



International
Labour
Office
Geneva



Green Jobs Assessment in Lebanon

Synthesis Report

Employment
Sector

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Introduction

While environmental threats and climate change may not be directly linked to the current wave of popular uprisings in the Arab region, their impact has been exacerbated by some of the underlying development failures, including unemployment, poverty, inequality, and weak governance. On the other hand, the continuous degradation of the natural environment, which essentially serves as a living base for the poor, has further aggravated social tensions; hence adding to discontent among Arab people. Combined, all these challenges constitute a vicious circle that reflects the inability of prevailing socioeconomic model in the Arab region to deliver on poverty eradication and employment creation as well as pursue an environmentally sustainable development pathway.

One common feature among Arab countries is the very limited allocation of resources into green solutions, investment, and technology, including in the areas of renewable energy, energy efficiency, sustainable agriculture, recycling and ecological aware construction. The concept of Green Jobs offers an innovative approach to simultaneously address the development failures and environmental threats; hence creating a win-win situation for economic growth and employment creation as well as sustainable human development and improved well being.

Applying the Green Jobs approach to Lebanon, a preliminary assessment conducted jointly by ILO and UNDP found that there is considerable potential for green jobs in the energy, construction, agriculture/forestry and waste management sectors fostering economic growth, social development and wellbeing due to improved environmental health.

In order to realize these gains the report suggests five key policy recommendations:

- (I) Undertake a follow-up study to provide more in-depth analysis of the opportunities and impacts of greening on employment in the various sectors addressing, inter alia, the decent work gaps identified.
- (II) Foster informed social dialogue, awareness raising, and capacity building of stakeholders on development gains of the green jobs agenda
- (III) Advocate for the enforcement of employment and environmental policies that encourage green economy and promote green jobs
- (IV) Channel investment into green and employment intensive sectors and introduce further financial incentives to encourage a green economy
- (V) Invest in human capital and notably youth including green entrepreneurship training so as to close the skills and unemployment gap which is a prerequisite for the promotion of green jobs

The Concepts of Green Jobs and Just Transition

Climate change constitutes the defining sustainable development challenge of the 21st century (Stern, 2007) and the greatest threat to the achievement of the Millennium Development Goals (MDGs) by 2015 (Klein and Persson, 2008; Oxfam, 2007). It is therefore not surprising that this phenomenon and its environmental, economic, and social implications have gained increased prominence in global debates over the past two decades since the Rio Summit in 1992. This debate has led to increased awareness among international agencies, governments, employers' organizations, labour unions, environmental groups, and civil society organizations that business as usual based on the strategy "grow first, clean up later" is not economically, socially or environmentally sustainable.

Despite the global agreement since Rio on the strong interlinkages between the environmental, social, and economic dimensions of sustainable development, policies at the global and national levels have not been successful thus far in presenting coherent and integrated approaches for addressing climate change. Indeed, research in this area has focused essentially on the environmental dimensions of climate change and to some extent the economic, while it has been quite weak in addressing the social dimensions, particularly the employment impact of this phenomenon¹.

In response to this neglect of the social dimension of climate change and environmental degradation and increased recognition of its importance and relevance, the notion of "just transition" has been gaining increased attention in the last few years, particularly in the aftermath of the financial crisis. This concept, which is being increasingly promoted by the International Trade Union Confederation (ITUC) as a "tool that smooth[es] the shift towards a more sustainable society and provides hope for the capacity of a green economy to sustain decent jobs and livelihoods for all" is not a new one². Indeed, it builds on the very concept of sustainable development known decades ago and stems from the need to have "just" sharing of the burdens of environmental challenges, including climate change and the policies to mitigate it.

One of the very few initiatives that was triggered by the notion of "just transition" and consequently addressed the enormous impact of climate change and its mitigation and adaptation measures on industries, jobs, and workers is the green jobs initiative. This initiative was launched by the ILO in November 2007, in collaboration with the United Nations Environment Programme (UNEP), the International Organization of Employers (IOE) and the ITUC. As a result of this collaboration, a groundbreaking report, entitled: **Green Jobs: Towards Decent Work in Sustainable, Low Carbon World** was launched jointly by the four partners of the initiative in 2008³.

