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Mainstreaming environmental issues in sustainable enterprises: An exploration of issues, experiences and options

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Preface

The primary goal of the ILO is to contribute, with member States, to achieve full and productive employment and decent work for all, including women and young people, a goal embedded in the ILO Declaration 2008 on *Social Justice for a Fair Globalization, and*[1] which has now been widely adopted by the international community.

In order to support member States and the social partners to reach the goal, the ILO pursues a Decent Work Agenda which comprises four interrelated areas: Respect for fundamental worker's rights and international labour standards, employment promotion, social protection and social dialogue. Explanations of this integrated approach and related challenges are contained in a number of key documents: in those explaining and elaborating the concept of decent work[2], in the Employment Policy Convention, 1964 (No. 122), and in the Global Employment Agenda.

The Global Employment Agenda was developed by the ILO through tripartite consensus of its Governing Body's Employment and Social Policy Committee. Since its adoption in 2003 it has been further articulated and made more operational and today it constitutes the basic framework through which the ILO pursues the objective of placing employment at the centre of economic and social policies.[3]

The Employment Sector is fully engaged in the implementation of the Global Employment Agenda, and is doing so through a large range of technical support and capacity building activities, advisory services and policy research. As part of its research and publications programme, the Employment Sector promotes knowledge-generation around key policy issues and topics conforming to the core elements of the Global Employment Agenda and the Decent Work Agenda. The Sector's publications consist of books, monographs, working papers, employment reports and policy briefs.[4]

The *Employment Working Papers* series is designed to disseminate the main findings of research initiatives undertaken by the various departments and programmes of the Sector. The working papers are intended to encourage exchange of ideas and to stimulate debate. The views expressed are the responsibility of the author(s) and do not necessarily represent those of the ILO.

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[1] See http://www.ilo.org/public/english/bureau/dgo/download/dg_announce_en.pdf

[2] See the successive Reports of the Director-General to the International Labour Conference: *Decent work* (1999); *Reducing the decent work deficit: A global challenge* (2001); *Working out of poverty* (2003).

[3] See http://www.ilo.org/gea. And in particular: *Implementing the Global Employment Agenda: Employment strategies in support of decent work, "Vision" document,* ILO, 2006.

[4] See http://www.ilo.org/employment.

Foreword

In 2007, the International Labour Conference of the ILO discussed the promotion of sustainable enterprises. The Conference sought to take stock of the debate on the role of the private sector and enterprise development in overall economic and social development; to assess the relevance and implications of recent trends with respect to the implementation of the Decent Work Agenda; to provide an ILO contribution to the debate; and to provide guidance to the Office on its work in this area.

Promoting sustainable enterprises calls for strengthening the institutions and governance systems which nurture enterprises – strong and efficient markets need strong and effective institutions. Promoting sustainable enterprises is also about ensuring that human, financial and natural resources are combined equitably and efficiently in order to achieve innovation and enhanced productivity. This calls for new forms of cooperation between government, business, labour and society at large to ensure that the quality of present and future life and employment is maximized whilst safeguarding the sustainability of the planet.

The conclusions to the discussion on the promotion of sustainable enterprises underscore the principle that sustainable enterprises need sustainable societies and that business tends to thrive where societies thrive and vice versa. The conclusions outline six enterprise level characteristics of a sustainable enterprise; identify and elaborate on 17 interconnected and mutually reinforcing conditions of an environment conducive to the formation and growth of sustainable enterprises; and provide guidance to governments, social partners and the ILO on their respective roles in promoting sustainable enterprises.

One of the 17 conditions refers to the “responsible stewardship of the environment" and this paper by Sabrina De Gobbi focuses on this very important subject. It is a timely contribution to a hot topic. The paper makes a vital contribution to ongoing discussions on sustainable production patterns and identifies the pivotal role that different actors can play to improve the social, economic and environmental performance of enterprises whilst at the same time mitigating the adverse impact that businesses can sometimes have on the natural environment.

The paper illustrates with a wealth of practical examples how sustainable enterprise development goes hand in hand with the responsible stewardship of the environment but underscores that this needs to be backed up with appropriate policies, laws, regulations and incentives. The focus of the paper is on SMEs, which often face particular constraints and challenges in responding to the environmental imperative. It is hoped that this paper will help policy makers, practitioners and SMEs themselves to understand better what mainstreaming environmental issues in sustainable enterprises actually means and the benefits that come from doing so!

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Introduction

The 2007 International Labour Conference report and conclusions on sustainable enterprises address several economic, social and environmental aspects which are to be taken into account in order for businesses to be sustainable. The main purpose of the present paper is to illustrate the environmental elements of a strategy towards the creation of sustainable enterprises by highlighting impacts on employment of different environmental instruments and policies.

The paper will try to address both those environmental aspects which are linked to the impact of environmental policies, instruments and approaches on enterprises, as well as those which consist of the tools and behaviours which firms should adopt to mitigate their effects on the environment. Employment implications will be an underlying factor throughout the analysis. The environmental aspects considered will be structured according to the conceptual framework of the recently adopted ILO Sustainable Enterprise Strategic Programme. This strategic document represents the structure of the ILO Enterprise Department. It includes three pillars around which concrete activities are to be organized. These three pillars are:

- Enabling environments for enterprises and employment;
- Entrepreneurship and business development; and
- Sustainable and responsible workplaces.

The paper will explain what the different environmental aspects stand for, by referring to existing international literature and ILO project experiences. Besides theoretical arguments, international examples will also be presented to better illustrate concepts. Knowledge gaps will be highlighted and topics for future research activities will be identified.

Each environmental aspect will be considered in a chapter which may consist of several sections, depending on the level of complexity of issues presented. Chapters can be read individually, and do not necessarily have direct linkages with the others. The information provided will hopefully offer useful ideas for the implementation of activities for greening enterprises both by ILO officials and by external practitioners.

An additional aim of the present paper is to constitute a solid background document where readers – in particular ILO staff dealing with sustainable enterprises – can find answers to questions on the environmental impacts of different policies, instruments and approaches among which they have to choose, as well as on the effects of environmental policies and tools on enterprises and employment.

1. A schematic overview of mainstreaming the environment in sustainable enterprises

Based on the 2007 International Labour Conference report and conclusions, and on the recently adopted Sustainable Enterprise Strategic Programme, some aspects of the environmental component of sustainability are to be prioritized by the ILO Enterprise Department, while others can be dealt with by other ILO units and departments (for example, financial services, trade, public procurement, etc.). The following table indicates specific issues concerning the environment which the Enterprise Department should directly address, with a classification by pillar.

Table 1.1 Environmental issues to be addressed by the ILO Enterprise Department

Pillar	Environmental aspect
Enabling environments for sustainable enterprises and employment	1. Item 17 of ILC conclusions (Responsible stewardship of the environment): Relationship between environmental regulations, taxes, subsidies, emission trading schemes and employment. Inclusion of considerations on the impact of such instruments on national and international competitiveness and employment.
	2. Policy and regulatory frameworks favouring enterprise development in sectors contributing to a low-carbon economy.
	3. Industrial ecology to minimize environmental impact and maximize employment opportunities.
Entrepreneurship and business development	4. Green business ideas, green jobs and sectors with potential to lead to a low-carbon economy (linked to item 2 above).
	5. Greening SMEs: Business associations, large companies and the value chain approach.
	6. Green technology and green technology transfer.
Sustainable and responsible workplaces	7. OSH and greening the workplace.
	8. Developing skills for greener enterprises.

The following chapters provide technical information on the different elements of environmental sustainability in enterprises listed in the table above. Chapter 2 focuses on pillar 17 of the 2007 ILC conclusions on sustainable enterprises, whereas the other chapters deal with different aspects of environmental sustainability mentioned in the 2007 ILC report.

The 2007 ILC Conclusions provide details on a conducive environment for sustainable enterprises by combining elements of human dignity, environmental sustainability and decent work. Such a conducive environment comprises 17 pillars, the last one of which is entitled “Responsible stewardship of the environment”.

2. Responsible stewardship of the environment

2.1 An overview of available instruments for environmental protection

Pillar 17 listed in the conclusions of the ILO International Labour Conference on Sustainable Enterprises states that "in the absence of appropriate regulations and incentives, markets can lead to undesirable environmental outcomes". It adds that tax incentives and regulations should be used to promote consumption and production patterns which are compatible with sustainable development.[5] This chapter examines existing environmental instruments for the achievement of a green economy by highlighting their positive and negative impacts on the labour market and employment creation.

The policy instruments to achieve a green economy which will be considered in this chapter are environmental standards, taxes, subsidies, marketable permit schemes, certification, self-assessment for cooperatives, and environmental banking.

McKinsey reports that about one-third of greenhouse gas cuts may result in financial savings for private businesses, whereas the remaining two-thirds entail companies' investments in cleaner technology. Businesses will make such investments only if pushed through governments' regulations, taxes and subsidies.[6] The representatives of Slovenian companies interviewed for a study on climate change claim that laws, standards and fiscal measures are the most effective tools to make their enterprises develop emission reduction strategies. State subsidies are seen as very useful for research and development.[7]

Carbon prices are reportedly twice as efficient as a standard and about two-and-a-half times as efficient as a subsidy.[8] However, if properly enforced, standards reach the environmental target (reduced level of pollution) with certainty, whereas incentive-based instruments, like taxes and subsidies rely on market forces which do not necessarily meet the fixed environmental target.[9]

CO2 emissions have reportedly increased by 20 per cent since the signature of the Kyoto Protocol in 1997. A reason accounting for this phenomenon is the relocation of some dirty industries (steel, cement, cars, etc.) from rich countries to poor ones with fewer

[5] International Labour Office. 2007b. Conclusions concerning the promotion of sustainable enterprises, ILC (Geneva).

[6] The Economist. 2009. A special report on the carbon economy – Is it worth it? What economists have to say about mitigating climate change (5 December).

[7] Schafer-Sparenberg, C. 2006. Impact on activity and employment of climate change and greenhouse gas mitigation policies in the enlarged Europe: Slovenia final country report (Wuppertal Institute).

[8] The Economist. 2009.

[9] Fraser, I.; Smith, L. 2009. Introduction to environmental economics and policy, School of Oriental and African Studies (London).

or no environmental restriction.[10] It is therefore important to analyse the effects of each instrument on different geographical areas, sectors and type of enterprise.

Within the range of different types of businesses, large firms are usually considered as the main source of pollution and are hence the principal subjects of regulation and incentives for environmental protection. This is why international literature tends to neglect SMEs in general, and even more enterprises in the informal economy.

Paragraph 4 of ILO Recommendation 189 of 1998 on Job Creation in Small and Medium-Sized Enterprises mentions different types of SMEs, including cooperatives, partnerships and family enterprises. The present paper will try to address the special needs of SMEs in environmental protection as much as possible either by referring to the scarce existing literature in this regard or by identifying knowledge gaps which require further research.

Paragraph 6 of the same recommendation urges governments to adopt policies that eliminate obstacles to the development and growth of SMEs. The application of instruments for environmental protection should therefore be considered also with respect to their impact on this particularly vulnerable group of enterprises.

The following matrix provides a very much simplified and tentative illustration of the impact of the policy instruments considered in the present chapter on enterprises and the environment. The sections below will clarify that such a classification is actually not as straightforward as it may seem. Different policy instruments may lead to different results depending on geographical area, economic sector and type of enterprise.

Table 2.1 Summary table of impact of policy instruments on enterprises, employment and environment

		Negative effect on enterprises and employment	
		Low	High
Positive effect on greening economies	High	Environmental standards Marketable permit schemes	Certification Self-assessment tool for cooperatives
	Low	Environmental Banking	Taxes Subsidies

2.2 Environmental regulation

Environmental regulation is the most effective measure to set clear limits on pollution which are not to be passed. It is particularly useful in situations where there are safety and health issues at stake.

[10] The Economist. 2009.

It can be used to ban a specific substance, when the smallest amount of that substance is dangerous. An example is asbestos which was banned in manufacture, import, sale and use in France in 1997. It can otherwise set specific limits in the use of a substance.[11]

Standards are often applied to emissions, for example carbon dioxide (CO2) or sulphur dioxide (SO2) emissions from factories, but they can be used to set limits to:

- ambient quality (for instance, to maintain a certain level of air quality or to set limits to noise);
- products (for instance, a standard limiting the amount of pesticide residues in food);
- process (which usually refers to clean technology);
- input (for example a specific standard limiting the use of fertilizers).

