assessments.[28]

Conducting business biomimetically

What steps need to be taken, according to the biomimetic approach, to conduct business successfully and drive innovation? First, we must observe nature and 'ask' it the questions we have, as advocated by biomimicry theorist, Janine M. Benyus, and take note of changes in the ecosystem in which the company operates.

In addition to the above-mentioned principles for achieving a sustainable and resilient economy, evolution has shown us that progress takes the form of a three-step process **'innovate – fail – learn'**. Once an innovation is proved to work and last, it must then be replicated. Bearing in mind the experience gained by nature in this process over 3.8 billion years, it could be useful for engineers and business people to emulate the forms, materials and organisation of the natural world. The latter may also include disassembly, transparency and sustainable packaging for products. Products last longer when they are repairable, multifunctional and modular. An even better solution is to make the switch from products to service delivery.

With regard to business management, nature shows business leaders that it can prove more effective to decentralise initiatives and responsibility, taking into account employee diversity. For example, Morning Star, a tomato processor, achieved spectacular results (double-digit growth over 20 years) after introducing an atypical management model. Its '**Management 2.0**' style is based on the principle of a totally flat hierarchy and simple rules of individual responsibility that apply to all the company's employees, called 'colleagues'. Each colleague must draw up a personal mission statement every year and share it with the other colleagues. Each person is then responsible for accomplishing his

27 http://www.inoculumplus.eu/les-mycorhizes/my-corhize.

28 Nakrani and Tovey (2007).

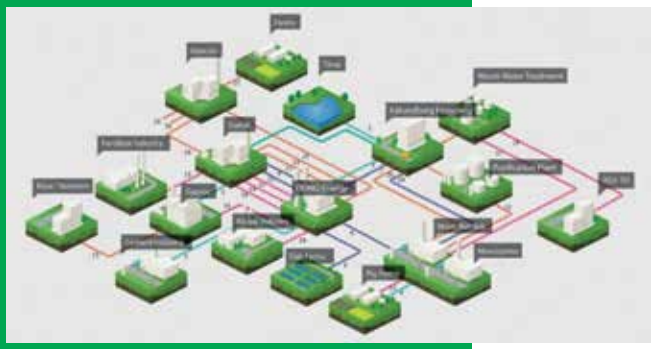
or her own mission. They interact frequently with the people most concerned with their work, and their pay is determined on the basis of individual and collective feedback. Ultimately, it is up to each member of the company to find his or her own place in the organisation.

An approach that goes hand in hand with biomimicry is **industrial ecology**, which seeks to radically change the way we produce, sell, market and buy in order to avoid fouling our own nest. In an ideal world, according to the industrial ecology approach, our ecosystem would be characterised by long and complex lifecycles, well-developed cooperation, good stability and low entropy.[29]

29 For more on this subject, see Benyus (2011), pp. 326-344.

CASE STUDY: INDUSTRIAL ECOLOGY IN DENMARK

A small industrial zone in Kalundborg has established a circular economy system, in which the waste from one activity or actor is a resource for another. Public and private actors exchange not only waste, but also energy, water and information. It is a web of closed loops, as in a natural ecosystem. For example, the power plant pipes surplus thermal energy to a fish farm and greenhouses and also to residential heating systems. The pharmaceutical plant uses waste steam from the power plant and gives its treated slurry to neighbouring farms to fertilise their land. CO2 emissions in this industrial zone have been reduced by 240,000 tonnes a year, and savings are estimated at USD 10 million a year.



Source of information and photo:
http://www.symbiosis.dk/en

1.3. The territorial approach to promoting green entrepreneurship

A form of support

The sustainable territorial approach is a way of addressing local development and supporting projects with multiplier effects.[30] It is a global approach that aims to develop a coherent holistic vision encompassing physical, economic and social aspects. Local development can be defined as 'a process that seeks to mobilise the power of all local stakeholders for economic, social and cultural advancement in a given area. The aim is to leverage stakeholder participation to improve the quality of life of people living in the area'.[31]

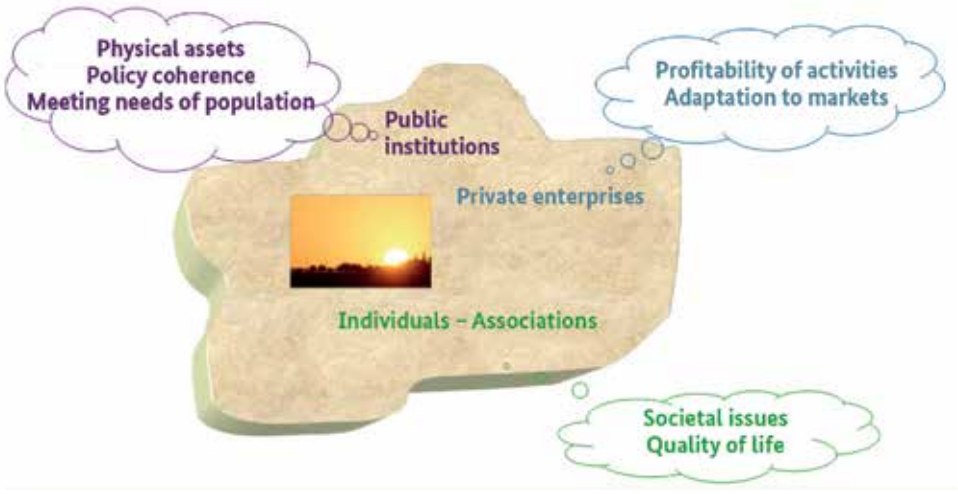
Unlike economic policy that is based on an administrative area, the territorial approach addresses economic challenges in the context of human activities, and on a broader scale, in the context of the biosphere.

A 'territory' is therefore regarded as a geographical area in which to develop a common project for the future without the constraints of pre-established territorial divisions. It is determined by the collective identity of the inhabitants, established through a sense of belonging and exchanges with the outside world, which project back a certain image of the territory. Geographic, historical, economic, social and cultural information is also factored in. Obviously, all this changes over time, making the notion of territory temporal and dynamic.

The territorial approach can be considered a form of GE project support in that it provides a broad, systemic vision, initiates

30 The contents of this section are a summary of the workshops held in Tunisia by the not-for-profit organisation AEIDL (European Association for Information on Local Development), commissioned by GIZ.

31 DED/GTZ (2010), p. 4.



Source: adapted from Caspar, Farrell and Thirion (1997) by AEIDL.

long-term dynamics and addresses issues and needs taking into account available resources. A partnership dynamic in a given territory creates an enabling environment for innovation and networking, including cooperation with neighbouring territories. Advocates of the territorial approach seek to drive territorial competiveness via the added value that remains in the territory, thereby initiating a virtuous circle of development. The results of the approach provide momentum and create capital for the next stage.