The Green Jobs Initiative offers a win-win solution to climate change and environmental degradation such that it seeks to reconcile goals for poverty reduction with low greenhouse gas emissions and improvement of the natural environment through the creation of decent work; hence making goals 1 (poverty reduction) and 7 (environmental sustainability) of the

¹ Climate Change and Labour: the need for a "Just Transition", International Journal of Labour Research, volume 2

² The concept of just transition was first introduced in 1998 by Brian Kohler, a Canadian union activist. It constituted an attempt to reconcile the union movement's efforts to provide workers with decent jobs and the need to protect the environment.

³ Another important study is the one carried out by the European Trade Union Institute (ETUI) on the employment impact of mitigation measures on various industrial sectors in Europe.

MDGs mutually supportive rather than conflicting⁴. Green Jobs constitute a response strategy to the negative effects of climate change and environmental degradation on employment while aiming to reduce the environmental impact of enterprises and economic sectors ultimately to levels that are sustainable or involve jobs that conserve or rehabilitate the environment. Specifically, but not exclusively, this includes jobs that protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high-efficiency strategies; de-carbonise the economy; and minimize or altogether avoid generation of all forms of waste and pollution.

Worker advocates and the ILO rightly emphasize that green jobs also need to be decent jobs—pairing concerns like efficiency and low emissions with traditional labour concerns including wages, career prospects, job security, occupational health and safety as well as other working conditions, and worker rights. Indeed, a job that is exploitative, harmful, or fails to pay a living wage can hardly be called green. Jobs thus need to provide equal hope for the environment and the jobholder.

What is Decent work?

Decent work is defined as opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity.

Decent work sums up the aspirations of people in their working lives – their aspirations for opportunity and income; rights, voice and recognition; for family stability and personal development; for fairness and gender equality. Ultimately these various dimensions of decent work underpin peace in communities and society. Decent work is central to efforts to reduce poverty, and is a means for achieving equitable, inclusive and sustainable development.

ILO Definition

Source: http://www.ilo.org/global/About_the_ILO/Mainpillars/WhatisDecentWork/index.htm

The Green Jobs Report identified four ways in which employment will be affected as the economy is oriented towards greater sustainability:

- First, in some cases, additional jobs will be created—as in the manufacturing of pollution-control devices added to existing production equipment.
- Second, some employment will be substituted—as in shifting from fossil fuels to renewables, or from truck manufacturing to rail car manufacturing, or from landfilling and waste incineration to recycling.
- Third, certain jobs may be eliminated without direct replacement—as when packaging materials are discouraged or banned and their production is discontinued.
- Fourth, it would appear that many existing jobs (especially such as plumbers, electricians, metal workers, and construction workers) will simply be transformed and redefined as day-to-day skill sets, work methods, and profiles are greened.

⁴ For example, China was able to create 1.1 million jobs in the renewable energy sector as it sought to reduce the energy intensity of its growth while also reducing carbon emissions. (UNEP, ILO, IOE and ITUC, 2009. Green Jobs: Towards Decent Work in a Sustainable, Low-carbon World).

Green Jobs Assessment in Lebanon

Rationale

In support of the global ILO green jobs initiative and in light of the striking unemployment rates in the Arab Region, particularly among women and youth⁵ on the one hand and the grave environmental challenges⁶, on the other, the ILO Regional Office for Arab States (ROAS) felt the urgent need in 2010 to commission some preliminary research on potential for green jobs in the region using one country as a case study⁷. Accordingly, it joined forces with UNDP and initiated the first green jobs study in the region that aimed to assess the employment implications of shifting towards a green economy in four key sectors in Lebanon.

Ultimately, it is hoped that this country study, the planned follow up research, and other relevant ongoing and planned initiatives would contribute to the policy dialogue on and increased awareness of green jobs and the nexus of climate change, environment and employment⁸. Furthermore, the knowledge accumulated and lessons learnt from these policy and downstream interventions on green jobs and just transition could feed into and prove very timely for the institutional and economic reforms that have been recently launched across the region in response to the wave of popular uprisings in the Arab States⁹. These reforms need to eventually lead to a new development model that calls for a more inclusive, equitable, fairer, and greener economy. Lessons could be drawn upon from other countries that have used green stimulus packages to respond to the financial crisis, which in turn had a significant positive impact on employment (e.g. Korea Green New Deal). Further successful initiatives combining social and environmental opportunities are increasingly implemented around the world such as Brazil's Social Housing Program, India's National Rural Employment Guarantee Scheme, France's programme which has linked national green policies to local green jobs.