Evidence on the impact of environmental regulation on employment is mixed[12] and several theories have been developed. Environmental regulation may increase costs, reduce demand, and weaken competitiveness for firms which have to face higher costs compared to enterprises which are not subject to the same tight rules. This may lead to job losses.[13]

However, some believe there is now enough evidence showing that environmental regulation does not determine reductions in employment.[14] Others claim that environmental regulation accounts for only a minor proportion of jobs linked to the environment.[15] It is also observed that when there are employment gains equal to job losses due to environmental regulation, the new jobs are usually in different locations and require different skills, which leads to social problems.[16] Complementary public policies in re-skilling, local development interventions and support for social dialogue are very useful measures to avoid social tension in similar cases.

It should not be forgotten that expected job losses in some states were a major reason why acid-rain legislation was delayed until 1990 in the United States. The adoption of scrubbers allowed high-sulphur coal production to continue thus mitigating negative impacts on employment.[17] Introducing scrubbers is also a source of green jobs.[18] One should bear in mind that changes in technology are anyway preferable to end-of-pipe

[11] Fraser and Smith. 2009.

[12] Tietenberg, T.; Lewis, L. 2009. Environmental and natural resource economics (8th edn., Pearson/Addison Wesley).

[13] UNEP, ILO, IOE, ITUC. 2008a. Green jobs: Towards decent work in a sustainable, low-carbon world (Nairobi).

[14] Forstater, M. 2006. Green jobs: Public service employment and environmental sustainability, Challenge 49(4): 58-72 (July-August).

[15] ECORYS. 2008. Environment and labour force skills: Overview of the links between the skills profile of the labour force and environmental factors, European Commission (Rotterdam).

[16] Tietemberg and Lewis. 2009.

[17] Ibid.

[18] UNEP et al. 2008a.

solutions for environmental protection.[19] It is even shown that moving from end-of-pipe technologies to cleaner production has the dual effect of being environmentally beneficial and creating jobs.[20]

The so-called "pollution haven" hypothesis states that strict environmental regulation may determine production relocation to countries with less stringent rules, with negative employment consequences for the domestic economy. If correct, this hypothesis leads to the conclusion that lower environmental standards in developing countries determine an increase in employment in those nations. However, some authors report that because pollution control costs are a small fraction of production costs, evidence indicates that the "pollution haven" hypothesis is not correct.[21]

Some companies do relocate their activities for economic reasons, and some do try to mitigate the impact of job losses due to their production relocation. For instance, in Scotland, Alcan donated land to the village where it had developed its activities and helped create new jobs. In Norway, Norsk Hydro collaborated with the government to attract other enterprises, such as a solar panel manufacturer, which could use its old site and recruit some of its dismissed employees.[22]

Environmental regulation can also enhance technological innovation which businesses would be encouraged to adopt to abate costs linked to the application of rules. The Porter Hypothesis supports this idea stating that technological innovation increases competitiveness and gives a "first mover" advantage to businesses penetrating new markets.[23] However, few studies have demonstrated that the Porter hypothesis is universally true.[24]

Through technological innovation, new jobs can be created. A study by the European Commission reveals that new regulation-driven markets are dominated by small and medium-sized enterprises. As the new market grows and consolidates, competitors are fewer and larger in size.[25] Another report reveals that 50 per cent of the firms surveyed introduced concrete changes towards technological innovation to comply with

[19] Higman, S.; Poole, N. 2009. Managing social and environmental responsibility, School of Oriental and African Studies (London).

[20] IMPRESS. 2004. EU socio-economic research: The impact of clean production on employment in Europe: An analysis using surveys and case studies, European Commission (Luxembourg).

[21] Tietemberg and Lewis. 2009.

[22] World Business Council for Sustainable Development. 2006. From challenge to opportunity – The role of business in tomorrow's society (Geneva).

[23] Vickers, I.; Vaze, P. 2009. SMEs in a low-Carbon economy. Centre for Enterprise and Economic Development Research, Final report for BERR Enterprise Directorate (London).

[24] Tietemberg and Lewis. 2009.

[25] European Commission. 2006. Eco-industry, its size, employment, perspectives and barriers to growth in an enlarged EU (Brussels).

environmental rules. The same study reports that small enterprises generate more jobs in relation with innovation compared to large companies.[26]

An example of a large business generating employment through technological innovation is Interface, a carpet manufacturer. The volume of production decreased because the sale of products was largely replaced with the provision of services consisting in payments for the use of carpet instead of its purchase. New jobs were generated in quality inspections, up-keeping and remanufacturing operations. Employment in Interface rose by 73 per cent between 1993 and 1998.[27]

To conclude, environmental regulation seems to create new jobs when it encourages technological innovation and clean production. Moreover, it contributes to decent work in general and to better working conditions when there are safety and health issues at stake. It tends to meet pollution reduction targets with certainty, provided that adequate investment of states in compliance measures including inspection, interventions against corruption, etc. is made. For developing countries with lower enforcement capabilities, policy instruments such as taxes that shift relative market prices so that it is in the business interest of firms to change their behaviour, which requires less investment in enforcement, may be a more effective way to reduce pollution.[28]

2.3 Taxes

Environmental taxes are based on the polluter pays principle, according to which polluters have to pay a tax for the damage they cause. Since the tax is proportional to the pollution that has been generated, polluters have an interest in reducing their pollution levels.

Like standards, taxes can be imposed on emissions, inputs, outputs, ambient levels, etc. Unlike in the case of standards, with taxes the level of pollution reduction achieved is not certain, because polluters are free to decide to what extent they intend to react to a tax. They can for example decide to pollute more and pay more taxes if pollution abatement costs are higher than what they have to pay in taxes.

Compared to standards where all firms must abate pollution up to a certain level regardless of the costs each one of them has to face, taxes allow differences in their application depending on the type of business. The flexible character of taxes results in aggregate savings which are the higher the more heterogeneous the industry.[29]

Taxes are often perceived by firms as a double burden, in that they make enterprises pay both for pollution abatement measures and for the tax on the remaining level of pollution which they cannot control. However, if paying taxes increases overall production

[26] IMPRESS. 2004.

[27] UNEP et al. 2008a.

[28] Evans-Klock, C. 2010. ILO Skills Department, final comments on the present paper by the Skills Department director (Geneva, 17 September).

[29] Fraser and Smith. 2009.

costs, the cost of taxes is shifted to consumers who are charged higher prices for the products they buy.[30]

Like standards, taxes also favour technological innovation which enterprises are encouraged to introduce in order to pay fewer taxes. For examples on how technological innovation can contribute to employment creation, the experiences described in section 2.2 apply.

Like in the case of environmental regulation, domestic green taxes may lead to losses of competitiveness of firms in international markets, which may determine national employment reductions. Business relocation can be a consequence of green taxes and higher production costs in the location of origin.[31] Remedies like border tax adjustments are being considered on an international level.[32] However, the WTO warns that taxes and charges on products can be adjusted at the border, whereas taxes and charges on processes cannot. So, for example, a tax on the energy used in steel production cannot be applied to imported steel.[33]

Another serious concern about environmental taxes is their regressive distributional impact, in that they increase the prices of goods which represent a higher share of poor households' expenditure.[34] Measures to offset these negative impacts include using the revenue from environmental taxes for compensating policies.[35] In line with such an approach, the ILO suggests that social policies can be used to limit the risk of excessive income inequality. In addition, tax distortions which negatively affect employment and labour market participation should be avoided.[36]

Environmental taxes have been increasingly used in advanced economies, but many examples exist also in transition and developing countries (China, Colombia, the Philippines, Tanzania, Thailand, etc.). Eco-taxes can deploy tax revenues which are normally used to finance national health or social security funds through payroll taxes to reduce indirect labour costs and boost employment. Several EU countries (Denmark, Germany, Italy, the Netherlands, Norway, Sweden and the United Kingdom) have adopted

[30] Ibid.

[31] Tietemberg and Lewis. 2009.

[32] Brown, C. S. 2005. The sustainable enterprise: Profiting from best practice (London, Kogan Page).

[33] World Trade Organisation. 2004. Trade and environment at the WTO (Geneva).

[34] Torres, R. 2008. The social impact of policies to address climate change: A review of the issues, International Labour Review 147(2-3): 275-279.

[35] Fraser and Smith. 2009; Fullerton, D.; Leicester, A.; Smith, S. 2008. Environmental taxes. Prepared for the report of a commission on reforming the tax system for the 21st century, chaired by Sir James Mirrlees.

[36] International Labour Office. 2008a. World of work report 2008: Income inequalities in the age of financial globalisation, International Institute for Labour Studies (Geneva).

green taxes and lowered social security contributions. Most revenues are linked to taxes on gasoline, diesel and vehicles.[37]

Even in poor countries environmental taxes offer the advantage of increasing government revenues and can replace taxes on other activities, such as labour, which are more socially beneficial. However, environmental taxes generate more deadweight losses than other tax sources.[38]

"Double dividend" is the expression which is often used to describe the potential dual effect of environmental taxes:

- improve the environment; and
- raise revenues which can be used to lower other taxes with a distorting impact on employment.

The second effect would arise when a government uses environmental tax revenues to reduce the wage tax, which would determine a net wage increase, and reduce the welfare cost. But some believe that environmental taxes have their own distorting effects on labour supply, and may turn out to be even more burdensome than labour taxes on employment. An environmental tax increases production costs, reduces the net return per hour worked, and enhances labour tax distortions, unless the government uses the revenues to offset such an effect through a reduction in the labour tax rate.[39] Others are of the opinion that it may be preferable to use green tax revenues to finance public investment to create new jobs.[40]

The ILO (2009) estimates that a CO2 emission tax whose resulting revenues were used to lower labour taxes could increase employment by 0.5 per cent by 2014. This would entail the generation of over 14.3 million new jobs worldwide. These figures are the result of the application of an input-output methodology that classifies employment sectors based on the volume of CO2 emissions. This methodology allowed to estimate the incidence of employment in high carbon intensive sectors. The level of tax considered was rather modest and led to emission reduction rates below what was needed. Higher taxes would create more jobs. Eco-taxes also generate higher domestic content of non-energy expenditure and high employment intensity even in carbon-intensive sectors.

To sum up, taxes favour employment creation by promoting technological innovation. In addition, environmental taxes may increase government revenues and replace taxes on other activities, such as labour, and thus abate restrictions to the generation of employment. However, the level of reduction of environmental pollution achieved through taxes is not certain.

[37] UNEP et al. 2008a.

[38] Bluffstone, R. A. 2003. Environmental taxes in developing and transition economies, Public Finance and Management 3(1): 143-175.

[39] Fullerton et al. 2008.

[40] Dupressoir, P. 2006. Climate change and employment – Impact on employment in the European Union – 25 of climate change and CO2 emission reduction measures by 2030 (Brussels).

2.4 Subsidies

Subsidies are used to help firms meet pollution abatement costs. They can be financial contributions corresponding to units of pollution reduced, lump sum grants, special loans, or tax allowances. They are usually applied to emissions, but can equally be granted for using clean production methods or specific bits of pollution abatement technology, or to make farmers adopt more environmentally friendly production methods.[41]

A distinction ought to be made between environmentally harmful subsidies and subsidies which aim to reduce pollution, as is the case of those discussed in this section. Subsidies create distortions in international competitiveness because they lower production costs and prices of goods. The idea of making environmentally friendly products cheaper may not be considered as wrong, while having goods from polluting industries which create negative externalities at low prices due to subsidies is to be avoided. The latter type of argument is very common in international literature on subsidies.[42] Subsidies which are to be eliminated include those encouraging agriculture in general, for the power industry, for water, for forestry and fishing, and for road transport.[43]

Since they are voluntary by nature, subsidies are appreciated by businesses unlike taxes or standards.[44] Moreover, they do not entail any "double burden" for firms. Like taxes, the level of pollution achieved with subsidies is not certain, because no target can be clearly fixed as would be the case with standards.

Comparing taxes and subsidies, the former lower the polluter's profit, whereas the latter increase it. Hence, depending on the instrument used, a polluter may decide to stay in the industry or leave it. A tax may force a marginal firm to close down. In other words, taxes tend to reduce the size of an industry, whereas subsidies tend to increase it.[45] Following this argument, consequences on employment may seem obvious, with taxes causing job losses as opposed to subsidies. Considering findings from section 2.3, this could well be the case except when eco-taxes generate the so-called "double dividend" and create employment.

Subsidies may even attract new enterprises in a given industry, thus determining an overall increase in pollution levels[46] but possibly in employment as well. ILO (2009) finds that subsidizing low carbon sectors has a stronger impact on employment creation than the provision of subsidies to high carbon ones. In the nine OECD countries considered in the

[41] Fraser and Smith. 2009.

[42] UNEP et al. 2008a; UNEP. 2008b. The economics of ecosystems and biodiversity (Wesseling, Germany); International Institute for Sustainable Development. 2009. Enabling conditions Chapter 0 (draft), report commissioned by UNEP for the preparation of the Green Economy Report (Winnipeg).