The approach step by step

The consultants on the Green Entrepreneurship Project in Tunisia proposed three steps to be followed to define a territorial development strategy. The first step is to conduct an initial assessment in which the actor leading the initiative organises a shared reading of the territory. A common mobilising vision (project action plan) is formulated and then put into action (implementation).

The purpose of the territorial assessment is to examine the baseline situation in the territory and explore options for the future. It is shared, global and strategic, providing the data required to make informed choices about the options available and take action. An effective assessment therefore focuses on analysing the territory in a collective and global manner and not in sectoral terms, addressing real needs and local priorities and involving all the stakeholders in the territory in all the project preparation stages.

A baseline inventory is drawn up, highlighting unmet needs, available resources and possible courses of action to promote development in the territory. The analysis covers both the structuring elements and the interactions between them which characterise the territory. In identifying resources, the following categories should be taken into account:

- physical and natural factors;
- economic activities and jobs: industries, craft sector, agriculture, tourism, local products and services;
- human know-how, expertise, skills, talents, education, training and knowledge transfer;
- social links: community-based organisations, exchange forums, neighbourhood networks, families, solidarity and ‘living together’;

'Territorial promotion is a demanding task requiring time and resources. Every opportunity must be taken to meet with the actors and inhabitants and motivate them. To do this, you have to be on the ground.'

Armelle Ledan Prade, AEIDL consultant

- culture and heritage: buildings, monuments, cultural activities, collective memory, local history, knowledge and traditions;
- financial aspects: own resources, savings, remittances from diasporas and national and international programmes;
- institutional aspects and governance: forums for dialogue, professional organisations, state-region-commune relations and the legal framework;
- external relations: image, reputation, twinning, cooperation and partnerships.

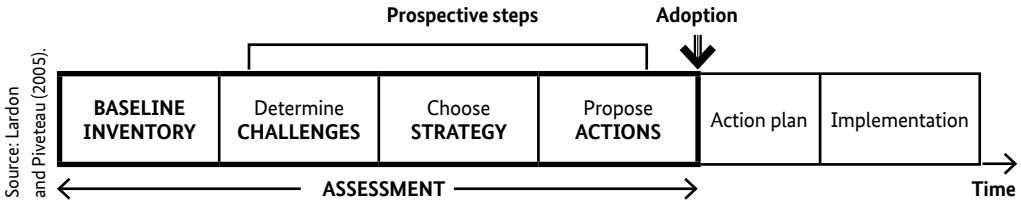
It is important to pay particular attention to endogenous, non-relocatable resources and unexplored resources to determine the comparative advantage of a specific geographic area. The comparative advantage of a territory affords business opportunities that local entrepreneurs can turn into a competitive advantage. In this way, the collaborative territorial assessment helps to target unexplored opportunities in the region (or community) and, ideally, promotes entrepreneurial initiative.

When conducting the initial analysis of the territory, it is important to keep sight of the strategic goal pursued, in this case, the promotion of green entrepreneurship, before the assessment and throughout the process. This helps to avoid the pitfall of becoming mired in data collection. The approach must remain global in nature without being confined to a particular sector and without overstepping the threshold of useful information. There is no universal formula for knowing when the initial analysis is complete. Defining the type of information and data required to take decisions on the next stages of the project and jointly validating them helps to determine when the time is right to move on to implementation of the action plan. These criteria are used to make regular checks during the assessment process to ensure that it remains on track, that is, if enough data is being gathered on all the relevant aspects of the analysis. The criteria must include both quantitative and qualitative data and be time specific in order to take into account the evolution and history of the territory. It is crucial to share the findings of the assessment with the stakeholders involved and discuss it with them in order to ensure a real sense of ownership.

Once this baseline inventory has been completed, the second step is to determine the economic, social and environmental challenges to be addressed, identifying the potential effects of the dynamics in play and the risks posed. There are various practical tools that can be used in this step; the traditional SWOT analysis, adapted to territorial planning,[32] can prove useful. It consists of a four-column grid used to list strengths, weaknesses, opportunities and threats. The strengths and weaknesses are the territory's internal resources, and the opportunities and threats are the external factors (challenges and needs identified, the economic and political climate, etc.).

The next step is to formulate a strategy for territorial development by ranking the challenges based on the dynamics observed and the objectives pursued. Find win-win strategies and choose one. You

32 See, for example, Éléments d'analyse sur le développement territorial: aspects théoriques et empiriques, L'Harmattan, 2007.



can opt for a specific gateway for economic activities, for example, enhancing sectoral integration, collecting and building on traditional knowledge and skills or attracting new activities and entrepreneurs. Another idea for a strategy that promotes green entrepreneurship is the creation of an enabling environment for innovation, offering favourable conditions to encourage new initiatives, assessing the risks involved and putting in place a safety net to cushion the effects of potential failure. Support can be provided to entrepreneurs undertaking such projects to give them the time they need to mature.

'The training was of great use to me in cognitive and human terms.'

Ahlem Jaoua, PAEI green entrepreneurship network.

Lastly, measures and actions must be established to bring about the changes pursued by the stakeholders (**propose actions**). Potential courses of action include:

- measures focused on the supply side (for example, introducing ethical criteria);
- measures focused on the demand side (for example, supporting entrepreneurs undertaking projects);
- measures to fill gaps (for example, creating 'missing links').

This is the last step in the assessment before formulating and implementing the action plan. The assessment is the most important stage. It is more than just a snapshot of the situation; it is the stage when the actors in the territory are empowered to take action. This is the way to develop a common vision of a territory, which will avoid conflicts further down the line, as it encourages ownership of the project by all the stakeholders. It is crucial to adapt the administrative and financial framework to accommodate these new public policy procedures.

In order to drive a collective dynamic, public-sector actors must use the assessment and presentation of the project as a tool for promotion and dialogue. In the prospective stages of the assessment, there must be room for manoeuvre to change ongoing dynamics.

'This workshop has strengthened my love for my country and my commitment to take action for the good of the whole planet'

Nibraz Dimassi, PAEI green entrepreneurship network.

In summary, the **key factors** of territorial development that enhance support for green companies are a well-focused, dynamic, shared baseline assessment, training for those undertaking projects and networking, none of which can take place without the conductor of the orchestra: the territorial promoter. Effective territorial development involves all the actors in the territory in question in all the stages of project preparation. Actors must take ownership, par-

Participants at a GIZ workshop held
in Hammam Bourghiba make an initial assessment.

ticularly of the key elements. Giving them responsibilities can help to make them more active.

Successful experiences show that the territory-based sustainable development concept is a bold and demanding one. Tools and approaches must be constantly invented, innovated and adapted with a view to mutual learning.[33] There is no one-size-fits-all approach or infallible formula; it is a collective learning experience.