⁵ The Arab MDG Report (2010) acknowledges that employment and decent work remain the most serious development challenges as Arab countries face the highest unemployment rates (particularly amongst the youth) worldwide. According to the ILO, unemployment rates in the Middle East and North Africa stood at 10.1 per cent and 9.8 per cent in 2010, respectively. The employment challenge in the MENA region is even more pronounced for women and youth. In 2010, the unemployment rate for women was 15.0 and 17.0 per cent in North Africa and Middle East, respectively compared to a world average of 6.5 per cent. Moreover, unemployment amongst Arab youth is the highest in the world (23.6 per cent in North Africa and 25.1 per cent in the Middle East compared to a world average of 12.6 per cent

⁶ The Arab region historically suffers from serious environmental challenges that are being aggravated further by climate change. The UNDP Arab Human Development Report (2009) identified a number of serious environmental challenges that constitute a threat to human security in the region in terms of physical survival and access to jobs, income, food and health services.. These include: water shortages, desertification, pollution, and climate change, and the interactions among all of them.

⁷ It must be noted this study is part of a number of green jobs initiatives that ILO ROAS has started implementing in the region since late 2009. In Gaza, the ILO has been working closely with UNRWA since 2009 on promoting green jobs through the construction of safe and environmentally friendly housing and livelihood opportunities to the most vulnerable in the Gaza strip. In Syria, it joined efforts with UNDP in late 2010 within the framework of a joint UN Programme for *Community Development Upscaling the MDGs*, to promote green jobs in the solar energy sector through developing skills of young men from some of the country's poorest villages.

⁸ For example, this discussion could contribute to the UNDP Regional Climate Resilient Initiative that was launched in 2010 with the aim to support a broad spectrum of regional and national partners in moving toward integrated responses to key climate challenges, including through awareness raising, policy dialogue, and capacity building.

⁹ Both the Regional United Nations Development Group (R/UNDG) and the Regional UNDP Response Strategies to the Transformational Changes in the Arab Region identified "greening the brown economies" as one areas of intervention under the broader thematic priority "Promoting inclusive growth and job creation".

Structure of the Assessments

Specifically, the Lebanon study comprises four sectoral assessments, namely: energy, building construction, agriculture, and waste management. The assessments provide an overview of the sector, including ongoing projects (public, private sector, and international aid) and relationship of the sector to the environment. They also present the existing policies and legislations, and available and planned financing and investments in the sectors in question. Furthermore, they provide estimates of the number of potential green jobs that can be created if green policies relevant to the different sectors are implemented, and evaluate the needed occupational skills and retraining needs required for the creation of green jobs or the greening of existing jobs and identify other potential gaps preventing the implementation of policies related to green job creation. Finally, they present a set of policy recommendations to address the identify challenges and bottlenecks.

Research Methodology

The four sectoral assessments followed more or less the same research methodology. They were mainly based on extensive literature review along with meetings with and interviews of officials and identified stakeholders in the target sectors, and consultations with ILO ROAS and UNDP throughout the process. As input-output tables are not readily available, the assessments utilized a combination of methods to estimate the number of jobs that could be created¹⁰, including transfer of data from other studies on the subject and extrapolating data obtained from interviews. Hence, this, along with a number of information gaps in the studied sectors (e.g. exact number of workers in the construction sector is not known as most of them are in the informal economy), resulted in key limitations on the findings that were clearly highlighted in all four studies. Yet the studies provide a preliminary assessment that will kick-off discussions on green jobs in Lebanon and the region.

Overall Findings

The overall findings of the four sectoral assessments indicate that there is considerable job creation potential in going green in Lebanon. As new environmentally sustainable technologies and practices are introduced and adopted, new job opportunities across all the studied sectors are expected to appear. Already now several green jobs exist in all the studied sectors, including in renewable energies and energy efficient appliances, organic agriculture and integrated pest management, green construction as well as in a number of green waste management activities, such as sorting, composting and recycling. If an enabling environment is created to advance the transition towards a green economy, several further green jobs opportunities in these activities can be created.