[43] Koslowski, S. 2000. The Ecological Challenges of the 21st Century, Dialogue and Universalism 10(7-8): 47-78.

[44] Fraser and Smith. 2009.

[45] Ibid.

[46] Ibid.

ILO report, jobs increase by more than 1.8 per cent in low carbon intensive industries, and by 0.5 per cent in high carbon intensive ones over a period of five years. By subsidizing green sectors with low carbon intensive industries, over 3.9 million jobs could be created in the nine OECD countries considered in the report.[47]

It is observed that subsidies do not encourage technological innovation. The amount of subsidies that a firm receives is proportional to the level of pollution. The polluter has therefore no interest in reducing its pollution level by adopting new technologies, if that means receiving less subsidies.[48]

The results of an interesting survey of a sample of firms in five EU countries shed some light on existing correlations between subsidies, innovation and employment.[49] The conclusion is that overall subsidies for innovation do not have any significant impact on employment. However, grants for product and service innovations have the strongest employment creation effect.[50]

A case where subsidies are a quite effective tool is that of environmental management agreements with farmers. Under such schemes, farmers may receive grants for adopting a specific environmentally friendly farming practice like organic farming, not implementing a certain practice or activity which has a negative impact on the environment, maintaining an existing activity, such as livestock grazing on marginal land, etc.[51] This type of subsidy could be beneficial to cooperative enterprises operating in agriculture, for example.

Subsidies are often mentioned as a fundamental tool to lower the cost of eco-innovation through grants to research centres.[52] However, grants for research and technological innovation do not seem to be particularly effective in multinational companies which base their strategies on their own resources and not on possibly fluctuating grants from the government.[53]

Green subsidies to enterprises are also deemed necessary to encourage employers to invest in training their workers to meet the newly emerging needs in ecological and environmentally friendly practices.[54] The issue of training will be further discussed in chapter 8.

[47] International Labour Office. 2009. World of work report 2009: The global jobs crisis and beyond, International Institute for Labour Studies (Geneva).

[48] Fraser and Smith. 2009.

[49] IMPRESS. 2004.

[50] Ibid.

[51] Fraser and Smith. 2009; UNEP. 2008b.

[52] European Commission. 2006.

[53] Metzke, R. 2010. Towards sustainable enterprises: The Ecovision programme at Philips Electronics, presentation at the Integration 40th Decent Work Forum (Geneva).

[54] ECORYS. 2008.

Overall, environmental subsidies can create jobs, particularly when they target low carbon intensive industries and employment intensive sectors. Moreover, since technological innovation may generate employment, environmental subsidies are useful for employment creation also when they support research for eco-innovation. Last but not least, decent work is promoted when environmental subsidies finance training for employees and contribute to the improvement of working conditions. However, as is the case for taxes, the level of pollution reduction achieved through subsidies is not certain.

2.5 Marketable permit schemes

Tradable permit systems allow to fix a maximum level of pollution in a region just like standards. They are normally used to limit emissions and set a maximum ceiling for them in an industry. The target does not necessarily need to be emissions.[55]

Property rights on emissions are established and a corresponding price for emission units is fixed. This process results in a market where emission permits can be bought and sold by companies, both among plants of the same polluter and among different polluters. Enterprises with high pollution abatement costs will prefer to buy emission permits, whereas firms with low abatement costs can sell emission permits and make some profit. Like taxes, marketable permit schemes allow individual firms to adjust to abatement costs.

To initiate the market, emission units must be allocated. This is usually done through grandfathering, where companies are allocated emission units free of charge based on their past pollution levels. Although this method puts new firms in a disadvantageous position because they have to buy permits, it is the most adopted approach.[56]

Emission permits can be granted free of charge, bought or auctioned. The two latter approaches increase production costs and are likely to determine higher prices for consumers and a loss of business competitiveness than if permits were granted free of charge. The relocation of industries to countries with fewer environmental restrictions is even in this case a relevant issue.[57]

Like taxes, emission trading schemes promote technological innovation as companies try to reduce pollution abatement costs and sell saved permits rather than buy them.[58]

Despite the several positive features of marketable permit schemes, not so many examples exist, most probably due to the burdensome institutional and administrative organization they require for management. One of the best known schemes of this kind is the US SO2 emission system which was launched in 1995.[59] Ten years after its introduction, SO2 emissions lowered by 50 per cent which is considered to be a very

[55] Fraser and Smith. 2009.

[56] Ibid.

[57] UNEP et al. 2008a.

[58] Fraser and Smith. 2009.

[59] Tietenberg and Lewis. 2009.

positive result.[60] Partly based on this example, the EU Emission Trading Scheme (EU ETS) has been developed.

Box 2.1 The EU Emission Trading Scheme

The EU ETS concerns CO2 emissions and is linked to the Kyoto Protocol and EU related commitments. It is applied in 25 EU countries. It was launched in 2005 and it is reported that by 2008 it had managed to reduce CO2 emissions by 2.5 per cent per year compared to what they would have otherwise been.

Each Member State can set its own national limits (cap) for CO2 emissions. The EU Commission establishes which sectors participate in the scheme, but Member States are free to decide on the allocation of permits by sector and on their balance across sectors. The sectors that are currently included in the scheme are iron and steel, minerals, energy, and pulp and paper. More than 12,000 plants are expected to be part of the scheme. The differences which such a system creates between countries and within industries are remarkable.

Sources: The Economist. 2009. Fraser and Smith. 2009. Tietenberg and Lewis. 2009.

Relocation and increased imports from non-EU countries are already quite common in the cement sector which is subject to the EU ETS. This industry has a high rate of CO2 emissions per sales unit and cannot afford to buy CO2 quotas at a price higher than 25 Euros. It can meet the limits set by the ETS only through a reduction of the production capacity, closures or relocation.[61] The EU chemical industry feels it is in a disadvantageous position because of overseas competitors which are not subject to emission limits, different emission targets for single EU countries in the ETS, and because of the advantageous situation of large polluters which can transfer marketable permits within a company.[62]

The different effect of the EU ETS on small and medium-sized enterprises as opposed to large companies is witnessed by the case of a German business in the lime industry employing 87 people. This family-owned company had to lower CO2 emissions by 1.25 per cent compared to the baseline. Achieving that goal would considerably affect competitiveness and employment. The years for which data was collected to set the baseline were years with low production. Later on demand increased, but production could not follow, because otherwise the emission target would not be met. Production had therefore to remain 20 per cent below market demand. In addition, the ETS required many hours of work to be fully understood and implemented in the firm. If emission permits were purchased for the business to be allowed to increase production, the price of products should be higher, and goods would possibly remain unsold.[63]

The case of the German firm is a clear illustration of the fact that small and medium-sized enterprises do not have the capacity to transfer CO2 emission rights from one production site to another within or between countries. Only large companies can do that and have at their disposal the needed staff capacity to deal with detailed environmental

[60] Fraser and Smith. 2009.

[61] Dupressoir. 2006.

[62] UNEP. 2006. Show me the money: Linking environmental, social and governance issues to company value (Geneva, UNEP Finance Initiative).

[63] Irrek, W. 2006. Impact on activity and employment of climate change and greenhouse gas mitigation policies in the enlarged Europe: Germany final country report (Wuppertal Institute).

regulation.[64] SMEs may also encounter difficulties in coping with the high costs for establishing and managing transactions in emission trading schemes.[65]

Some large companies, such as Shell and British Petroleum, established internal emission trading schemes before the ETS was set up. This put them in a rather advantageous position compared to other enterprises when the ETS was introduced.[66] This experience shows that applying strict standards on a voluntary basis may help anticipate and avoid the potential negative effects in terms of future costs and loss of competitiveness that new environmental legislation may entail.

A study on the impact of the EU ETS on jobs reveals that a moderate decrease in employment has been recorded. It is added that conclusions cannot be considered as robust.[67] If the idea that revenues from taxes can generate employment were applied to a marketable permit scheme like the EU ETS, then more jobs could be created. Instead of using grandfathering, permits should simply be sold or auctioned to obtain revenues.[68] Auctioning permits seems to be in the EU plans for the new phase of the ETS starting in 2013.[69]

Compared to taxes, a trading permit system generates fewer jobs, is much more complicated to manage, and, since trading of emission permits is subject to speculative investments, can cause a high level of volatility in prices.[70] However, let us not forget that unlike taxes, tradable permit schemes allow to limit pollution to a specific level.[71]

Summing up the advantages that tradable permit schemes offer for the achievement of more and better jobs, it can be said that like standards, these schemes fix a maximum level of pollution and thus contribute to decent work in general and to better working conditions when there are safety and health issues at stake like in the case of exposure to sulphur dioxide (SO2). In addition, emission trading schemes promote technological innovation and generate employment, as companies try to reduce pollution abatement costs and sell saved permits. If the idea that revenues from taxes can generate employment were applied to a marketable permit scheme, then more jobs could be created. Instead of using grandfathering as is often the case presently, permits should simply be sold or auctioned to obtain revenues. One disadvantage which ought to be mentioned is the fact that marketable permit schemes are not beneficial to small and medium-sized enterprises which do not have the capacity to cope with the burdens and constraints that such schemes impose.

[64] Dupressoir. 2006.

[65] Vickers and Vaze. 2009.

[66] WBCSD. 2006.

[67] ECORYS. 2008.

[68] Tietenberg and Lewis. 2009.

[69] The Lisbon Council – Allianz Dresdnar Economic Research. 2008. European growth and jobs monitor 2008 indicators for success in the knowledge economy (Frankfurt).

[70] ILO. 2009.

[71] Fullerton et al. 2008.

2.6 Certification

An environmental standard is a policy guideline regulating the effects of human activity on the environment. It can also be considered as a set of conditions which are necessary to maintain a given environmental component, asset or function.[72]

Enterprises may or may not meet environmental and social standards. Some do but it is difficult for them to show it clearly and quickly, and to provide reliable information. This is why some companies decide to pay for an external and independent verification service which entitles them to obtain certification. Certification therefore is a clear sign indicating the respect and actual application of social and/or environmental standards, such as ISO 14001 for environmental management systems, EMAS (Eco-Management and Audit Scheme) for companies in EU countries, and SA8000 for Social Accountability in the application of social standards. Although certification is voluntary, it is reportedly becoming a requirement in some sectors, such as the international timber trade.[73]

Box 2.2 Examples of environmental and social standards for certification

An environmental management system requires the establishment of procedures to control and improve the environmental performance of a company. The best known and most adopted standards in this regard are the International Standard Organisation on environmental management systems (ISO14001), and the Eco-Management Audit Scheme (EMAS). The former is the result of international negotiations, whereas the latter is the outcome of discussions on a EU country level only. The EMAS has tighter requirements and among other things entails the integration of employees into the environmental management process.

The Forest Stewardship Council (FSC) certification is based on environmentally appropriate, socially beneficial and economically viable forest management. The engagement of stakeholders including employees and consideration for labour conditions are important aspects of the system.

The best known scheme for certification in social standards in the workplace is Social Accountability 8000 (SA8000). The standard is mainly based on ILO conventions and includes the control of labour conditions among suppliers, subcontractors and sub-suppliers. SA8000 also requires the adoption of a management system.

Sources: Higman and Poole. 2009. Forest Stewardship Council: http://www.fsc.org/

Verification entails costs which not all businesses can or are willing to face. But it may also bring advantages and increase profit. Four benefits which have been identified are:[74]

- Reducing economic and legal risks;
- Lowering environmental costs due to better documentation, and reduced waste and disposal costs;
- Improving organizational procedures and structures; and
- Improving relations with public authorities, environmental agencies, and business associations.

[72] Wikipedia. 2010. Environmental standard. Accessed on 9 December 2010, available at: http://en.wikipedia.org/wiki/Environmental_standard

[73] UNEP et al. 2008a.

[74] Schaltegger, S.; Burritt, R.; Peterson, H. 2003. An introduction to corporate environmental management: Striving for sustainability, (Greenleaf Publishing, Sheffield).