33 DED/GTZ (2010), p. 4.

2. Promoting green entrepreneurship in Tunisia

2.1. Environmental and social challenges in Tunisia

Throughout the southern Mediterranean region, the three-pronged trend of urbanisation, a rising standard of living and concentration of the population in coastal zones can be expected to have implications for energy demand and will certainly put pressure on resources and have a serious impact on the environment.[34] This impact includes industrial pollution, pollution caused by different types of chemicals, soil degradation, waste management problems and overexploitation of natural resources in forest, mountain, agricultural, marine and coastal environments.[35]

Further complicating these environmental challenges for Tunisia is the added problem of climate change, which threatens not only the environmental balance, but also the economic and social balance. Climate change will have a significant effect on water resources, ecosystems and agricultural systems. Tunisia is among the twenty poorest countries in the world in terms of water resources, and 90 per cent of the water available is used for agriculture. The successive years of drought forecast by climatologists will result in an 80% decrease in livestock in central and southern parts of Tunisia and a 20% fall in the north by 2030, in addition to a 200,000 m^3 reduction in cereal-growing areas in the central and southern areas of the country.[36]

In addition to these problems, youth unemployment poses a particularly serious threat to economic, social and political stability in Tunisia. Young people between the ages of 15 and 29 are those most seriously affected by the shortage of jobs, with this age group registering a jobless rate of 35.2% and accounting for 72.2% of the unemployed in 2012.[37] Some sectors of the population are particularly vulnerable to the risks of exclusion and unemployment, including people living in southern and western parts of Tunisia, young university graduates and women. The unemployment rate among women is double the rate for men, and among university graduates the jobless rate was much higher for women (43.5%) than for men (20.9%) in 2012.[38]

'With so many unemployed and underemployed, there is little chance of young people contributing to national development, and they have difficulty exercising their rights as citizens [...]. Unemployment and underemployment also deprive businesses and countries of opportunities to innovate and develop comparative advantages based on investment in human resources, and this compromises their future development'.[39]

Entrepreneurship is one of the most effective solutions for creating stable jobs and,

34 Alla et al. (2010).

35 Akari (2012), p. 11.

36 KfW, see Europäischer Wirtschafts Verlag (2013), p. 127.

37 Annual report on the labour market in Tunisia published in November 2013 by the National Observatory for Employment and Qualifications (ONEQ). Information at /www.huffpostmaghreb.com, 15 April 2014.

38 GIZ/CNFCE (2013), p. 4.

39 Bousnina (2013), p. 20.

most importantly, allows people to build their own future. Young Tunisians are attracted to this option for positive reasons, such as personal achievement, the possibility of higher earnings and the chance to play an active role in the community. Other factors include a desire to escape unemployment, low job satisfaction and the culture shock experienced by many young Tunisians returning to Tunisia after studying at foreign universities.[40]

The current national energy landscape is marked by the stagnation of energy production and rising demand (averaging 6% a year), leading to a widening gap and a structural energy deficit which grows with every passing year.[41]

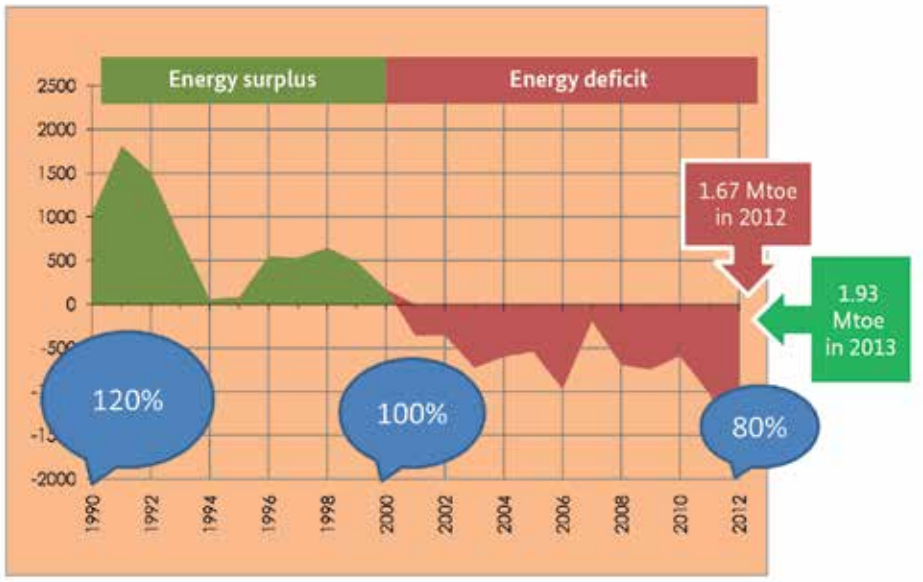
Green entrepreneurship could provide a solution, in one fell swoop, to environmental, economic and social challenges, and at the same time open up a novel and promising path for the future. Tunisia has considerable renewable energy sources, particularly solar and wind power. In spite of this, renewable energy continues to account for only a small share in the energy mix.

A survey conducted in November 2011 by GIZ in neighbouring country Algeria revealed that 54 of the 203 young Algerian entrepreneurs who received coaching (26.6%) decided to undertake projects related to the green economy. 'These findings show that there is great interest in these new skill areas and that young people are aware of changes in the labour market and immediately adapt to new needs'. [42] They also clearly show that young entrepreneurs in the region have identified important opportunities in the green economy. Tunisian public and private-sector actors could promote this innovative green approach among the country's entrepreneurs.

40 Baccari (2013), p. 53.

41 Data from STEG (Tunisian electricity and gas company).

42 GIZ Algeria (2012b), p. 36 ff.



Source: Tunisian Ministry of Industry

2.2. Mapping initiatives in Tunisia

Environmental policy

In the 1980s, Tunisia became aware of the pressure that economic development exerts on ecosystems and natural resources. The National Environmental Protection Agency (ANPE) was created in 1988, and other institutions were put in place in the course of the 1990s (Ministry of the Environment, Coastal Protection and Planning Agency – APAL, etc.).[43] From 1993, the National Sanitation Utility, which had been in operation since 1974 as the institution responsible for managing the wastewater network, extended its role to become the main operator in the protection of water resources and the fight against all sources of pollution.[44]

Tunisia is a signatory to all the international conventions, treaties and agreements concerning environmental protection, 17 of which are on the protection of nature and species, 25 on the protection of the marine environment and 25 on the fight against pollution.[45] In order to apply these treaties, Tunisia has taken steps to formulate an environmental policy, which seeks to conserve biodiversity, natural resources and ecosystems, prevent industrial pollution and eliminate existing sources of pollution, ensure the management of waste from industrial activities and strengthen environmental monitoring and observation mechanisms.[46]

On the subject of climate change, Tunisia has undertaken important measures, in coordination with Algeria and Morocco, to implement the United Nations Framework Convention on Climate Change and the Kyoto Protocol. At the institutional level, a national committee bringing together the ministries and other bodies concerned with climate change issues has become the focal point for this matter in Tunisia. A sustainable energy and environmental information centre (CIEDE) has been created within the ANME, and a national, scientific and technical committee, consisting of Maghrebian climate change experts, has been set up.[47]

Energy conservation policy

Another policy area that is increasingly important for sustainable development is energy conservation. This issue was addressed by political actors at the same time as environmental policy. They have established an institutional and regulatory framework favourable to renewable energy sources, which still requires some tweaking. In 1985, Tunisia adopted its first law on the development of renewable energy and later passed a law creating a specialised agency, now called the National Agency for Energy Conservation (ANME).[48] The ANME is responsible for the promotion of efficient energy use, the development of renewable energy and energy substitution.