Considerable growth potential is especially found in a number of green activities, such as solar water heating and photovoltaics, organic farming and marketing, energy-efficient building construction as well as recycling. Going green implies a structural shift from less preferable economic sectors, activities and practices towards more environmentally sustainable ones. Inevitably this will lead to a reduction of jobs in a number of environmentally unsustainable sectors, such as in fossil fuels, conventional agricultural and construction activities as well as quarrying and extraction of virgin resources. Further research is needed to assess the exact implications in these sectors in Lebanon. Nonetheless, the findings of the sectoral assessments imply that the overall net employment effect of going green in energy, agriculture, construction and waste management in Lebanon appears to be clearly positive.

¹⁰ All four assessments quantified direct jobs only and excluded indirect and induced jobs.

Policy Recommendations

The overall policy recommendations will be presented below followed by short descriptions of the findings and conclusions of each sectoral assessment.

Follow-up studies are required to provide more in-depth analysis of the impact of greening on employment in the various sectors addressing, inter alia, the decent work gaps identified. The four preliminary assessments clearly revealed major data gaps in relation to green jobs in Lebanon which made it very difficult to come up with accurate figures on the net job gains/losses in the studied sectors. This is due to a number of factors: i) the very low frequency in conducting labour force surveys in Lebanon; ii) the absence of ready input-output tables that can depict job creation effects caused by green practices in details in every sector in the economy; and iii) the dearth in data on environmental indicators, which makes the link between environmental impact and labour market indicators even more difficult to measure. Hence, there is an obvious and urgent need to conduct in-depth research that would provide more complete economic data on employment, labour intensity; hence allowing for a much more accurate estimation of job creation/loss using different economic models. Further assessments are also required in other key economic sectors, such as ecotourism, industry, transportation, etc.

In addition, the assessments have identified data and information gaps in relation to the link between green jobs and decent work and the quality of the employment opportunities arising from greening the four sectors. This gap is indeed one that has also been identified at the global level by the 2008 Green Jobs Report. In all four sectors, the assessments have shown that there is a great deal of informality and ample room for improvement of conditions of work in terms of payment, social benefits, and unionization. Yet, all these different elements of decent work need to be better assessed. Therefore, the follow-up studies also need to answer a number of key research questions related to the organization of the sectors, the relevant legislations that govern conditions of work and the strategies available that improve working conditions in both emerging green sectors (e.g. renewable energy) and in existing sectors that are being made more sustainable (e.g. green construction), etc.

Informed social dialogue, awareness raising, and capacity building of stakeholders are essential for harnessing the development opportunities of the green jobs agenda - As 'green jobs' is a new concept in Lebanon, lack of awareness and knowledge among the social partners, government counterparts, and the key stakeholders is one of the key constraints for enabling the market to create green jobs. Hence, social dialogue that is informed by the findings of studies and research in this area could serve as a forum for raising awareness and building capacities of tripartite constituents and key players in the area of green economy with a focus on the notions of just transition and green jobs, the environment-labour market linkages; and discussing the pertinent opportunities and challenges in Lebanon. It is hoped that this dialogue would encourage government counterparts, employers, and workers to collaborate on coherent policies and effective programmes that will support a green economy, with green jobs and decent work for all.

There is a need to set and enforce employment and aligned environmental policies that encourage green economy and promote green jobs– there is a clear gap in government policies and legislations that promote the shift towards green economy in Lebanon. Where they exist, there is lack of enforcement and implementation mechanisms (example: energy policy). As is the case in many other countries, environmental oriented policies could serve as a very strong tool for enforcing environmentally friendly practices in Lebanon. However,

it must be noted that such policies need to consider the other two dimensions of sustainable development, namely economic and social. Hence, a policy that promotes renewable energy for example needs to be a coherent one that integrates both the economic dimensions (e.g. GDP growth) and the social/employment impact (e.g. the number of workers who will be negatively affected, the number of jobs that will be created, the conditions of work in the new sector, the skills gaps and needs, etc.). It must be noted that for such a policy to be well integrated, it needs to build on empirical evidence (hence the importance of addressing the research gaps mentioned above) and result from a process of social and policy dialogue that reflects the viewpoints of the social partners and the key actors.