But it is sometimes believed that certification is linked to niche markets, is not popular among retailers and the public, and does not lead to market expansion. In addition, if it becomes a requirement for market access, it may represent a barrier for small producers.[75] However, there is evidence showing that improved market access, better contractual arrangements, risk reduction and more transparent negotiations are some benefits of certification. Moreover, a survey in Brazil indicates that coffee producers have increased their revenues thanks to certification.[76]

Compared to other certification schemes, Fairtrade is more favourable to small producers. "Fair trade" is defined as 'a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in the South'.[77]

For small coffee producers, the Fairtrade certification has determined positive results in pre-financing, training and trade facilitation.[78] The market for Fairtrade-certified products is rapidly expanding, rising in retail value by 218 per cent for coffee, 153 per cent for tea, 358 per cent for chocolate and cocoa, and 292 per cent for bananas over the period 2000-2004.[79]

Costs to obtain the Fairtrade certification are not a real problem for small producers. Their major problem is getting organized collectively as required by this certification scheme.[80]

In Brazil, the Rainforest Alliance has started to co-finance audits and subsidize certification costs for small coffee producers, using revenues from fees paid by large firms and a grant from the European Union.[81]

Food safety and quality standards introduced in advanced economies are considerably limiting agricultural imports from poor countries and thus hindering development opportunities, particularly for small producers in the agrifood industry. Global marketing standards in this area are essentially missing. GLOBALGAP is a private-sector quality-assurance body based in Germany, which seeks to harmonize agrifood standards. Its members are producers and retailers. The standards cover areas such as sound environmental practices, animal welfare, and workers' health and safety. "GAP" stands for "Good Agricultural Practices". It is a set of voluntary standards with certification and

[75] Consumers International. 2005. From bean to cup – How consumer choice impacts upon coffee producers and the environment (London, Consumers International and IIED).

[76] Ibid.

[77] Moore, G.; Gibbon, J.; Slack, R. 2006. The mainstreaming of fair trade: A macromarketing perspective, Journal of Strategic Marketing 14(4): 329-352.

[78] Consumers International. 2005.

[79] Moore et al. 2006.

[80] Consumers International. 2005.

[81] Ibid.

inspection procedures. It is to be noted that costs for producers remain nonetheless high, whereas prices of certified goods are not increased because of certification.[82]

In general, because of the high costs involved, certification for environmental and social standards tends to be obtained only by large companies. Small firms rely more on self-assessment tools as illustrated in the following section, and on codes of conduct proposed by large companies as presented in some of the examples described in section 5.3.

If on the one hand, based on available literature, the implications of certification on employment creation and the environment are difficult to identify, on the other it can be clearly stated that the certification of compliance with specific environmental and social standards is a major achievement in a path towards sustainable development.

2.7 Cooperatives and environmental protection

The large majority of cooperatives are SMEs. The International Co-operative Alliance (ICA) is their representative body worldwide. In 1995, this organization adopted a "Statement on Co-operative Identity". The seventh principle contained in the statement deals with "Concern for communities" and provides that cooperatives work for the sustainable development of their communities.[83]

In April 2008, ICA adopted a strategy on climate change to reduce greenhouse gas emissions. In addition, some regional and national initiatives have been launched over the past decade.

In 2009, at the first Co-operative Summit of the Americas which took place in Mexico, the members of ICA Americas adopted an "environmental resolution". This act stems from the signature of a Green Co-operative Pact by different representatives of the cooperative sector in that continent in 2008. The Pact urges co-operatives to undertake actions for environmental conservation, carry out periodical institutional assessments of their environmental practices, and include an environmental section as a norm of conduct.[84]

In France, since 1998, the cooperative movement has introduced the idea of "bilan sociétal", a self-assessment tool which allows cooperatives to evaluate their performance and improve it focusing on five areas including environmental impact. Through a participatory approach, the performance of a cooperative is assessed based on 450 indicators.[85] Until now, "bilan sociétal" has been applied only to cooperatives in agriculture in pilot and experimental phases.

[82] Higman and Poole. 2009.

[83] International Co-operative Alliance. 1995. Statement on Co-operative Identity.

[84] International Co-operatives Alliance – Americas. 2009. Pacto Verde Cooperativo.

[85] Chomel, C. 2002. La démarche de bilan sociétal développée par les coopératives agricoles françaises, CFCA (Paris).

Box 2.3 An application of bilan sociétal

Sicaseli is a French agricultural cooperative which has applied "bilan sociétal" as of 2003. A participatory approach was chosen, according to which self-assessment takes into account inputs of both cooperative members and external partners.

As a result, an action plan was adopted, where the environmental component emerges as a crucial one for performance improvement, in particular to reduce negative environmental externalities. A commission was set up within the cooperative for the provision of technical advice on environmental services.

Some environmental elements traditionally considered as negative were turned into economic gains; this is particularly the case of using waste to make other products. This change seems very promising also to foster the creation of new jobs.

Source: Cariou, Y.; Fournie, S.; Wallet, F. 2006. Le bilan sociétal: Un outil de management pour renforcer l'ancrage territorial et la responsabilité sociale des coopératives agricoles, Développement Durable et Territoires.

2.8 Environmental banking

In the present paper, the expression "environmental banking" refers to habitat and species banks where individuals and companies can purchase tradable credits to compensate for their negative impact on the environment.[86]

This instrument can be considered as the very last option a firm has when it cannot avoid to pollute the environment. There is no information on how environmental banking affects employment in enterprises, but it can be assumed that new jobs would be created through the establishment of banks.

In the United States, by September 2005 more than 400 wetland mitigation banks had received formal approval. Tradable credits are bought to offset the degradation of the environment caused by agriculture and development activities. Almost three quarters of such banks have been created by enterprises.[87]

In the same country, a cap-and-trade scheme has been established to offset the negative impact of companies on endangered species and their habitats through the purchase of credits. By May 2005 930 transactions had taken place and over 44,600 hectares of endangered species habitats protected.[88]

In 2006 Australia passed a BioBanking Bill which creates incentives to protect private land with a high environmental value. Under this system, developers buy "biodiversity credits" to compensate for their negative impact on biodiversity.[89]

Similar in structure to the schemes described above and linked to the Kyoto Protocol is the Clean Development Mechanism (CDM). This scheme allows emission reduction projects in developing countries to earn emission reduction credits. Such credits can be

[86] UNEP. 2008b.

[87] Ibid.

[88] Ibid.

[89] Ibid.

traded and sold by industrialized countries to meet their emission reduction targets under the Kyoto Protocol. As of end 2010 there were over 6,300 registered projects.[90]

2.9 Key points for action

After exploring in depth the impact on employment and the environment of each one of the seven policy instruments considered so far, it is possible to refer to table 2.1 and note that the proposed classification does not always apply to any situation.

In general, certification and self-assessment in cooperatives are tools which entail positive impacts both for employment and for the environment. The situation is much less clear for environmental standards, taxes, subsidies and marketable permit schemes. When they stimulate technological innovation, they all create employment with benefits for the environment. Subsidies create jobs in particular when they target low carbon sectors. Marketable permit schemes could generate employment if permits were sold or auctioned instead of granted. Environmental standards are beneficial for the environment provided that they are enforced. Environmental banking generates jobs through the creation of banks and transaction management, but does not offer the best option for environmental protection.

Despite the fact that each situation and national context presents specific characteristics which may make one environmental instrument more effective, efficient and recommendable than another in terms of improving the environmental behaviour of enterprises with minimum costs and increasing jobs at the same time, some key points for action may be suggested.

- Standards, taxes, subsidies and tradable permits can yield positive results when they are used as a mix, all together, with more emphasis on one or the other depending on the country and its level of development. The benefits of each one of these instruments for employment creation have been highlighted, but the existing trade-offs between employment and the environment as emerged in the different sections are also to be considered in each and every particular situation.
- Certification is always a desirable target for an enterprise, provided that the certifier is credible on a national and/or international level. Achieving certification makes a company adopt measures which certainly improve its environmental and social performance. However, if the certifier is not known for recognizing a decent level of standards and for professionalism in granting certification, paying for its services may turn out to be worthless. As noted, certification may also entail costs which are excessive for SMEs, and self-assessment may be an alternative solution.
- Environmental banking must be considered as the very last option, after all opportunities for an enterprise to safeguard the existing environment have been exhausted. As a matter of fact, the re-creation of ecosystems usually does not lead to the same environmental benefits as the preservation of existing environmental assets. For example, buying credits to plant new trees for offsetting the suppression of existing trees in a different area entails the risk that the newly planted trees die before growing, and that the ecological services which were provided by the old ecosystem will not be available in the newly created one.

[90] For more information, see http://cdm.unfccc.int/about/index.html

3. Policy and regulatory frameworks favouring enterprise development in sectors contributing to a low-carbon economy

Pressed by the need to meet the Kyoto emission targets and combat climate change, many governments have re-directed investment flows from traditional sectors to low carbon ones. The list of low carbon sectors varies depending on the source used. In general, low carbon or environmentally friendly sectors include renewable energy (solar, wind, biofuel, etc.), energy efficiency construction, building hybrid and electric cars, waste collection and the recycling industry in general, ecotourism, organic agriculture, sustainable forest management, environmental services, natural resource management, environmental management with restoration and reclamation, environmental protection, etc.[91]

The development of such sectors is being promoted through different policies, such as setting specific targets for clean energy production, land-use policies, energy efficiency standards, clean production standards, financing R&D projects, etc.[92]

ILO (2009) reports that new jobs are created when revenues from taxes to high carbon intensive sectors are used for employment promotion through reductions in social contributions. This happened in Germany and Sweden. In general, in the nine OECD countries considered, the employment creation effect in low carbon sectors is three times larger than in high carbon ones when revenues are reallocated as job subsidies.[93]

To tackle the negative consequences of the recent financial crisis, some countries have adopted "green" stimulus packages. China, the United States, Europe and the Republic of Korea have launched the most ambitious green packages,[94] with China and the Republic of Korea allocating three per cent of their national GDPs to green stimulus programmes.[95]

Some governments focused on a single sector, such as passenger rail or clean vehicles. Overall, most investments were directed towards improvements in energy efficiency in power generation, heavy industry, transport and buildings. China has launched massive investments in rail construction, whereas the United States has largely invested in the renewable energy sector. The Republic of Korea has focused on renewable

[91] UNEP et al. 2008a; European Commission. 2006; OECD. 2009. Eco-innovation in industry: Enabling green growth, OECD Innovation Strategy (Paris).

[92] UNEP et al. 2008a.

[93] ILO. 2009.

[94] Morrison, J. 2009. China, United States, Korea take lead in clean energy and low-Carbon initiatives, in Research Technology Management (Arlington).

[95] Barbier, E. B. 2010. Green stimulus, green recovery and global imbalances, World Economics 11(2): 149-177.

energy, smart power grids, and hybrid cars. In Europe the largest green investments are in energy-efficient buildings and vehicles.[96]

It is reported that a large share of stimulus resources have been allocated to the renewable energy sector through subsidies. About one-quarter of those grants have been assigned to improving energy efficiency.[97]

Some governments have adopted policies to facilitate financing to SMEs for eco-innovation technologies.

Box 3.1 Examples of government eco-innovation initiatives for SMEs

In Denmark, a state-sponsored investment fund has been set up to provide seed and start-up funding for innovative SMEs. Financing is available on commercial terms using equity or state-guaranteed loans. In 2007, 12 per cent of total investments made by venture funds in the country went to clean-tech firms.

In Greece, grants up to 40 per cent of investment cost are available for firms that intend to improve their environmental performance and get eco-label or EMAS certification. Support is provided for testing expenses, certification and consulting services, process modifications and environmental improvements in general. Over the period from 2000 to 2006 some 130 enterprises received funding for a total of slightly over 16 million euros.

The Hungarian Government sponsors energy audits in industry on a municipal level through soft loans. Other financial mechanisms to facilitate energy audits include an Energy Efficiency Credit Fund and a EU co-funded loan programme.

Sources: OECD. 2009. Wagner, O. 2006. Impact on activity and employment of climate change and greenhouse gas mitigation policies in the enlarged Europe: Hungary final country report (Wuppertal Institute).

Those companies with ecological products and technologies which need supportive policies from governments in order to be competitive on a large scale lobby for reforms. Some enterprises try to promote higher environmental standards and policies to introduce markets for cleaner technologies. Japan, Germany and California are examples of governments which have adopted supportive policies in the area of solar energy.[98]

The ILO is about to launch a project called "Greener Business Asia" to identify and promote sectors with potential for the development of sustainable production and consumption. Tripartite workshops will then be organized to explore lessons learned in the project and their implications for the regulatory and policy framework.[99]

To conclude this short chapter, one key point for action may be suggested:

- The new business opportunities which the promotion of low carbon sectors offer must be fully exploited. This is to be done by considering the specific business sectors which benefit from special measures and favourable conditions by national

[96] Morrison. 2009.

[97] The Economist. 2009.

[98] WBCSD. 2006.

[99] Bodwell, C. 2008. Green business Asia – Promoting sustainable consumption and production through the ILO's Small Business Development Networks, internal concept note, ILO; Mamic, I. 2009. Greener Business Asia project document, ILO.

governments. Moreover, new business ideas in low carbon sectors are to be supported and disseminated (see chapter 6).

4. Industrial ecology to minimize environmental impact and maximize employment opportunities

4.1 The benefits of geographical proximity of enterprises and their application in industrial ecology

The concentration of enterprises in a limited and well-defined geographical area offers advantages for both enterprises and environmental protection.