In 2010, Tunisia adopted an ambitious solar plan which covered energy efficiency in transport, buildings and energy-intensive industries and renewable energy sources (solar, wind and biomass). The country's lack of oil resources and its strategic position at the heart of the Mediterranean are two factors

43 MDG-F (2012), p. 17.

44 http://www.onas.nat.tn/Ar/page.php?code=58.

45 PAEI (2013), p. 8.

46 Akari (2012), p. 13.

47 Khalfallah (2010).

48 MDG-F (2012), p. 18.

that have galvanised the government's ambition to become a hub for the exportation of green energy to northern Mediterranean countries. Projects formulated under the solar plan were accompanied by adjustments to the regulatory framework and a series of feasibility studies.[49]

Between June 2013 and April 2014, Tunisia engaged in a national debate on the country's energy policy, which resulted in the formulation of an energy conservation strategy. The strategy foresees a 17% reduction in primary energy demand by 2020 and a 34% reduction by 2030 in relation to the baseline scenario, predicting that renewable energy sources (excluding biomass) will account for 7% of final consumption by 2020 and 12% by 2030. Another target that it has set is an increase in the share of renewable energy in total electricity output to 30% by 2030. Overall, this should reduce CO_2 emissions by 185 megatonnes over the period 2014-2030 and create over 12,000 permanent and temporary jobs by 2030, thanks to the development of the renewable energy and energy efficiency sectors.[50] There are currently 3,500 people employed in the renewable energy and energy efficiency sectors in Tunisia. The largest proportion work in renewable energy, closely followed by energy efficiency and cross-cutting activities such as research, consultancy and promotion of renewable energy and energy efficiency. Given the current production structure, most of the jobs will be created in the short term as a result of the installation, operation and maintenance of renewable energy facilities and in the field of energy efficiency in buildings. In the long term, greater integration of production processes and exports of photovoltaic panels and solar water heaters could also lead to more jobs.[51] Solar thermal water heaters, thermal insulation and photovoltaic installations fitted in households pay for themselves within a reasonable time span (5-10 years).[52] These three technologies require credit on reasonable terms for the initial investment, such as that available via the PROSOL programme for solar water heaters, PROSOL Elec for photovoltaic panels and the PROMO-ISOL programme launched in March 2014 for roof insulation.[53]

Tunisia's energy conservation strategy is implemented within the framework of multilateral cooperation among Mediter-

49 http://www.anme.nat.tn/.

50 National energy conservation strategy, June 2014.

51 GIZ/ANME (2013), p. 4.

52 GIZ/ANME (2013), p. 86.

53 http://www.webmanagercenter.com/actualite/economie/2014/03/10/147256/l-anme-lance-un-nouveau-mecanisme-financier-pour-promouvoir-l-isolation-thermique.

ranean countries in the field of energy and sustainable development, in particular the Mediterranean Solar Plan, which is one of the six key initiatives of the Union for the Mediterranean aimed at achieving the rational use of resources for sustainable development throughout the area.[54] Aware of its regional role, Tunisia is also active in several other regional initiatives, such as MEDGRID, IRENA, MEDENER and DESERTEC.[55]

Roof-mounted solar water heater in La Marsa, Tunisia.

Legal, institutional and financial framework for green companies

Tunisia aims to establish an enabling environment to encourage green start-ups, by developing a regulatory framework and mechanisms providing financial incentives. Three main sectors are emerging: the waste management sector (management of wastewater and household and other waste), which alone accounts for 50% of all environmental enterprises. It is followed by energy conservation and organic farming.[56] 'With regard to the legal form of these start-ups, it appears that most [green] businesses are sole traders or limited liability companies with share capital not exceeding TND 50,000.' [57]Most green businesses in Tunisia are small enterprises or consultancy firms whose main activity is energy saving audits.[58] The **energy conservation law** passed in 2004 made energy audits compulsory for industry and other large consumers. This has resulted in the emergence of new green entrepreneurs and occupations, specifically experts and architects certified as professional auditors. An amendment to the law in 2009 established regulations on the self-generation of electricity from renewable energy sources. Electricity producers using renewable resources such as solar energy are now entitled to use the grid to transport electricity and sell any surplus power to the STEG.[59]

Other mechanisms conducive to the creation of green companies include the law on waste management, control and disposal (1996), the law on organic farming (1999) and the investment incentive code (1993). There are also other public institutions, in addition to those mentioned above, that are promoting green entrepreneurship. The National Waste Management Agency (ANGed) is tasked with encouraging the private sector to become involved in the field of waste management.[60] The Ministry of Agriculture has launched a project to promote socioeconomic development based on organic farming in three rural areas.[61] The Tunisian Observatory for Sustainable Development (OTED) is also pre-

54 Keramane (2010).

55 http://www.anme.nat.tn/.

56 MDG-F (2012), p. 33; PAEI (2013).

57 MDG-F (2012), p. 33.

58 Information from the ANME.

59 Missaoui (2013), pp. 5 and 8.

60 http://www.anged.nat.tn/.

61 Information from the green entrepreneurship network of the PAEI (GIZ).

paring an annual report on the state of the environment and calculating development indicators.

The Tunis International Centre for Environmental Technologies (CITET) is the main national body responsible for the environmental upgrading of companies through technical assistance (environmental management systems, waste management, national and international standards, etc.).[62] The CITET is also the lead institution for the Environmental Upgrading Programme, a government programme that aims to bring the number of ISO 14001-registered Tunisian companies (compliance with international environmental standards) up to 500. [63]

Another institution active in this field, but specialising in the hotel industry, is the National Centre for Continuing Training and Professional Development (CNFCPP) which provides training in implementing environmental management systems.[64]

The CITET is also involved in the Tunisian Clean Production Project (PPPT), which trains and supports young engineers in resource management, competitiveness and pollution reduction. The project began in December 2010 and will run for five years. It has a budget of around EUR 2.5 million, is co-financed by the United Nations Industrial Development Organization (UNIDO) and receives technical support from Switzerland. [65]

There are also a number of business start-up incubators seeking to promote green entrepreneurship. The one located in the Borj-Cedria science and technology park specialises in renewable energy, water, the environment and plant biotechnology. Entrepreneurs can benefit from synergies between production, training and scientific research.[66]

In 2005, a **National Fund for Energy Conservation** (FNME) was created, under the direction of the ANME, to provide financial support for activities aimed at rationalising energy consumption and promoting renewable energy and energy substitution. Eligible activities include energy audits, demonstration projects and cogeneration. Direct financial aid is supplemented by tax incentives (mainly VAT exemption for energy conservation equipment and products). The fund is financed from tax revenues and also currently receives subsidies from the European Union.