Further financial incentives need to be introduced to encourage green practices and green enterprise development – Some efforts have been made over the last few years in Lebanon to introduce financial incentives that promote green investments in the energy sector, which have also had bearing on the building construction sector. For example, the Lebanese Center for Energy Conservation worked with Banque du Liban on the development of the National Energy Efficiency and Renewable Energy Account” (NEEREA), which was adopted in 2010 as Circular 236. Its purpose was to ensure 0% interest rate loans for investors in RE&EE projects. While it is still preliminary to assess the full impact of such incentives, early indications have shown that it would have a positive impact on investments in renewable energy¹¹. In addition, Circular 10187 called the “Green Circular” reduces to 3% the interest rate on “environmental projects” covering several sectors such as agriculture, industry, tourism, construction, etc. Other measures could include green enterprise development through tax incentives, entrepreneurship training and green public procurement or direct subsidies to investments, tax reductions or exemptions on the purchase of environmentally friendly products (e.g. recycled materials or organic products). Lessons learnt could be drawn from other countries (e.g. Germany) that have introduced innovative financial incentives such as eco-taxes with a positive impact on both the environment and jobs¹².

Investment in human capital and notably youth so as to close the skills and unemployment gap is a prerequisite for the promotion of green jobs and green enterprises – Similar to the case in most other countries, skills bottlenecks and subsequently a lack of capable enterprisers constitute a major barrier for the spread of green technologies and subsequent creation of green jobs in Lebanon¹³. As mentioned previously, there are at least four ways in which employment will be affected as a result of the shift to green economy. The four ways will have important implications for skills¹⁴. In all cases where jobs will be created (e.g. installation on operation of SWHs), replaced, or substituted, new skills and enterprises will also have to be developed. Hence, there is a need for the government along with the social partners, the training institutions, and other concerned stakeholders to formulate a skills development strategy that would come hand in hand with enterprise development and environmentally oriented policies. Such a skills strategy should specifically focus on youth to

¹¹ The LCEC noted that LCEC noted that circular 236 has stimulated the growth of enterprises offering renewable energy technologies such as SWH

¹² In 1999 the German government increased taxes for engine fuels, electricity, oil and gas in small foreseeable steps up to 2003. The revenue was directly used to reduce non-wage labour costs by lowering the social partner’s contribution to the pension fund. A recent impact Study conducted by the German Institute for Economic Research found that the effect of reduced non-wage labour costs is estimated to have created an additional 250.000 full time equivalent jobs and reduced CO2 emissions by 3% of in 2010.

¹³ The UNEP 2011 Report entitled: *Towards a Green Economy: Pathways to Sustainable Development and Poverty* identifies skills development and adaptation of the labour force as a necessary and strategic condition for a faster and more feasible implementation of green economy.

¹⁴ For a detailed discussion see Stietska-Ilina, O.; Hofmann, C.; Duran Haro, M., Jeon, S. 2010 forthcoming. Skills for green jobs: A global view (Geneva, ILO).

find productive work in growing and prospering sectors which will likely be green as the future world economy will increasingly be growing in these sectors (renewable energies were growing by 32% in 2010)¹⁵. National employment offices should also be kept in the loop in terms of the skills strategy in order to provide up-to-date career counseling services to job seekers. This strategy should include both the highly technical skills (e.g. of university students and professionals) to other vocational skills and could reduce the mismatch between the required and available skills. Examples can be drawn from other developed and developing countries that have developed and implemented similar strategies (E.g. Australia's Green Skills Agreement, US Green Jobs Act).

In terms of vocational training, the assessments have identified a need to embed skills for sustainability in vocational education and training programmes, including development of new curricula, upskilling VET trainers to be able to deliver training on new green skills, and introducing a low-carbon element into apprenticeships¹⁶. The experience of the ILO with the Saida Vocational Training Institute in upgrading skills in the construction sector could be built on in developing green skills. Trade unions could also engage in setting up educational programmes to train workers on green skills.