Let us first consider benefits for enterprises.

To choose the location where to start a business and develop operations, an entrepreneur usually considers the following factors:[100]

- Closeness to market;
- Access to communication channels and transport;
- Availability and price of raw materials;
- Availability and cost of skilled labour force;
- Availability and price of energy;
- Availability and price of land; and
- Government incentives, such as tax exemption and subsidies.

Obviously, the final goal is to find a location which meets all of the above requirements and possibly others, like the availability of suppliers and the sharing of infrastructure, at the lowest cost. If several companies are concentrated on a specific area, some costs can be shared and hence become lower. These costs include the provision of energy; access to natural resources like water, gas, etc.; and the provision of services, such as meals and transport for employees.[101]

Another cost which can be lowered through the concentration of firms in a limited area is that which is related to waste disposal. Some "eco-industrial parks" have been established, based on the notion of industrial ecology.[102] According to this concept, industrial operations can be as efficient as natural ecosystems, where resources and energy are used, reused and recycled at full efficiency through ecological functions. The idea is

[100] European Commission with Cambridge Econometrics. 2007. Links between the environment, economy and jobs (Brussels).

[101] Chertow, M. 2007. Uncovering industrial symbiosis, Journal of Industrial Ecology 11(1): 11-30.

[102] OECD. 2009.

that the by-products of an enterprise, which could be considered waste, become the feedstock of another or several others.[103]

The concentration of enterprises in a limited area offers advantages for environmental protection as well. These are:

- A limited use of energy and natural resources, particularly in the case of industrial ecology;
- A reduction in pollution due to lower transport flows; and
- The degradation of a smaller surface, with infrastructure development being concentrated in a small geographical area. This aspect is relevant especially for biodiversity conservation, because it tends to limit habitat fragmentation and leaves broader areas for the development of larger populations of species.

One major disadvantage of geographical proximity of enterprises which is absolutely not to be neglected is difficult access to the work place for the poor particularly in developing countries; these people often live in remote rural areas with scarce means of transport. This aspect must be taken into account in urban planning and in the creation of rural employment.[104]

4.2 Characteristics and examples of industrial ecology

The idea of industrial ecology is based on three business principles:[105]

- What enters a company as material entails costs;
- What leaves the company is potentially a product which can be sold; and
- The business is but a small part of the material flows which characterize the environment.

Industrial ecology may introduce a problem linked to different economic cycles within a company. This happens when a firm delivers two products, one being the by-product of the other. If the production of the former diminishes, the business may still have to produce enough of the latter which is the feedstock of a different production cycle in another enterprise. It may be that demand for one product decreases when demand for the other rises.[106]

The best known example of industrial ecology or industrial symbiosis is the Kalundborg case in Denmark presented in the following box.

[103] UNEP et al. 2008a.

[104] McFalls, R. 2010. ILO Multinational Enterprises Unit, Enterprise Department, personal communication with the unit chief (Geneva).

[105] Higman and Poole. 2009.

[106] Ibid.

Box 4.1 Industrial ecology: The Kalundborg case

In Kalundborg (Denmark), over a period of two decades, very close linkages between initially five large companies have been spontaneously created, where the waste materials of one enterprise are recycled and used by another business to produce a different, new product. Nowadays the network includes about 20 projects.

So, through the desulphurization of natural gas by a power station, very good quality gypsum is obtained. Fly-ash from a coal-fired power plant is used to produce cement by another company. Sludge with nitrogen and phosphorus from a pharmaceutical factory is used as fertilizers by local farmers.

Sources: Higman and Poole. 2009. UNEP et al. 2008a.

Another network of enterprises involved in an industrial ecology scheme has been identified in Styria (Austria). In this case, the network is much larger and diverse. Like in Kalundborg, industrial ecology activities developed spontaneously.[107]

Implications of industrial ecology for employment are hard to detect. Specialized staff to identify re-use and recycle opportunities may be paid out of the savings resulting from reduced waste and waste disposal costs. However, a case by case analysis might provide more precise information.[108]

It is to be noted that the ecological industrial relations between firms which characterize the Kalundborg case were created spontaneously, without any external intervention or focus on employment creation.[109] Research shows that efforts to plan industrial symbiotic systems tend to fail.[110]

In some cases, industrial ecology has been merged with the notion of economic development and some "eco-industrial parks" have been established with the multiple objective of revitalizing urban and rural sites, promote employment growth, and enhance sustainable development. A project of this type was set up in a poor county in Virginia (USA). In China an eco-industrial scheme was launched starting from a sugar refinery and its supply chain. The goal was to minimize the environmental impact of sugar refining by creating new enterprises based on the use of by-products from the main company, and to create new jobs.[111]

Other examples of industrial ecology have been documented in Kwinana near Perth in Western Australia, and in Ulsan in the Republic of Korea. In the former case, 47 projects involving 22 firms were implemented. Projects were developed in areas such as heat and power generation, water recycling and reuse, productive use of lime kiln dusts, and the recovery and reuse of carbon dioxide and hydrogen from industrial processes. The latter case concerns 12 enterprises which developed common plants for the production of

[107] Ibid.

[108] UNEP et al. 2008a.

[109] The Kalundborg Centre for Industrial Symbiosis. 2010. Industrial symbiosis, a website (Kalundborg). Accessed on 19 April 2010, available at: http://www.wiserearth.org/resource/view/4f0b67d18e75c975ce43e68c2c10cc4a

[110] Chertow. 2007.

[111] Ibid.

process water and treatment of effluent, the production of biogas, copper and zinc from smelting residues, and the reuse of slag in construction applications.[112]

As already mentioned above, the most successful cases of industrial ecology were spontaneously created by self-organized firms. The situations where eco-industrial parks were established through government incentives are usually based on one of the following three approaches.[113]

- Eco-industrial park planning: The government tries to attract businesses to a specific geographical location by investing in the provision of common facilities, such as effluent treatment plants or transport connections. This approach has not proven to be very successful. In 1996, in the United States some 15 eco-industrial parks for development were identified, but ten years later, only seven were operational and none of them had developed a decent level of resource exchanges among firms.
- Recycling legislation: The government enacts a regulatory framework for a recycling-oriented economy. Mandatory recycling rates and subsidies for recycling industries constitute the basis of such a system. A very successful case is that of Japan, where between 1997 and 2006 26 eco-towns were established.
- Industrial matchmaking: In many countries waste exchange databases have been set up, so that companies can identify potential production inputs or sell their waste as production outputs. Results have been mixed, also because waste generators tend not to provide details about their waste volume and composition, and because chemical materials are given different names.

An essential factor for success in industrial ecology or industrial symbiosis is the small physical distance between enterprises. As a matter of fact, transport of residuals for long distances is not profitable. Short distance is particularly relevant in the exchange of energy.[114]

But rising transportation costs may make short physical distance useful and profitable for companies also when they are not in a symbiotic relation.[115] If commercial exchanges were to be on a local level more than they are nowadays, in terms of employment long-distance truckers would be replaced by pick-up van drivers.[116]

An economic system based on re-use and recycle, with a lower utilization of materials would also entail a shift from jobs in handling products to employment in facilities for returning used products or submitting them to firms which can re-use them.[117]

[112] UNIDO. 2009. Making it – Industry for Development: Time to go green? Prosperity without growth, issue 1 (Vienna, November).

[113] Ibid.

[114] The Kalundborg Centre for Industrial Symbiosis. 2010.

[115] Business for Social Responsibility. 2009. Value Chain Approaches to a Low-Carbon Economy: Business and Policy Partnerships, A discussion paper for the World Business Summit on Climate Change in Copenhagen.

[116] UNEP et al. 2008a.

[117] Ibid.

4.3 Key points for action

Three main points for action can be mentioned to conclude this chapter:

- It is recommendable that firms be concentrated in a limited geographical area. This leads to both economic and environmental benefits. Geographical proximity can also be conducive to social positive outcomes, because proximity favours contacts among workers and may result in employees getting organized. However, attention must be paid to employment creation in remote, rural areas where poor people may have difficulties in accessing their workplace.
- It is preferable to detect the existence of spontaneous industrial ecology schemes and enhance their potential for development and employment generation rather than to establish such schemes artificially through government actions.
- It is important to explore the employment-generation capacity of existing industrial ecology schemes, in order to further enhance their job creation potential through specific interventions.

5. Greening small and medium-sized enterprises: Business associations, large companies and the value chain approach

5.1 Why focus on small and medium-sized enterprises

The large majority of enterprises in the world are small in size. They usually do not have enough information on the negative impacts of climate change on their activities, and even when they are aware of forthcoming changes, they do not have the financial means which are necessary to cope with the effects of global warming. This is why it is particularly important to focus on the application of the conclusions on sustainable enterprises of the 2007 International Labour Conference (ILC) on small and medium-sized firms.[118]

Compared to large companies, small businesses have a lower capacity to adjust to government environmental policies, regulations and incentives. They may hence experience higher costs and enjoy fewer benefits. Moreover, it seems that SMEs are less advanced than large firms in the environmental field, and that they tend to be more re-active than pro-active. The situation of medium-sized enterprises is different, because they have more developed managerial and organizational structures.[119]

Some obstacles which SMEs encounter in improving their environmental performance include:[120]

- Low environmental visibility and exposure to regulatory and stakeholder pressures;

[118] International Labour Office. 2008c. Employment and labour market implications of climate change, GB.303/ESP/4, Committee on Employment and Social Policy (Geneva).

[119] Vickers and Vaze. 2009.

[120] Ibid.

- Lack of a supportive network for environmental activities and limited infrastructure support to environmental management (like poor local recycling facilities);
- Lack of awareness of the impact of business activities on the environment;
- Perception that environmental measures are costly and lead to a loss of competitiveness;
- Poor management skills and lack of capacity to turn environmental improvements into business opportunities;
- Limited time and resources;
- Perception that environmental management systems do not meet the special needs of small firms;
- Lack of skills to implement environmental improvements.

However, there are some characteristics which make small firms more likely than others to have an environmentally responsible behaviour. Some of these features include:[121]

- The owner is the business and his/her behaviour is perceived as that of the enterprise;
- The location of SMEs usually does not change and the owner and his/her family spend their life in the same community becoming embedded in the local environment;
- The owner tends to consider his/her employees as family members.

Small enterprises are reportedly heterogeneous in nature and react in different ways to regulatory and social pressures, including environmental ones. Among factors determining small firms' reactions are the awareness and motivation of the owner or manager, the "culture" of the enterprise, competitive conditions, as well as the level of exposure to regulatory and public pressures.[122]

The three following sections will focus on three main ways to promote environmental improvements in SMEs: business associations, supply chains, and value chains. Some other means, such as specific public-funded programmes and facilities will also be explored.

5.2 The role of business associations

As mentioned in the previous section, the two main problems that SMEs face in improving their environmental performance are limited access to information and financial constraints. Business associations can play an active and useful role in overcoming those two obstacles.

Business associations, as well as chambers of commerce and other similar institutions, are networks through which information can flow within a specific industry and reach even very small firms in the sector.[123] Such networks can also constitute a solid structure for the implementation of specific R&D programmes and for the introduction of new environmental technologies. Through business associations even geographically

[121] Ibid.

[122] Ibid.

[123] Brown. 2005.

dispersed enterprises can be reached.[124] The forthcoming ILO project "Greener Business Asia" adopts the approach described above to provide environmental business development services to SMEs in the Philippines and Thailand.[125]

A further challenge for SMEs is meeting the increasing need to be part of low carbon initiatives and reporting to the investment community, consumers, and their own industry.[126] It is suggested that business associations play a stronger role in setting, promoting and monitoring standards within a sector. Peer pressure can be used to raise standards in a specific industry. An ILO experience reveals that a factor of success for SMEs in Java is benefiting from quality control programmes both on a firm and on a sector level. Such programmes include activities ranging from basic controls to facilitating access to ISO 14001 certification.[127]

Support programmes for environmental improvements in SMEs have been established in diverse forms in different countries. Business associations tend to be associated with the provision of basic information or advice. There may then be organizations specialized in the provision of specific services, such as training and audit. Last, there are programmes funded by public national or international bodies.[128] An example is given in the following box.

Box 5.1 Local and EU-funded initiatives to green businesses in the UK

The construction sector is very large and has a vast majority of SMEs. In the UK a "Construction Best Practice Programme" (CBPP) and the Movement for Innovation (M4I) were set up in the early 2000s. The former created a website and a network of Best Practice Clubs. Together with industry groups, it developed performance indicators. The latter focused on demonstration projects showing the "Rethinking Construction" principles. The effects of the application of such principles were measured using the CBPP indicators, which revealed an excellent performance in safety and reduced environmental impacts.