Other national funds that encourage the development of the green economy are the Energy Efficiency Guarantee Fund (FGEE), the Fund for the Development of Industrial Competitiveness (FODEC) and the Clean-Up Fund (FODEP).[67]

The BFPME bank, which finances small and medium-sized enterprises, has developed a

62 http://www.citet.nat.tn.

63 MDG-F (2012), p. 59.

64 MDG-F (2012), p. 53.

65 http://www.unido.org/tunisie-pppt.html.

66 http://www.tunisieindustrie.nat.tn/pepinieres/doc.asp?mcat=23&mrub=249.

67 MDG-F (2012).

CASE STUDY: PRODUCING ORGANIC DATES AT THE HAZOUA OASIS

Beni Ghreb is a producer of organic dates which began operations in May 2002 in the Hazoua oasis in southwestern Tunisia. The enterprise, which employs up to 90 people depending on the time of year, buys dates directly and exclusively from the Groupement de Développement de l'Agriculture Biodynamique, a group of around 120 farmers. Beni Ghreb deals with all the stages of processing, buying and packaging the dates for export. The production of dates from the Hazoua oasis is fully organic. They are Fair Trade certified and marketed in Europe under the Fair Trade label.

On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), GIZ assisted local farmers in developing and implementing a professional quality management system in order to strengthen the livelihoods of the population. The farmers received training in date growing, storing, processing and marketing techniques. Emphasis was placed on crop diversification rather than single-crop farming, and now lemons, grapes, pomegranates, peppers, tomatoes and potatoes grow in the shade of the palm trees. These crops enrich the diet of all the area's inhabitants and improve biodiversity in the oasis area. The irrigation systems have also been improved, resulting in a 30% saving in water. Furthermore, by using drainage water to regenerate pasture land, farmers are able to prevent soil erosion and desertification and protect the oasis from the effects of climate change.

Sources: http://ecohazoua.org/index.html; http://www.fairtrade.de/cms/media/pdf/Handelspartner/beni_ghreb.pdf; http://www.giz.de/fachexpertise/html/11099.html.

number of specific products aimed at the green economy. The 'Energy Loan' is granted to finance specific initiatives involving investments in energy saving measures and renewable energy, and the 'Environment Loan' is granted to finance investment projects for environmental protection, particularly waste collection, treatment and reuse. The bank does not require any particular guarantees, basing its decisions on its own ratings and collaborating with SOTUGAR, the Tunisian Guarantee Company.[68]

In addition to these national institutions, Tunisia also receives cofinancing and support from other sources such as the World Bank, the European Union, individual European countries, carbon finance mechanisms and other international funds.[69]

68 PAEI (2013).

69 GIZ/ANME (2013), p. 86.

In order to make a determination, it is also absolutely necessary to know more about demographic structure and trends and about the future of Tunisia's education system. Technological progress in Tunisia as a whole and developments in industrial sectors that are only indirectly related to the promotion of renewable energy and energy efficiency mean that qualified personnel are required in all economic sectors. The experience of European countries and close cooperation with European enterprises will be useful in formulating the respective programmes.[73]

Education and training in green entrepreneurship

Professor in economics Abdallah Akari observes that there is a lack of specific training in green economy subjects at Tunisian universities.[70] The growing share of renewable energy in the national energy mix brings with it an increased demand for services such as wind forecasting.

Many experts in green economy training and skills development are of the opinion that it is far more effective to incorporate sustainable development and environmental subjects into existing qualifications than to create new training curricula.[71] Most of the skills required for the renewable energy sector are in fact specialisations within existing qualifications: electricians specialising in photovoltaic panel modules, plumbers specialising in solar water heaters, etc.,[72] although university graduates, particularly engineers, are also needed.

It is impossible to propose a qualification programme without more accurate information on the current supply of skilled labour available in the national economy and the potential for development in the future.

Green entrepreneurship projects implemented by GIZ in Tunisia

The PAEI implemented the Green Entrepreneurship Project referred to above in Tunisia between 2013 and 2014. The objectives of the project were, first, to raise the awareness of stakeholders about green entrepreneurship and its potential in Tunisia and, second, to strengthen the capacities of priority stakeholders in terms of GE concepts and tools and networking. Priority stakeholders included academics, independent consultants advising companies, local associations and business start-up support organisations. The third objective was to create a network of actors capable of supporting the continued development of green entrepreneurship in Tunisia after the project came to an end.

The task of gradually building up a network of actors capable of spearheading green entrepreneurship in Tunisia was entrusted to a steering committee (COPIL), made up of representatives of associations, universities, consulting firms, institutions and regional delegates from the pilot areas. The PAEI team provided technical assistance to

70 Akari (2012).

71 GIZ Algeria (2012b), p. 43.

72 GIZ/ANME (2013), p. 85.

73 For a more detailed analysis of existing training and needs in this area, see the MDG-F report (2012) on skills required for green jobs in Tunisia.

the project with the aid of local and international consultants. They identified and brought together actors already actively engaged in green entrepreneurship and those with the potential to become multipliers to disseminate the concept.

In pursuit of the objectives set, GIZ organised workshops and training trips for the priority stakeholders and a coaching trip for entrepreneurs. Along with representatives from public institutions, they were also invited to take part in a strategic workshop and the project wrap-up forum to determine the structural measures to be put in place in order to ensure continued support for the development of green entrepreneurship in Tunisia.

The network formulated an action plan covering the following main areas:[74]

- raise the interest of students at universities and business centres in entrepreneurship options;[75]
- coach entrepreneurs from the conception of a green business idea to start-up;
- provide training for coaches;
- carry out communication activities;
- establish a multi-stakeholder platform to discuss issues, exchange experiences and develop synergies.

Before it initiated the Green Entrepreneurship Project, the PAEI had already started holding awareness and training workshops for business centres and launched a national competition called Go Green & Win in 2012. The PAEI team also held a workshop to discuss the potential of green entrepreneurship in Tunisia, bringing together as many as thirty European and Tunisian participants from different sectors: academics, researchers, representatives of NGOs, green business operators, finance institutions, business start-up support centres and people responsible for promoting entrepreneurship nationally and regionally.[76]

Another PAEI project related to the promotion of green entrepreneurship involved the production of a guide on corporate social responsibility in small and medium-sized enterprises and social and green start-ups. The handbook ***Start-Up Durable***

74 Two activities were established for each area of action and a roadmap was produced for five specific collective activities.