In addition to the needs in VET, the various assessments identified some key existing training programmes that are available at universities in the country and obvious gaps in those programmes if the path to green economy is going to be pursued. While the assessments have shed light on some key skills deficiencies in the four sectors, they have also highlighted the need to undertake an in-depth skills assessment for green jobs in Lebanon. ILO's recently published global report on "Skills for Green Jobs", which includes comprehensive case studies from a number of countries across the world could guide further research in this area.

The skills for Green Jobs strategy should be combined with green entrepreneurship development as often highly qualified youth cannot find employment. Entrepreneurship training should start in-school and continue out-school. A conducive green enterprise environment could be created through green business development services, financial incentives for green start ups such as tax rebates and challenge funds as well as facilitated administrative procedures.

¹⁵ UNEP (2011): Global trends in renewable energy investment

¹⁶ The CEDEFOP (2010) states that: "... Integrating sustainable development and environmental issues into existing qualifications is much more effective than creating new training standards. Every new apprenticeship ought to have a low-carbon element." Rosemberg A. - Building a Just Transition, International Journal of Labour Research, 2010 vol. 2.

Energy

This report provides a preliminary assessment of green jobs in the energy sector in Lebanon. The study also estimates the number of green jobs in this sector by 2020. Besides, it analyzed the current gaps and potential interventions in the skills, technologies, policies, legislations, financing and administrative systems needed for stimulating the growth of green jobs. Finally, it should be noted that this study did not address the transportation sector, as there are virtually no sustainable or green initiatives in that sub-sector.

The current number of green jobs in the energy sector is a little more than 500. This number is an underestimation, as the survey did not cover the totality of companies working in energy. The real number is not expected to be much higher, since the companies surveyed are the major players in the Lebanese market, and because the green energy market is still in its infancy in Lebanon.

The projected number of green jobs in 2020, based on 12% share of renewables in electricity production and 1,050,000m² of installed solar water heaters target is around 4000. Renewable energy and energy efficiency jobs will be created through the need to establish energy management and auditing systems together with the introduction of concentrated solar power (CSP), wind energy, photovoltaics (PV), and the expansion of hydraulic power and solar water heater markets (construction, installation and operation, maintenance). Since there is no manufacturing base for such technologies in Lebanon, it is assumed that the number of manufacturers will remain nil. Even though the new policy paper by the Ministry of Electricity and Water will have a positive impact on green jobs creation, there is no policy that seeks to stimulate the manufacturing sector in Lebanon. Yet, encouraging the manufacturing sector in Lebanon could increase the number of green jobs by a third.

The current identified gaps on the private sector level for the increased penetration of renewable energy and energy efficiency (RE&EE) in Lebanon are a comprehensive policy on renewable energies including aligned labour market, skills and enterprise development policies. The efficient implementation of existent energy laws is lacking (law 462: allowing independent power producers) as well as the adoption of planned energy conservation and feed-in laws which hinders private sector development. Existent policy papers for the electricity sector need to be enforced and renewable energy targets and incentives up-scaled so as to ensure investment security. An underdeveloped business environment for green enterprise development further hinders the private sector. To accelerate the investment in renewable energies fossil fuel subsidies need to be phased out and tax reforms considered which internalize external costs of highly polluting technologies. Possibilities of well designed subsidies and incentive schemes for promising technologies are further options to overcome market entrance barriers. There is also a shortage of skills on the technical and professional levels, as there are no public institutes in Lebanon providing vocational and continuing education training in specializations related to renewable energy and energy efficient technologies. Moreover, professional programs in RE&EE are still rare, as the American University of Beirut is the only institution currently offering a graduate program in Applied Energy. On the demand side, there are limited credit facilities for households as well as for investors and enterprises. These limitations are further exacerbated by the lack of awareness of green technologies in Lebanon.

Last but not least, even though the new policy paper by the Ministry will have a positive impact on green jobs creation, there is no policy that seeks to stimulate the manufacturing sector. Around 30% of job creation in the RE&EE sectors could be in manufacturing. Encouraging the manufacturing sector may increase the number of green jobs by a third.