Results achieved include extraordinary savings. Leading construction companies and industry bodies used partnerships and integration mechanisms to disseminate knowledge and information throughout the entire construction sector.

Source: Brown. 2005.

Another active sector in the United Kingdom is the hospitality industry, which provides advice and support to SMEs and also acts as pressure group within the sector.[129]

In the same country, to help SMEs face the challenge of low carbon initiatives, the Carbon Trust offers free on-site advice to firms. Twelve energy advice centres for SMEs were set up in England, but were closed down in 2004 due to poor cost effectiveness.

[124] Dupressoir. 2006.

[125] Mamic. 2009, and Bodwell. 2008.

[126] Vickers and Vaze. 2009.

[127] Ewasechko, A. C. 2005. Upgrading the Central Java wood furniture industry: A value-chain approach. ILO (Nanila).

[128] Vickers and Vaze. 2009.

[129] Ibid.

Evidence shows that support to SMEs is more effective when it does not target energy efficiency, but rather considers all environmental aspects through general environmental audits.[130]

Unfortunately, it seems that programmes aimed at improving the environmental performance of SMEs in the United Kingdom are not effective in most cases. There tends to be a poor take-up of support, even when generous subsidies are provided.[131] However, project experience from the ILO Better Work Programme and Factory Improvement Programme in Asia indicates that SMEs are ready to fully pay for services improving their environmental performance.[132]

Some elements which could improve the effectiveness of environmental business support services to SMEs have been identified and include:[133]

- Better communication between different support services within a country;
- Sector-specific and locally provided services;
- Identifying opportunities for the creation of new SMEs;
- Focusing on programmes which deliver immediate results for beneficiaries;
- Providing integrated business support services;
- Providing individual tailored support;
- Peer influence with the involvement of business mentoring, networks and industry leadership;
- For beneficiaries, being able to see that business change results in increased business opportunities;
- Using appropriate language;
- Flexibility in support.

In countries other than the UK, the following services for SMEs on information on environmental issues have been provided by public or private institutions, such as chambers of commerce, usually with public funding.[134]

- Canada: Online information from the government is available on funding for environmental technologies.
- Denmark: A web portal has been created to provide information on biotechnology, ecology, environmental chemistry, energy, materials and food.
- France: Technical support is offered to SMEs to obtain EMAS or ISO 14001 certification, as well as to improve the environmental impact of products at each stage of their life cycle.
- Germany: An Internet portal provides information on German environmental technologies and services.

[130] Ibid.

[131] Ibid.

[132] Elkin, M. 2010. ILO project on Sustaining Competitive and Responsible Enterprises (SCORE), personal communication with the project manager (Geneva).

[133] Vickers and Vaze. 2009.

[134] OECD. 2009.

- Turkey: SMEs are informed about how to phase out the use of ozone-depleting substances in different sectors and technology alternatives.
- United States: Web portals are available to provide SMEs with information on environmental technologies, particularly for air, water and waste treatment control, and for sustainable manufacturing.

5.3 The role of large companies

The intervention of large companies in greening SMEs has a dual beneficial effect:

- It helps small businesses overcome the principal obstacles they face in improving their environmental performance (financial constraints and limited access to information); and
- It improves the environmental performance of large companies which depend to a great extent on the ecological behaviour of suppliers (SMEs).

For many large manufacturers, 40 to 60 per cent of a firm's carbon footprint results from suppliers' activities. For retailers, the proportion can reach 80 per cent.[135] For instance, Menzies found out that their supply chain produces over 4 million tonnes of carbon a year, while they produce only 37,500 tonnes.[136]

Most emission reduction actions entail no costs, because the needed upfront investment is more than offset through the lower usage of energy and material. To improve their environmental performance, some large companies have therefore decided to transfer to key suppliers best practices in manufacturing, purchasing, R&D, as well as energy efficiency.[137]

Other large enterprises provide support to their suppliers for environmental improvements even when it requires their own financial contribution to cover the additional costs which SMEs have to face. This is the case of Air France and KLM whose financial support to their suppliers may suffer from the consequences of the recent world economic crisis.[138]

Large companies may influence their suppliers' behaviour in two ways:[139]

- Working with suppliers to improve their environmental performance; and
- Replacing inputs used by suppliers with cleaner ones or changing supplier directly.

[135] Brickman, C.; Ungerman, D. 2008. Climate change and supply chain management, The McKinsey Quarterly.

[136] GHK. 2009. The impact of climate change on European employment and skills in the short to medium-term, European Union (Brussels).

[137] Brickman and Ungerman. 2008.

[138] GHK. 2009.

[139] Ibid.

The former type of intervention consists in providing information, advice, guidance, training, etc. to improve suppliers' environmental management capacity.[140] To this end, large enterprises may need to recruit environmental experts.[141]

An interesting application of the latter type of attitude is that of M&S and its carrier bag supplier in Germany. At a certain point, M&S decided to have recycled plastic bags in all stores. The usual supplier had only one pilot factory which could produce that type of bag and was unable to meet M&S's new increased demand. M&S changed supplier. After some hesitation, the initial German supplier decided to invest in increasing its recycled plastic bag capacity and recruited many more employees. M&S rewarded the contract to the original supplier which had adopted very innovative technology. M&S is known also for its Supplier Exchange initiative. A website has been set up, where suppliers are encouraged to swap best practices on lowering CO2 emissions, invest in workers and become more innovative.[142]

Examples of large companies trying to green their supply chain are numerous. Following are but a few cases.

- ANCC-COOP is trying to engage suppliers in greenhouse gas reduction and energy efficiency actions on a voluntary basis. The company provides practical suggestions, case studies, and a self-evaluation tool-kit on GHG emissions. It also organizes workshops and has produced a publication for awareness raising for its suppliers. The company has introduced a ANCC-COOP product brand which is also for suppliers which obtain certification based on a specific code of conduct.[143]
- Carrefour has developed a user friendly self-assessment tool for SMEs to evaluate their environmental performance and in particular their carbon footprint. The company has also helped some of its suppliers by carrying out an on-site environmental audit.[144]
- Deutsch Post DHL has developed a supplier code of conduct encouraging SMEs to adopt an environmental management system. The code of conduct was introduced in 2007 and focuses on the environment, ethics, as well as health and safety.[145]
- Holcim's suppliers must respect the company's social and environmental policies. Suppliers are requested to self-assess their performance in order to comply with SA8000 social standards and ISO 14001 environmental standards.[146]
- INMINSUR is a company which extracts gold from a mine located in a very poor area in Peru. It applies ISO 14001 environmental management standards which have been extended also to health and safety, and which suppliers must respect as well. The

[140] Higman and Poole. 2009.

[141] GHK. 2009.

[142] Ibid.

[143] Ibid.

[144] Ibid.

[145] Ibid.

[146] Ibid.

application of such environmental and social standards to suppliers has resulted in fewer accidents, and healthier and safer working conditions.[147]

- Philips requires that its own sustainability policy be applied by all of its suppliers. This policy is based on a code of conduct which includes environmental, social as well as ethical aspects. Suppliers are regularly audited and improvements are sought through discussions in forums. Philips has also set up a sustainability performance rating system for its suppliers. Firms which show a good performance receive bonuses, whereas those which have a poor performance are sanctioned. So far, Philips has terminated contracts with 20 suppliers out of the 40,000 it has.[148]
- Wal-Mart estimated that in 2006 72 per cent of its carbon emissions came from suppliers. The company is working not only with its suppliers, but also with non-profit organizations, governmental officials, academics, etc. Besides information sharing, suppliers benefit from economic incentives to improve energy efficiency.[149]

Meeting the social and environmental requirements of large companies can be extremely costly for SMEs, especially in developing countries. Small entrepreneurs may be squeezed out of the market and larger suppliers with a better financial and managerial capacity can be preferred to them. If non-compliance with social and environmental standards leads to a loss of contracts from large companies, compliance does not improve business because of high costs for small enterprises and unchanged prices. Many small firms have stopped seeking contracts with socially and environmentally responsible Western companies.[150]

5.4 The value chain approach

Section 5.3 deals with the role of large companies in greening their supply chain. It is also possible to improve the environmental performance of an entire sector through a value chain approach considering all the activities that a good or service requires from its conception to its end.

In such an approach, actors, processes and relationships within a specific value chain are taken into account. For example, the value chain in the dairy sector is composed of dairy farms, collection and distribution, retail intermediaries, milk processing, input supply, veterinary service providers, support service providers such as regulatory institutions and business associations, etc. The ILO is about to launch a "Green Jobs value chain development methodology" which focuses on this approach and uses the life cycle assessment as its main tool.[151] Life cycle assessment or cradle to grave analysis is the

[147] UNEP. 2007. Life cycle management: a business guide to sustainability.

[148] Metzke. 2010.

[149] Business for Social Responsibility. 2009.

[150] Vogel, D. 2006. The market for virtue: The potential and limits of corporate social responsibility (The Brookings Institution, Washington DC).

[151] International Labour Office. 2010d. Value chain development for green jobs – An ILO guide, draft (Bangkok).

evaluation of the environmental impact of a product or service from raw material acquisition, through production, usage and disposal.[152]

A specific value chain reflects the structure of a sub-sector. To improve the environmental performance of an industry, it is therefore necessary to consider several value chains. For instance, if the recycling sector is chosen, specific value chains such as paper, plastics, textile, etc. within the industry are to be separately considered. The ILO methodology prioritizes sectors with a high employment-creation potential and with a strong negative environmental impact.[153]

Making value chains more sustainable based on the ILO methodology entails introducing new technologies and techniques, either by using existing ones or by developing new technologies and processes.[154]

5.5 Key points for action

Points for action which can be drawn from this chapter include:

- The focus of greening actions must be on SMEs due to their financial constraints and lack of information on environmental issues.
- Financial sustainability must be considered as a priority for greening SMEs. In this regard, the most successful mechanism is large companies offering financial arrangements to green SMEs in their supply chain. Sectoral and value chain approaches can be promising, but as illustrated in section 5.2, evidence of SMEs' willingness to pay for environmental services is mixed and financial sustainability tends to be linked to specific projects and programmes.
- Business associations should include environmental services in the range of services they provide to their members, with environmental services being paying ones.

6. Green technology and green technology transfer

6.1 Green technology: What it is and what it does

The UN Global Compact lists three principles that firms should apply in their operations in order to cope with environmental challenges. One of them provides that

[152] Ecodesignguide. 2010. Life Cycle Assessment (LCA), a website. Accessed on 9 July 2010, available at:
http://www.ecodesignguide.dk/html_pages/tutorial/tutorial/tut_lca1.html
GDRC. 2010. Life Cycle Assessment, a website. Accessed on 9 July 2010, available at: http://www.gdrc.org/uem/lca/lca-define.html

[153] ILO. 2010d.

[154] Ibid.

businesses should promote the development and dissemination of environmentally friendly technologies.[155]

For some companies it is easier to be innovative than for others. The size of an enterprise and the country where it is located are factors which determine the level and type of technological innovation which can be developed. Section 6.2 will deal with the former aspect, and section 6.3 with the latter.

Cleaner technology allows firms to adopt measures through which they can reduce their impact on the environment and deliver products and services at a lower cost. This is the idea contained in the concept of eco-efficiency: "doing more with less".[156] Some examples are:

- In 2006 GE has decided to double research investment in green technology by 2010 and double its revenue goal from green products and services by the same year.[157]
- Cargill Dow uses agricultural crops to make clothing, carpets and packaging materials.[158]
- Japan's Taiheiyo Cement Corporation uses incinerated urban waste ash to obtain cement.[159]
- Holcim has made eco-efficiency the core of its business. This is crucial because concrete is the most used resource after water, and it has no substitute. Producing more cement with fewer resources and less waste and pollution is therefore extremely important.[160]
- Interface redesigns processes and products in order to recover all resources used and reuse them to close the natural or technical loop. In 2010, 36 per cent of total raw materials were recycled or bio-based materials.[161]

Clean business is good business, because sound environmental management goes hand in hand with good business performance. It has by now been clearly proved that being green means eliminating all sorts of inefficiencies, which entails gains and increased profit.[162] Some evidence is provided in the two boxes below.

[155] UNEP et al. 2008a.

[156] WBCSD. 2006.

[157] Ibid.

[158] Ibid.

[159] Ibid.

[160] GHK. 2009.

[161] Arratia, R. 2010a. Embedding sustainability, Interface Raise, The Endless Possibilities Series.

[162] Brown. 2005.

Box 6.1 Cutting energy use: Heating up profits

Nguyen Hoang Exim Co. is a Vietnamese company that employs 500 workers and which produces work wear and ladies and children wear. With the assistance of the ILO Factory Improvement Programme,[163] the firm increased profits through energy saving measures.