75 For more information on these public institutions that provide business support, visit http://caipe.tunisieindustrie.nat.tn/.

76 This publication provides some facts about the workshop; for more detailed information, refer to the PAEI report (2013).

CASE STUDY: Master's Degree in Sustainability Economics and Management at the University of Oldenburg (Germany)

This is a pioneering, award-winning course dealing specifically with the development of start-ups and business concepts with a focus on sustainability. The eco-venturing module makes use of an innovative teaching method which strengthens the students' entrepreneurial skills for the implementation of green innovations. It deals with both new business start-ups and the development of new business solutions and concepts in established businesses. The module devoted specifically to green entrepreneurship is included in the entrepreneurship and innovation management subject areas.

Source: http://sem.uni-oldenburg.de/

(sustainable start-ups) was produced in cooperation with the RIBH project, GIZ's responsible and inclusive business hub for the Middle East and North Africa (MENA) region, and the local organisations Cogite and CONECT. The handbook is free and available from the PAEI office to project promoters, entrepreneurs and organisations supporting entrepreneurs.

The PAEI also launched the **CEFE** programme to provide business start-up training for entrepreneurs, which includes a module on green entrepreneurship. The programme is now being run by CEFE International. [77]

GIZ also has other programmes in Tunisia concerned with the development of the green economy. Programmes currently being carried out include Innovative solar thermal applications for Tunisian industry, Supporting the Mediterranean Solar Plan and Sustainable greenhouse gas management.

77 www.cefe.net.

Initiatives by other actors

The European Union finances the Energy-Environment Programme (PEE) through the European Neighbourhood and Partnership Instrument (ENPI). The programme aims to reduce the environmental impact of the greenhouse gas emissions of industrial and agricultural enterprises. The EUR 33 million budget is shared between various public institutions (FODEP, ANME, MEDD, ANPE and APAL) and the French Development Agency (AFD) to support them in implementing their projects.[78] As part of its Civil Society Strengthening Programme (PASC-Tunisia), the EU supports and funds sustainable development and environment projects, such as the alternative tourism project currently being implemented in Manouba. [79]

78 www.pr-e-e.org.

79 Discussion workshop open to civil society held in August 2014; see https://docs.google.com/forms/d/15C-MKYUzix-WKOrzab99M4PQD55TguFFYIyUhbQpoj5RI/viewform.

Within the framework of inter-regional and bilateral cooperation, ANME's counterpart in France, the ADEME (Environment and Energy Conservation Agency), has been assisting Tunisia since 2003 in its efforts to put energy conservation policies in place.[80] The twelve member countries of the Mediterranean Association of the National Agencies for Energy Conservation (MEDENER) are working together to implement the Kyoto Protocol flexible mechanisms and exchange experiences and know-how, particularly with regard to different levels of training in renewable energy.[81]

The French Development Agency and the World Bank offer lines of credit for energy conservation amounting to EUR 85 million.

The **UNDP** implemented a programme to create jobs for young Tunisians, with a special focus on green industries and targeting the governorates of Siliana, Jandouba and Bizerte.[82] Under this programme, the UNDP, in collaboration with the North-West Development Office (ODNO) and the Regional Development General Commission (CGDR), has trained 720 young people in renewable energy, eco-tourism, waste recovery and the development of forest products in the period 2012-2013. The training strengthened their technical, entrepreneurial and management capacities, with a view to facilitating their access to productive resources and the potential of sustainable resources. The initiative concluded with the selection and incubation of the twenty best business ideas.[83] Another positive result was that more young people were given internships in businesses and other organisations and bodies. [84]

In February 2013, the International Organization for Migration (IOM), four United Nations agencies and a number of Tunisian ministries established the project **Youth, Employment and Migration** which is aimed at disadvantaged young people in rural areas in the pilot regions of EI-Kef, Gafsa and Tunis and seeks to facilitate their entry into the job market.[85] One of the measures relating to green entrepreneurship was the formation of a socio-professional body bringing together 16 rural women for the production of organic essential oils and natural vegetable dyes.[86]

Civil society initiatives include green entrepreneurship projects carried out by the consulting firm MedSirat (MASEER programme) and APERe (association for the promotion of entrepreneurship learning and research). There were also initiatives carried out in rural areas by the NGOs FEKDR and ACPP. The ecotourism project 'Live Your Tour' is financed by the ENPI. The TAMSS (Tunisian Association for Social Management and Stability) has established a tourist circuit linking the two regions of Béja and Bizerte, with a range of tourist offerings based on local historical, natural and cultural assets. This territorial development initiative will provide an opportunity to create and develop micro-enterprises.[87]

Another green entrepreneurship project implemented with European funding, but

80 http://www.presse.ademe.fr/2011/03/cooperation-franco-tunisienne-lademe-et-la-gence-nationale-pour-la-maitrise-de-lenergie-anme-renouvel.html.

81 Bal (2010).

82 http://metiersvertstunisie.com/.

83 Information supplied by Mohamed Elkamel, coordinator for the governorate of Siliana and participant in PAEI green entrepreneurship training.

84 http://www.tn.undp.org/content/tunisia/fr/home/operations/projects/poverty_reduction/programme-de-generation-d-emploi-pour-les-jeunes-en-tunisie-gou/.

85 http://www.iom-tunisie.org/activites_details.php?id=9.

86 Results of research carried out under the PAEI project.

87 https://www.facebook.com/pages/Live-Your-Tour-Tunisie/352852601509294.

this time a private undertaking, is Fikra. This joint fund for Tunisia is financed by four private, independent foundations, which are all members of the European Foundation Centre, a Brussels-based network of foundations. These foundations intend to support people with ideas for non-profit projects in the governorates of Béja, Jendouba and Kef. The projects address a variety of areas of action, and there are several that deal with environmental needs and the social, economic and cultural needs of people living in the north-west. Support will be provided for selected ideas during an incubation period, at the end of which funding will be offered to the projects reaching maturity.[88]

The American NGO CRDF Global organised a two-day Green Start-Up Boot Camp to promote green technologies. This intensive workshop provided mentoring for entrepreneurs from Morocco and Tunisia who have started up an information technology or green technology enterprise, incorporating environmentally friendly practices.[89]

There are many other initiatives undertaken to support social start-ups. The *Start-Up Durable* handbook provides a list of them in the 'information corner' section. There are also numerous public and private initiatives that promote all forms of entrepreneurship in Tunisia.

88 http://fikra-tounisiya.org/presentation.