Construction

The construction sector is the highest growing sector in terms of value added after services and trade. While Statistics show that buildings consume or are responsible for 40% of the world's total energy use and 35% of the world's CO₂ emissions as well as high use of raw materials, water and waste there is enormous potential for efficiency gains through green construction. Six categories can be identified in green construction: sustainable sites (e.g., alternative transportation, light pollution reduction), water efficiency (e.g., water efficient landscaping, water use reduction), energy and atmosphere (e.g., onsite renewable energy, optimize energy performance), materials and resources (e.g., waste management, recycled content), Indoor environmental quality (e.g., low emitting material, thermal comfort), and design innovation (e.g., exceptional performance above the requirements). Considering the boom in the building construction in Lebanon and the increased awareness among some major contracting companies of the benefits of constructing green buildings, the assessment in fact showed that this industry has a potential of creating significant numbers of green jobs.

Based on two methods highlighted in the research methodology, USD 1 million investment in green buildings in Lebanon can create approximately 45 jobs per year on average over 20 years. This includes direct construction and indirect building material supply related jobs as well as induced employment due to energy savings and increased spending in other sectors. Using the estimates from Banque du Liban of 100 million USD worth of green projects over the next five years, green jobs buildings can create 900 jobs per year over the 2011-2016. Using the same estimate of 45 jobs and the cost estimate of a few ongoing green building projects (Sama Beirut, Beirut City center, and AUB's Irani-Oxy Building) which add up to 250 million USD, a total number of approximately 2,800 jobs will be created annually over the period 2011-2014.

Going green in the construction sector will have a significant impact on the work of design engineers and will lead to the creation of new jobs such as energy auditors, green assessors, green construction coordinators, and suppliers of green materials and systems. Other jobs will be transformed such as those of plumbers, electricians and insulators and some might be lost such as in high energy intensive or polluting building materials.

The gaps inhibiting a wider implementation of green buildings in Lebanon include lack of government regulations on green standards and verification, high perceived costs, and lack of education. A conducive environment for green enterprise development is still lacking. To address these obstacles, the report makes several recommendations including: set and enforce policies and regulation that encourage green construction. This includes introducing green construction curricula in technical education and training institutions, on the job training, a conducive environment for green enterprise development, green building regulation and standards, introduce further financial incentives to encourage green building practices, setup education programs, and setup a platform for coordination between green engineering firms, contractors, suppliers and operators.

Waste Management

Greening waste management refers to a shift from less-preferred waste treatment and disposal methods, such as indiscriminate dumping and basic incineration (without energy recovery), towards more-preferred solutions, especially waste reduction, reuse, recycling and recovery. Based on the internationally recognised approach of Integrated Solid Waste Management (ISWM), the strategy of greening is to move upstream in the waste management hierarchy towards more environmentally sustainable options. The long-term objective for greening the sector is to establish an economy in which the use of materials and the generation of waste is reduced to a minimum, unavoidable waste is recycled, composted or remanufactured, and any remaining waste is treated in a way that causes the least damage to the environment and human health.

The current state of the waste management sector in Lebanon is far from ideal. Collection activities are fairly advanced what regards municipal solid waste, but insufficient for wastewater, and totally lacking for hazardous waste. Currently only two-thirds of the total generated solid waste in Lebanon undergoes some form of treatment, while the remainder is discarded in open dumpsites or directly into nature. Moreover, wastewater treatment is insufficient and Lebanon currently lacks any effective strategy or system for dealing with hazardous waste.

Incrementally, the sector is nonetheless changing. In recent years green activities such as sorting, composting and recycling have become more common, advanced medical waste treatment is being developed, and several international organizations, NGOs and private enterprises have launched initiatives to green the sector and reduce its environmental impact. Also large-scale governmental initiatives to close down and rehabilitate old dumpsites and construct new waste management facilities and wastewater treatment plants are currently planned or implemented, which will have a considerable impact in greening the waste management sector in Lebanon.

In the assessment, green jobs in waste management are defined as jobs providing decent work that seek to decrease waste loads and the use of virgin resources through reuse, recycling and recovery, and reduce the environmental impact of the waste sector by containing or treating substances that are harmful to the natural environment and public health. According to the findings of the assessment, the current numbers of green jobs in waste management in Lebanon are about 3,400. These jobs are mainly found in solid waste management (waste collection, sorting, composting, recycling and sanitary landfilling), hazardous waste management (medical waste treatment) and wastewater treatment (sewerage and operation of secondary wastewater plants).