Two additional electricity meters were introduced in order to better monitor energy consumption and identify areas of wastage. In addition, a cleaning and maintenance programme was adopted to increase the efficiency of the coal-based steam production system of the company.

As a result, a 16 per cent reduction in monthly electricity consumption was recorded. Efficiency in heating water and steam production was also increased. Monthly coal consumption decreased by 24.5 per cent in 2007 compared to 2006, and the amount of boiled water produced per tonne of coal increased resulting in a 37.4 per cent improvement in energy efficiency from 2006 to 2007.

Source: ILO. 2008e. Cutting energy use: Heating up profits at Nguyen Hoang Exim Co., Factory Improvement Programme (Bangkok).

Box 6.2 Saving energy and boosting the bottom line resource efficiency

Tien Bo is a Vietnamese printing company employing 400 people. It has benefited from the assistance of the ILO Factory Improvement Programme.

Areas where energy inefficiencies were identified included inadequate air conditioning units in the administrative offices and poor insulation of printing rooms, high electricity price due to a lack of a capacitor in the company, and unnecessary high-capacity light bulbs.

The changes introduced to improve air conditioning and insulation resulted in a 10 per cent reduction in energy consumption annually. The purchase and installation of an electricity capacitor lowered electricity bills by 10 per cent a year. All the measures adopted including the installation of less powerful light bulbs resulted in a 20.3 per cent increase in energy/production output efficiency by July 2007 compared to 2006.

Source: ILO. 2008f. Saving energy and boosting the bottom line resource efficiency at Tien Bo Printing Company, Factory Improvement Programme (Bangkok).

Specialized agencies such as UNEP and UNIDO have developed the concept of cleaner production, which entails efforts to reduce the environmental impact in manufacturing through the adoption of environmentally friendlier technologies. Cleaner production focuses on the prevention of risks for humans and the environment rather than on remediation, and this occurs through the introduction of improved technologies.[164]

Environmentally friendly technologies offer new business opportunities also through the creation of new products. Examples include:

- Silk instead of titanium: Alternative silk applications would increase the demand for silk after decades of losses. It can be used instead of titanium in applications such as nerve repair, bone grafts and orthopedic surgery. Unlike silk, titanium requires high temperatures for smelting and conditioning and is therefore more polluting. In addition, mulberry trees for silk production constitute a carbon sink. Last but not least, the price of a ton of processed silk corresponds to half the price of a ton of processed

[163] This programme has now been replaced by a new ILO project titled "Sustaining Competitive and Responsible Enterprises" (SCORE).

[164] Higman and Poole. 2009.

titanium. Farming 100,000 additional tons of silk would result in 1.25 million rural jobs and 25,000 industrial jobs in silk manufacturing.[165]

- Coffee bean husks for growing mushrooms: In Colombia, over 100 companies, mainly run by women, have been created to produce food from what used to be considered as waste. Coffee bean husks are used as substrate to grow mushrooms, and the substrate which is left after harvesting the mushrooms is used to feed animals.[166]
- Toxic algae for paper: In North-Eastern Italy, some high-school students have managed to convert toxic algae into paper. They have set up a business to produce paper and have recently won an award for this ecological business idea.[167]

Technology transfer entails the transmission of knowledge and skills from one party to another. The transfer can occur

- between companies of different size – usually from a larger enterprise to a smaller one – and
- from rich countries to poor ones.

Public policies can facilitate technological transfer between enterprises through incentive mechanisms or direct interventions, and between countries through bilateral or multilateral agreements, international development cooperation, the establishment of technology transfer institutions, promotion of foreign direct investment, export credit, and pilot projects.[168]

6.2 Technology transfer between enterprises

It is conceptually wrong to believe that innovation occurs in isolated firms. R&D and innovation usually stem from cooperative links between large and small businesses. Enterprises of different size play complementary roles. Large companies have easier access to resources, whereas small firms are more flexible, adaptable, and have the capacity to quickly respond to customers' needs.[169]

The innovation capacity of SMEs tends to be limited to incremental changes within existing product/service configurations and supply chain relationships.[170] Small firms are more successful than large ones in new regulation-driven markets. As the market develops, the providers grow stronger, there are fewer competitors and of a larger size.[171] There is a great potential for start-ups and dynamic SMEs in the core sectors of the green economy,

[165] UNIDO. 2009.

[166] Ibid.

[167] Il Piccolo. 2010. Alghe tossiche trasformate in carta. 12 June (Gorizia – Italy).

[168] OECD. 2009.

[169] Vickers and Vaze. 2009.

[170] Ibid.

[171] European Commission. 2006.

such as renewable energy technologies, energy storage, food supply on a local and regional level, activities supporting biodiversity, and new transport options.[172]

Large companies dominate long-standing eco-industry markets as well as those new ecological markets which do not derive from regulation, but are linked to existing sectors, such as eco-construction.[173]

Multinational companies have a pivotal role to play in technology transfer to SMEs in global value chains.[174] The 1977 ILO Tripartite Declaration concerning Principles of Multinational Enterprises and Social Policy urges large companies investing in developing countries to use technologies which generate employment and adapt technologies to the needs and characteristics of the host nations.[175]

However, large companies like Coca-Cola complain because costs for innovation technology are too high. It is suggested that more financial incentives be introduced, which go beyond the tax breaks adopted until now in some countries.[176]

In some particular sectors, such as soil remediation, even small and specialized firms invest up to 5 per cent of their revenue in R&D, because more effective and cheaper techniques are very important to remain competitive in the market.[177]

A study by the European Commission (2004) reveals that the three main reasons why enterprises introduce technological innovation are to improve the image of the enterprise, to comply with environmental regulation, and to lower costs. Both product and process innovation are mainly driven by environmental regulations. Innovation is voluntarily introduced only if companies do not face negative consequences on competition factors, such as costs and quality.[178]

Since environmental R&D is strictly linked to environmental regulation, it is suggested that measures to make environmental regulation more dynamic be adopted.[179] Such measures could include a tax on waste production, and tax exemptions for companies which adopt green technologies.[180]

[172] Vickers and Vaze. 2009.

[173] European Commission. 2006.

[174] ILO. 2008c.

[175] International Labour Office. 1977. Tripartite Declaration concerning Principles of Multinational Enterprises and Social Policy (Geneva).

[176] GHK. 2009.

[177] European Commission. 2006.

[178] IMPRESS. 2004.

[179] European Commission. 2006; Dupressoir. 2006.

[180] European Commission. 2006.

Responding to a request from the Indian Government, ILO New Delhi is planning to launch a research study to consider profitability of emerging green technologies, when integrated at different stages in the product life cycle.[181]

6.3 Technology transfer between countries

Article 11 of the Kyoto Protocol states that developed country parties should provide the financial resources, including technology transfer, which developing country parties need to fulfil existing commitments. It is believed that transfers of climate-friendly technologies to poor nations should not be based on commercial conditions, but rather on preferential terms. It however seems that the protection of intellectual property rights over climate-friendly technologies remains an obstacle to technology transfer.[182]

"Issue linkage" where countries negotiate a climate-change agreement and a related economic agreement at the same time could be a viable solution to the problem. In this case, the economic agreement could be about cooperation in R&D. Such an arrangement would result in mutual gains and would increase the number of countries bound to climate change commitments.[183]

6.4 Government initiatives for technology transfer

Several government initiatives have been launched to encourage environmental technological innovation. Such activities are often based on public-private partnerships and may involve also research institutions and universities. Following are some examples:[184]

- Denmark: Five partnerships have been created to promote innovation in areas such as water and industrial biotechnologies. The overall objective is to develop competitive eco-efficient technological solutions.
- France: Since 2004 71 competitiveness clusters have been established through partnerships between businesses, research institutions and training organizations. Environmental technology projects cover the areas of renewable energy and energy efficiency, chemistry and the environment, industry and agro-resources, city and sustainable mobility, and vehicles of the future. Such initiatives are expected to generate growth and employment in the country.
- Germany: Several cooperative ventures are being established between SMEs and research institutions, or innovation clusters and interlinking activities.
- Greece: Thanks to a mix of EU, public and private funding sources, some technological innovation poles have been set up. The poles are based on cooperation between industry, enterprises, research centres and academia. Two of them focus on environmental technology. One deals with innovation in environmental management

[181] Young-Hyman, T. 2010. The role of EMP/ENT in the ILO Green Jobs Initiative: A strategic think piece, ILO draft internal paper (Geneva).

[182] UNEP et al. 2008a.

[183] Tietemberg and Lewis. 2009.

[184] OECD. 2009.

of power plants, biomass, hydrogen and renewable energy technology. The other one focuses on managing industrial wastes and natural resources.

- United States: The Environmental Protection Agency coordinates the Green Suppliers Network for SMEs in the manufacturing sector. Specific programmes have been set up to help small firms adopt cleaner production strategies. Evidence shows improved environmental performance and large savings for participating enterprises. Experiences in Europe also indicate that SMEs are increasingly interested in adopting cleaner production techniques to improve their environmental and economic performance.

Technological innovation is crucial for a transition to a green economy. It is certainly to be facilitated in all the ways described in this chapter. The technical input that specialized agencies such as UNIDO can offer in this respect is to be considered as the main source of reference and direction. A gap which needs to be filled is the direct implications of technology transfer and technological innovation on employment. Chapter 2 documented some evidence, but there is certainly scope for more research focused on this aspect of environmental sustainability.

7. Occupational safety and health (OSH) and greening the workplace

7.1 Occupational safety and health (OSH): International standards

Sound environmental practices in firms and clean production have a direct positive impact on the health and safety of workers. This is illustrated, for example, in the INMINSUR case described in section 5.3, where the respect of social, health and safety standards has resulted in fewer accidents and better working conditions.

The ILO promotes several international legal instruments which are directly linked to the safeguard of the environment. Some are binding (conventions) whereas others consist of guidelines:[185]

- The Working Environment (Air Pollution, Noise and Vibration) Convention, 1977 (No. 148), and its accompanying Recommendation No. 156 (1977);
- The Occupational Safety and Health Convention, 1981 (No. 155);
- The Asbestos Convention, 1986 (No. 162), and its accompanying Recommendation No. 172 (1986);
- The Health and Safety in Construction Convention, 1988 (No. 167);
- The Chemicals Convention, 1990 (No. 170), and its accompanying Recommendation No. 177 (1990);
- The Prevention of Major Industrial Accidents Convention, 1993 (No. 174);
- The Health and Safety in Mines Convention, 1995 (No. 176);
- The Safety and Health in Agriculture Convention, 2001 (No. 184);

[185] International Labour Office. 2005. Promoting sustainable development for sustainable livelihoods, ESP for decision. ESP Committee, 294th session, GB.294/ESP/2 (Geneva). International Labour Office. 2010c. Internal comments to the third edition of Environmental Business Management (Geneva).

- The Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187);
- The Guidelines on Occupational Health and Safety Management Systems OSH-2001; and
- The ILO ship-breaking guidelines and those concerning, for example, recycling of asbestos (2004).

7.2 A participatory approach for a greener workplace

Workers and employers within firms are starting to collaborate to green their common workplace, following a long tradition of cooperation in the field of occupational safety and health. British trade unions have already achieved a lot in greening their workplace with employers. Energy saving has been chosen as a key priority, and activities began in 2006. First, some surveys were carried out for employees. Then, events with guest speakers from environmental organizations were organized as well as training activities. The results obtained include the establishment of joint environment committees, and the granting of facilities time for training, meetings, inspections and paperwork.[186]

Workers can play a very important role in greening their workplace, through the application of good practices to save water and energy, waste minimization, and the effective application of environmental rules concerning emissions and discharges both in water and air. Occupational safety and health workers' delegates could be responsible for environmental issues as well, but they are presently not entitled to. However, in some large companies, this function is being considered in sectoral collective agreements and voluntary regional accords.[187]

Employees' participation is a factor of success in improving the environmental performance of enterprises.[188] The relevance of a participatory approach in greening a business is well documented in the case of some large Western companies, such as Interface.

[186] Trade Union Congress. 2007. How to green your workplace – A TUC guide (London). Trade Union Congress. 2010. Green Workplaces project report 2008-10 (London). UNEP et al. 2008a.

[187] UNEP, ILO, WHO. 2007. Labour and the environment: A natural synergy (Nairobi).

[188] Vickers and Vaze. 2009.

Box 7.1 Interface and the implementation of Mission Zero

This large company has been engaging its employees in environmental sustainability since 1994 and has adopted a "Mission Zero" vision to eliminate all negative impacts on the environment by 2020. Environmental sustainability is a business objective. Absolute priority is given to technological innovation to do things in new ways.

Interface's employees are unionized, but activities for environmental sustainability are not organized through trade unions. A network of environmental "ambassadors" has been set up to drive the environmental sustainability agenda within the company. To become an ambassador, employees must complete three levels of training on environmental sustainability and write an essay which is assessed by external experts. In addition, ambassadors receive a valued reward, such as access to exclusive information on sustainability or an audience with senior leaders. A system of reporting on specific environmental indicators, accountability and bonuses for success has been introduced for managers.

Communication is targeted to different groups of employees so that they can relate to environmental protection depending on their different roles. For example, engineers are motivated through challenging environmental problems to solve and are granted the required time and resources to do it. This is how innovative solutions, such as ultrasonic cutting resulting in an 80 per cent reduction in waste trimmings when cutting carpet tiles were introduced. Factory workers are part of business improvement teams which meet regularly. Bonuses are offered to teams achieving a 10 per cent reduction in waste and energy in their production line.

Sources: Arratia, R. 2010b. Mission 0, Interface Raise, The Endless Possibilities Series. Arratia, 2010a. Personal communications with Brooks, B. and Arratia, R. 2010.

Although less common, good examples of companies engaging their employees in environmental sustainability have been identified also in developing countries. Following is an example.

Box 7.2 Greening the workplace at Ventanas Smelter and Refinery

This plant of the Chilean National Mining Company (ENAMI) has recorded remarkable results in greening the workplace through a participatory approach.

The metal processing operations of the plant had constantly and seriously jeopardized workers' health and lives. In addition, its negative environmental impacts on the surrounding area were devastating, and included sulphur dioxide and particulate matter emissions, water pollution and damage to the coastal zone due to wastewater spills. In 1990 the firm recorded the highest accidents index of the seven smelters and refineries in Chile.

The company's trade union suggested then to carry out a risk map using a participatory model of occupational health. This initiative was part of a project launched by the Chilean Mining Confederation, ILO and public institutions. By 1995 the number of accidents, their frequency and level of seriousness had considerably decreased.

An integral environmental management system was also introduced, combining technical information provided by experts with practical inputs offered by employees. As a result, toxic emissions diminished remarkably.

Environmental improvements could happen only because the administration, trade union leaders and workers shared a common "environmental consciousness" and because employees became actors of change.

Source: Espinosa Mora Bowen, M. C. 2009. Greening the work place: The Ventanas Smelter and refinery in Chile. Policy Integration Department, ILO (Geneva).

Although the successful example of Ventanas Smelter and Refinery is from a developing region, in general evidence indicates that in poor and emerging countries safety and health standards are lower than those applied in advanced economies. This seems to be the case also for large companies with subsidiaries in poor nations. Even multinational

enterprises based in Europe and the United States operating in China tend to apply standards on safety in the workplace and environmental pollution, which are much lower than those used in their countries of origin and yet a little higher than the Chinese ones.[189]

Occupational safety and health standards are very low also in SMEs. Financial constraints, lack of knowledge, adequate skills and awareness are some of the issues which small firms face.[190] In addition, SMEs have few employees and they are usually not organized. It is therefore difficult to adopt a participatory approach. For solutions to these problems, the reader should refer to chapter 5.

The promotion of a participatory approach in businesses of all sizes as well as the introduction of training as described in section 8.1 would substantially contribute to the improvement of occupational safety and health standards.

8. Developing skills for greener enterprises

A sound contribution towards a green economy requires new skills, in particular for green technologies.[191] Employers, workers and governments will have to act together, although from different perspectives, for the development of the new, emerging skills. The following section will deal with efforts of workers and employers within firms towards a green workplace, whereas section 8.2 will cover the new skills needs of enterprises, and companies' as well as governments' actions to fill existing and emerging skills gaps.

8.1 Skills for a green workplace

Training is the most important channel through which staff and their workplace can be greened. Training is necessary to inform employees about the company's environmental management, changes in legislation which affect their jobs, as well as to prevent accidents at the workplace.[192]

Historically environmental training programmes were first organized to deal with safety and health: safe disposal, handling, storage and materials use.[193]

ISO 14001, the best known international standard on environmental management systems, also has some training requirements. To obtain ISO 14001 certification, companies must conduct a training-needs assessment for staff whose job may have a strong

[189] Chinen, K.; Wang, R. L.; Wang, C. 2008. Policy variations of multinational enterprises' labour practices in China, Management Research News 31(10): 729-736 (Patrington).

[190] Dimopoulos, V. A. 2007. Effective information assurance with risk management (PH.D. dissertation), (Plymouth UK).

[191] Hofmann, C.; Durán-Hero, M.; Strietska-Ilina, O. 2009. Skills for the low-carbon economy, paper prepared for the European Commission's workshop "Emerging stronger from the recession to tackle the challenges of social cohesion and sustainable development" (Brussels).

[192] Higman and Poole. 2009.

[193] Ibid.

environmental impact. Employees must be trained or have experience in environmental management and be knowledgeable about:[194]

- The enterprise's environmental policy and practices;
- The possible environmental effects of their work;
- The means through which they can improve their performance in order to increase environmental benefits and reduce environmental damage;
- Individual duties in implementing the environmental management system;
- The consequences for the individual and/or the firm if policies and procedures are not applied.

8.2 Skills for green enterprises

Both quantitative and qualitative changes in occupations have been identified for the achievement of a green economy. Quantitative changes refer to more jobs concerning specific professions, such as national park rangers when the total surface of protected areas is expanded. Qualitative changes are linked to new technologies, where existing occupations need to be updated in terms of skills required. This is, for example, the case of engineers who must learn how to apply and install new technology.[195]

In several countries, skills gaps have been identified, particularly for skilled technicians, managers and operators. These gaps are recorded in the biofuels industry in Brazil, renewable energy and environmental industry in Bangladesh, Germany and the United States, and in construction in Australia, China, Europe and South Africa.[196] Other skills gaps include knowledge on sustainable materials, skills in measuring carbon footprint and in environmental impact assessment.[197]

Based on the skills gaps described above, two types of training can be identified:[198]

- vocational training to expand the occupational training to new vocational skills and re-training for successful restructuring of enterprises involving re-training from one occupation to another, and
- environmental training including competencies to use new clean technologies and their maintenance (training for skills upgrading), which may be stimulated by new regulation or institution, such as carbon accountancy, carbon trading, regulation on pollution control, etc. Environmental training also includes changes demanded across the value chain and retraining which could be offered through the supply chain.

[194] Ibid.

[195] Strietska-Ilina, O.; Hofmann, C.; Duran-Hero, M.; Jeon, S. 2010. Skills for green jobs: A global view. Synthesis report based on 21 country studies, ILO (Geneva).

[196] Hofmann et al. 2009.

[197] ECORYS. 2008.

[198] Evans-Klock. 2010.

Recent findings reveal that the number of jobs where skills need to be upgraded is much higher than that of completely new occupations emerging from a path towards a green economy.[199]

Life-long learning and vocational training for employees are two very sensible ways to upgrade the skills of workers in order to meet environmental challenges.[200] Large companies usually organize environmental training programmes for their staff, to improve their general skills and to increase their knowledge on climate change, environmental issues in general, energy efficiency opportunities, etc. Besides general environmental training programmes, individual enterprises also develop training activities to fill specific skills gaps.[201]

The ILO SCORE project provides training to enterprises on clean production and will try to make environmental training courses sustainable by transferring training capacity to local training institutions.[202] Another relevant ILO project is the "Greener business Asia". It aims to provide environmental training programmes to SMEs in Asia.[203]

Enterprises bear the primary burden of the rapid change in demand for skills for greening economies. Governments and other institutions, such as public employment services, employers/industry associations, trade unions, etc. assist firms in this process.

Examples of training activities adopted by companies include:

- PASAR is a copper-smelter enterprise in the Philippines. Its new owner turned it from a polluting firm into a clean one. Training and re-training of employees and managers were necessary for the transformation to be successful. Some training was provided by the foreign contractors supplying the new technology and one PASAR employee was sent abroad for training. Some national institutions also provided assistance in the retraining process.[204]
- Coca-Cola has established a partnership with WWF to create a toolkit on water efficiency for the company's bottling partners. Several training workshops have been organized since 2006 in five continents.[205]
- Interface offers to its employees three levels of training in order to provide them with the skills they need to contribute to the achievement of the company's Mission Zero target entailing the elimination of all negative impacts on the environment by 2020. The first level of training is mandatory for all employees when they enter the company.[206]

[199] Strietka-Ilina et al. 2010.

[200] ECORYS. 2008.

[201] GHK. 2009.

[202] Young-Hyman. 2010.

[203] Mamic. 2009, and Bodwell. 2008.

[204] Strietka-Ilina et al. 2010.

[205] GHK. 2009.

[206] Arratia. 2010a.

- DHL has adopted its own code of conduct. For the implementation of the code, guidance notes were developed for procurement teams. In 2008, more than 500 buyers were trained on the content of the code.[207]
- After obtaining the FairTrade certification, some medium and large coffee producers in Brazil have invested in training their employees in areas such as use of safety equipment and agricultural machinery, fire control and environmental education. They also recruited consultants for training without receiving any financial support.[208]
- The Rainforest Alliance has started to sponsor training for certification for small coffee producers in Brazil.[209]

Some examples of training programmes adopted by governments are:[210]

- Australia: In 2008, in New South Wales a Green Skills Strategy was adopted, which provides funding for training institutions for green small business incentives, and energy efficiency training. A Green Business Guide for SMEs is available online, as well as a green course finder for firms which plan to upgrade the skills of their employees. Funding is provided also for demonstration projects to investigate on business opportunities and skills gaps.
- Brazil: Emphasis in the post-crisis recovery programme has been given to the production, installation, repair and maintenance of solar panels and related skills. Training employees in the construction sector on how to minimize the environmental impact of the industry has also received funding.
- Ireland: In 2008, a programme for the restructuring of the construction sector was launched. Training opportunities were offered in particular to laid-off construction workers, with a focus on new skills for energy efficiency and renewable energy sources.
- Spain: The regional government of Extremadura has launched a training programme for the unemployed on renewable energy.
- Switzerland: Part of the post-crisis recovery package includes measures for greening the economy. A 2009-2012 training programme is a component of the package and concerns training workers particularly on solar panel installation skills, and insulation and retrofitting skills in the construction sector.
- United States: Training of green-collar workers has received funding under the stimulus package of this country. Grants are allocated to training activities which aim to facilitate employment creation in specific industries, such as energy efficiency and renewable energy sources.

Especially in developed countries, industry associations and chambers of commerce have also taken the initiative to organize training activities to upgrade skills for the green economy. Examples are the chemical industry in Germany and several other chambers active in the fields of energy efficiency and renewable energy in the same country, and the

[207] GHK. 2009.

[208] Consumers International. 2005.

[209] Ibid.

[210] Strietska-Alina et al. 2010.

Costa Rican Chamber of Industries training sustainability auditors.[211] More examples are provided in section 5.2.

The acquisition of new skills and training are without a doubt a fundamental pillar towards a green economy. The ILO is responding to emerging needs in this area through new research and skills strategies which will certainly contribute to greening businesses. Sustainable enterprises will have to carefully follow evolutions in this area and implement international guidelines in order to improve their environmental performance through the upgrading of the skills of their employees as well as the identification of new occupations.

Conclusions

The present paper has tried to explore the most relevant environmental aspects of sustainable enterprises as well as their impact on employment creation. As mentioned in chapter 1, a few others remained uncovered, and several additional ones could emerge in the implementation of specific activities.

The world of enterprises is large and heterogeneous. National and international literature tends to focus on formal firms, in particular large companies, and leaves issues concerning how to make small informal businesses sustainable without solutions. Available instruments for environmental protection as described in chapter 2, for instance, apply to formal enterprises only. Extending their application and effectiveness to small, informal businesses remains a challenge, especially in those sectors like construction where greening enterprises would have a tremendous positive impact on the preservation of the environment and in those countries where informal firms are a large majority like in developing economies.

It is however hoped that the issues raised in this report will be useful to shed some light on potential positive and negative impacts on employment and the environment of specific policies, instruments and actions. Strategies adopted by policy-makers can be different and with diverse objectives, but will hopefully be based on sound technical advice highlighting both the positive and the negative sides of available options as described in this paper.

“Sustainable enterprise” is a recently-adopted concept based on economic, social and environmental aspects which are to be taken into account simultaneously. The present report has focused mainly on one of those three factors, environmental sustainability, principally because it is the most recent to be introduced in notions about enterprise development. It is however to be noted that social and economic issues are equally important and deserve the same level of attention for the achievement of decent work.

It is to be added that literature on environmental issues and gender in sustainable enterprises is essentially missing. This research gap ought to be urgently filled as well as that on how to implement environmental protection measures on SMEs in general and in the informal economy in particular.

[211] Ibid.

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