89 https://www.facebook.com/GISTinitiative/info.

2.3. Opportunities and points for discussion

Summing up the analysis of green entrepreneurship in Tunisia, it can be said that there are three framework conditions conducive to the emergence of green companies: a legal and regulatory framework, financial incentive mechanisms and an institutional support framework. Green entrepreneurship is a real and promising opportunity for Tunisia, taking into account the strong growth of environmentally responsible products and services globally and the fact that renewable energy and energy efficiency can reduce energy costs for Tunisians in the long term. In addition, 'the democratic reconstruction of the country's institutions could present a historic opportunity to build real sustainable development, with the free, conscious and responsible participation of citizens and all components of civil society.[90]

There follows a number of points for discussion on how best to promote the emergence of green companies in Tunisia.

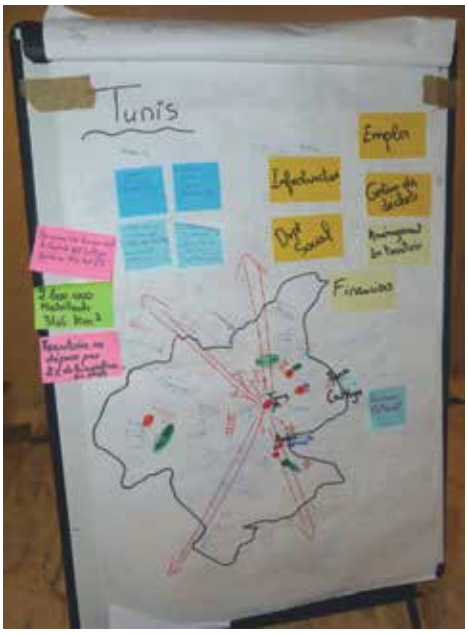
Entrepreneurship support institutions must leverage not only regional potential in terms of investment niches, but also human resources, which must be adequately qualified. It should not be forgotten that the legal and financial incentive framework already in place could be easily supplemented with a diverse array of measures, such as those aimed at broadening the spectrum of incentives for green companies and improving the market infrastructure. Policy-makers and donors can support green innovation ecosystems which permit and facilitate interaction and cooperation between different types of organisation in order to overcome the multiple challenges facing green and social innovation in an effective way. This cooperation can take the form of public-private partnerships, networks of civil society actors or territorial development projects.

Partnerships between business-driven and mission-driven organisations and support institutions can result in a mutually supportive ecosystem, a breeding ground for social, inclusive and green innovations. The development of green business models that have the potential to achieve broad market success will often involve dialogue and mutual learning.[91] Policy makers cannot know in detail which regulations and ecosystems green business models require before they are developed.

Once an initial network of green entrepreneurship stakeholders has been formed by

90 MDG-F (2012), p. 65.

91 UNGC/DCED (2012), p. 21.



GIZ, the next step is to draw up an ambitious but realistic shared roadmap. The Forum on responsible, innovative entrepreneurship, which will be held on 7 October 2014 by the PAEI, will contribute to this. By bringing together the programme stakeholders, GIZ aims to further the development of a responsible, social and green entrepreneurship ecosystem.

Efforts to build a green entrepreneurship ecosystem must also include action to raise awareness among the public at large. Green entrepreneurship must touch all facets of society. Consumers must be made aware of the long-term advantages of energy-saving appliances, producers must understand the financial cost of adverse effects on the environment, and young people need to realise the business opportunities offered by the green economy. Similarly, banks must rethink the way they evaluate this type of business model. Given the nascent nature of clean technology and the sometimes low purchasing power of target markets in the MENA region, a large number of small initiatives are far more preferable than to a single large investment. The decision to invest in this area must be based on a separate set of criteria and metrics, as such initiatives will almost never meet the short-term revenue and profitability targets associated with projects designed to expand existing businesses.[92]

When the Green Entrepreneurship Project in Tunisia comes to an end in late 2014, GIZ will pass on the responsibility for developing green business to the Tunisian actors with which it has been collaborating. There is a clear need to build community motivation and mobilisation, with a view to creating a favourable climate and relevant ideas, and to adopt a green approach with entrepreneurship as the driving force. The aim is to create a basis for the work of these ac-

92 Hart and Milstein (2003), p. 65.

tors, so that they can add a 'green' dimension to initiatives, modules, sectors, etc., and other mechanisms for the promotion of entrepreneurship in general, which are fairly well developed in Tunisia.[93] The aim is to create a new structure that encompasses the biomimicry approach and other holistic business and sustainable development concepts in addition to practical tools for green/social start-ups.

93 See also OECD (2012).

CASE STUDY: SOME BIOMIMICRY IDEAS WITH A TUNISIAN TOUCH

In the deserts of southern Tunisia, past generations had already found solutions to limit impacts on the natural world and overcome the many obstacles posed by living in such an arid environment. The troglodyte dwellings in Matmata are 'eco-constructions' adapted to the desert. It can also be seen that the principles of the inventions of oasis dwellers – polyculture, multifunctionality of water and land use, etc. – have led to the concept of agro-ecology now popular in Europe, known as 'permaculture'. These are traditional practices that stay within the limits of the natural world. There are therefore cases in which it is absolutely crucial to reactivate the know-how of past generations or apply it in other parts of Tunisia where it can be used more easily.

Tunisians can also draw inspiration from innovations based on biomimicry of desert flora and fauna to find solutions to the scarcity of water resources. The design of the Airdrop, which harvests water from the air, was inspired by a beetle that lives in the Namib Desert in Namibia. Another example is Bioarch, a house that regulates the ambient temperature inside it thanks to a self-shading design inspired by the shell of the desert snail.

Source: http://www.asknature.Org/strategy/dc2127c6d0008a6c7748e4e4474e7aal#.U_OBMWP-XHs.

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Executive Summary

About this report

This brochure summarises the findings of a project on green entrepreneurship in Tunisia financed by German international cooperation. The two-year project (2013/2014) was implemented by the Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) within the framework of the programme for entrepreneurship and innovation (PAEI).

A series of training courses were offered to a selected group of potential multipliers of the green business concept: local consultants, support organisations and college teachers, all already active in the promotion of entrepreneurship in general. They were trained by national and internal consultants. Over the two years, they built a strong network of promoters of green entrepreneurship and came up with an action plan for the time after the end of the German funded project.

The author of this report collected the most important facts and figures presented in workshops and supplemented them with data from international and national scholars and institutions through desktop research. This resulted in a brief study on green entrepreneurship as a driver for the green economy and ultimately a sustainable future. Thus, the scope of the ideas presented in this publication is not limited to the Tunisian context, even though this North African country serves as a point of reference.