If set plans for developing the waste management sector in Lebanon are successfully implemented over the coming decade the number of green jobs in the sector is expected to increase considerably in the future. By the year 2020 about 1,900 – 2,500 new green jobs are expected to be generated in waste collection, recycling and in several planned solid waste management facilities for sorting and composting and biogas generation, as well as in secondary wastewater treatment plants. Furthermore, if main strategies for the waste management sector are implemented, including strategies for municipal solid waste management, waste-to-energy, and the closure and rehabilitation of open dumpsites in Lebanon, another 640 permanent jobs and about 400 temporary jobs could be created, as well as several thousand short-term employment opportunities in the construction of new facilities and in supply of equipment and materials.

To take advantage of on these new opportunities, there is however a need to create an enabling environment for greening the sector, and especially emphasise job creation and skills in policy strategies, support small and medium sized enterprises in green waste management activities with growth potentials, such as recycling and composting, and improve labour conditions and promote decent work in both the formal and informal sector of waste management.

Agriculture and Forestry

The agriculture sector employs 9% of the workforce mainly in small scale farming and contributes to 6.1% of GDP. The wood, pulp and paper industry contributes 1% GDP employing 10,000 workers whereas the number of people informally depending on forest for their livelihoods is much higher. Conventional agriculture through the acidification of soils and water pollution and deforestation through logging and fires have increasingly severe impacts not only on the economic performance of the sector but on whole communities in rural areas and notably the poor. Organic agriculture and reforestation holds the promise of employment creation and economic growth at the same time as reducing vulnerability to external shocks and extreme weather events and improving the natural environment.

The assessment focuses on organic agriculture which it defines as a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes (organic fertilizers increase water holding capacity and soil fertility, integrated pest management (IPM)), biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects (acidification of chemical fertilizers). Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all.

As for the forestry sector, the focus is on the potential job creation in the reforestation activities supervised by the Ministry of Environment.

The assessment quantified for the present time and the year 2020 direct jobs only. The report further analyzed the current gaps and potential interventions in skills, technologies, policies, legislations, financing and administrative systems needed for stimulating the growth of green jobs.

The findings of the assessment point to a marked rise in green jobs in the agricultural sector in Lebanon. Currently, the number of green jobs in both IPM and organic agriculture is around 700. Assuming a linear trend in organic area until 2020, the projected number of organic workers, including farming, processing labeling and trading activities is expected to increase by 130% to 1600. As for the forestry sector, the National Reforestation plan of Lebanon, adopted by the council of ministers promises to create around 15,000 jobs in reforestation by 2020, the main concern being the preservation and reforestation of at least 20% of Lebanese soil. There is also a potential in forests for creation of green jobs in the eco-tourism sector, which makes the serious protection of forests vital. In spite of those facts, nowadays the current number of green jobs in forestry remains quite negligible and boils down mainly to some local NGOs and forest guards, with the latter not enforcing preservation efficiently. We should note that these figures are very indicative, as they assume that all sub-sectors of organic agricultural are already working at full capacity, and that any increase in cultivated area will result in an increase in labor, as well as the fact that the National Reforestation Plan would be implemented rigorously and on time.

The study identified the lack of targets, policies and strategies to promote organic farming, the high prices of organic products (200% to 300% higher than conventional agriculture), the lack of export strategies and failures in marketing, the negligence of the Lebanese government, and the skills shortages on both professional and technical levels as the key bottlenecks for the larger spread of organic agriculture.

In forestry, the lack of awareness of the Lebanese population about the importance of forests and what can cause fires leads to intense yearly fires and deforestation. Arsons that spread out in forests further exacerbate the situation. The lack of accountability and serious legal actions against arsonists and individuals who caused fires by negligence is a serious challenge.

There is a potential in forests for creation of green jobs. Apart from reforestation and planting of trees in sustainable forestry there are new jobs in fire protection, guards and forest management. Further, livelihoods can be supported through the exploitation of non timber forestry products. In the eco-tourism sector there is further potential for employment creation.

The need for green jobs in the agriculture sector cannot be over-stressed, not only because of the detrimental effects of current agricultural activities on health and on the environment but also because of the precariousness of the social status of most agriculturists in Lebanon, especially seasonal or part-time workers, who basically live by the day.