Key Recommendations

Humankind is clearly living beyond the earth's capacity due to economic growth, which in essence always values 'bigger and more', thereby increasingly reaching planetary boundaries. Taking into account the still unmet physical needs in many places around the world and among many disadvantaged social strata, there remains a need for more goods and services to be produced. The dichotomy between economic growth and environmental sustainability requires a new entrepreneurial mindset to find suitable solutions to global and local challenges. Entrepreneurs are the most important drivers for change and innovation in free market economies, because it is they who introduce new products and services. If a few pioneers succeed in the market with green innovations and by building on green and inclusive business models, it is likely that a greater number of managers will lead their companies in that direction as well.

Promoting and encouraging green entrepreneurial pioneers is a worthwhile endeavour with a view to restoring the balance between the economy and the environment. It manifests a window of opportunity in which governments would ultimately spend less on unsustainable and consequently inefficient economic policy measures and prioritise incentives for sustainable business models, ensuring access for those who need support for the benefit of all. Thus, it is the responsibility of public and financial institutions to provide a supportive legal and financial framework to these pioneers and their followers, preferably constantly working together to improve this framework in order to adapt to the changing conditions in rapidly developing green markets.

This document offers a broad range of examples of green innovations that build on a number of quite radical approaches

to green growth that are more than just improvements to today's way of doing business. Engineering inspired by nature, known as 'biomimicry', entails products and services that take into account the customer's needs, the shareholder's economic benefits and nature's boundaries. Bearing in mind millions of years of evolution, nature offers fascinating and sustainable solutions to local constraints that can be copied. This includes adopting the principles of living in an ecosystem, since wildlife knows how to keep the latter in balance. One of these prin-ciples is to see waste as a valuable resource. In a business model, this could lead to a point where there is nothing you could call 'waste' in the life cycle of a product.

There are many inspiring so-lutions from entrepreneurial green pioneers that act upon these principles. These emerge predominantly (but not exclusively) in the most advanced eco-nomies where more and more people are calling for 'better' rather than 'bigger', 'more' and 'faster'. These solutions can be copied and adapted to local conditions and, if they are successful in the local market, scaled up. For instance, a large corporation in the world of photocopying turned itself into a 'document management company' and renounced its mission to sell as many photocopiers as possible.

Instead, it hires out copiers and bills clients for the number of copies printed. As a result, it is in the company's interest to produce long-lasting machinery, spearheading a new trend in an industry where technical equipment is not usually designed to last. This company goes beyond eco-efficiency (aimed at reducing adverse environmental impacts), by adopting a functional and circular economy approach.

Policymakers and donors can support green innovation ecosystems by enabling and facilitating interaction and cooperation

between different types of organisations to effectively address the many challenges faced by green entrepreneurs. Such cooperation may take the form of public-private partnerships, civil society networks or regional development projects. Developing green business models with the potential for broad market success often involves dialogue and mutual learning.

Therefore, the local development approach can be seen as a way of launching green entrepreneurship. It offers a broad and systematic vision that initiates a dynamic over time and responds to the challenges and needs of the people, while making the most of available resources. Innovation is included in the local context as well as networking and, where mutually beneficial, cooperation between territories.

Public awareness of sustainable development has to be raised to create local markets for green innovations and to operate in a sustainable manner with regard to both demand and supply. Consumers must be made aware of the long-term advantages of energy-saving appliances, producers must understand the financial cost of adverse effects on the environment and young people need to realise the business opportunities offered by the green economy.

Key findings on green entrepreneurship in Tunisia

Tunisia faces serious threats from tidal and storm surges caused by climate change. These would affect the highly urbanised and industrial areas along the coast, with southern areas at risk from drought. As well as unpredictable man-made natural disasters, Tunisia will in the future have to deal with growing pollution and limited natural resources, as will all other countries sooner or later.

The German government had decided to support the development of a green economy and green entre-preneurship in Tunisia via its implementing agency GIZ, because it has identified great potential due to

- Tunisia's early adoption of an environmental conscience as evidenced by its constitution and legislation, and the creation of public institutions targeting the management of natural resources, energy and the protection of natural sites;

- the well-established support given to entrepreneurs by public

and educational institutions as well as private organisations;

- a huge pool of highly educated young people with the urge for personal development and jobs as well as political, economic and social change, most notably seen in the Arab spring movement; and
- its considerable sources of renewable energy, particularly solar and wind power.

As well as the PAEI project already mentioned, there are GIZ programmes working in the field of renewable energy together with Tunisian partners. The Tunisian solar plan is worth mentioning here, being a comprehensive and ambitious policy for promoting different types of renewable energy as well as energy efficiency. Tunisia's aim is for 30% of its total electricity output to be renewable by 2030. This report presents a list of initiatives (probably not definitive) that promote green entrepreneurship in Tunisia. Most of them are programmes implemented by local NGOs or financing or public institutions and are funded by international donors.

The existing favourable legal framework and financial incentives could be enhanced by a range of measures, such as expanding the range of benefits to green business and improving the market infrastructure. Public authorities could likewise mobilise communities to collectively help green entrepreneurs make the most of the opportunities arising from local and regional resources, be they human, natural or cultural. In the same way, financial insti-tutions should rethink the way in which they evaluate business models. Given the emerging nature of clean technologies and Tunisia's lower purchasing power than that of industrialised countries, many small initiatives are far more preferable than a single large investment. The decision to invest in this area should be based on a range of criteria and indicators, as such initiatives will almost never meet the short -term profitability targets associated with projects designed to develop established or common business models.

In order to spread the word about green entrepreneurship as an innovative and effective approach for good governance to foster the economic development of Tunisia, GIZ commissioned not only this study but has also scheduled a forum on responsible and innovative entrepreneurship for October 2014. There, key players will get together to draw up an ambitious, shared and yet realistic roadmap for green and inclusive growth in Tunisia.

List of abbreviations

ANME	National Agency for Energy Conservation
AFD	French Development Agency
ENPI	European Neighbourhood and Partnership Instrument
FNME	National Fund for Energy Conservation
GE	Green entrepreneurship
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
MEDD	Tunisian Ministry of the Environment and Sustainable Development
MEDENER	Mediterranean Association of the National Agencies for Energy Conservation
PAEI	Programme d'Appui à I'Entrepreneuriat et à I'Innovation
STEG	Tunisian electricity and gas company
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

Green entrepreneurship is a concept that opens up new opportunities for business, job creation and environmental innovation. Ecopreneurs play a key role in open market economies as drivers of change. By demonstrating the economic benefits that come from being greener, they act as a pull factor, encouraging other companies to proactively go green.

This publication, produced by the programme Appui à l'Entrepreneuriat et à l'Innovation (support for entrepreneurship and innovation – PAEI), seeks to show how green entrepreneurship can be a positive force for achieving sustainable development in a country. The PAEI, which is a programme of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, carries out its activities within the framework of German cooperation in Tunisia. It is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ).