

Chapter 2

Introduction

Abstract The international agenda of sustainable and inclusive growth is described and analyzed. Key aspects of sustainable development are explored including the Human Development Index, and the Ecological Footprint. The precise meaning of key terms are explained and discussed, namely green jobs, green skills, green growth, and sustainable and inclusive growth concerning economic and social development. The importance of learning providers' conceptualisation of green jobs and green skills, decent work and jobs, generic green skills, United Nations (and the Education for Development community) policy directions for greening, and policy challenges faced by countries are discussed. Sector issues and implications for TVET providers, business and government are analyzed. Recommendations across all four case study countries (India, Indonesia, Sri Lanka, and Viet Nam) are presented, compared, and discussed with particular reference to lessons learnt and emerging best practices. The research design, aims, scope, and research methodology for the research reported on in this book are explained.

Keywords International agenda for sustainable and inclusive growth • Human development index • Ecological footprint • Training pathway • Decent work and decent jobs • Generic green skills

1 The International Agenda of Sustainable and Inclusive Growth

The concept of the green economy has gained widespread acceptance and traction since the global financial crisis of 2008. The idea of mobilizing economies, societies, education, and training for climate change was reaffirmed at the United Nations 21st Conference of Parties in Paris in 2015 (Platform for Advancing Green Human Capital 2016). The United Nations Environment Programme (UNEP) defines a green economy as one that:

...results in “improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities” (UNEP 2010). In its simplest expression, a

green economy is low-carbon, resource efficient, and socially inclusive. In a green economy, growth in income and employment are driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services (UNEP 2011: 16).

Along with the widespread acceptance and adoption of the concept of the green economy in policy circles was a strengthening of the international agenda for sustainable and inclusive growth. This agenda has emerged mainly because of the recognition that “creating new wealth through a ‘brown economy’ model based on fossil fuels has not substantially addressed social marginalization, environmental degradation and resource depletion.” In addition, we are still “far from delivering on the Millennium Development Goals by 2015” (UNEP 2011: 17). The United Nations Capital Development Fund (UNCDF 2013) elaborates further that global inequality has been on the rise for some time, and disparities between and within countries are of significant concern in both developing and developed countries. For example, in the three decades since 1985, wage gaps have widened and household income inequality increased in a large majority of Organisation for Economic Co-operation and Development (OECD) countries (OECD, December 2014).

Global inequality is also expressed as differences in national consumption of the biocapacity of the planet, and as the differences in the health of ecosystems. This is of particular concern, considering that since the 1970s, the global annual demand on the natural world has exceeded what the earth can renew. Currently, we require 1.5 planets, which under a business-as-usual (BAU) scenario, is expected to increase to about 2 planets by 2030, and to 2.9 planets by 2050. The ecological footprint of high-income countries dwarfs that of low- and middle-income countries. Examples of ecological footprints in global hectares (gha) by consumption are: Australia, 9.3; United States (US), 8.2; United Arab Emirates, 8.4; Germany, 5.3; Canada, 8.2; United Kingdom (UK), 4.9; The Republic of Korea, 5.7; Malaysia, 3.7; Japan, 5; Brazil, 3.1; The People’s Republic of China, 3.4; Indonesia, 1.6; India, 1.2; Kenya, 1.0; Sri Lanka, 1.3; and Viet Nam, 1.7 (Global Footprint Network 2012). For comparison, in 2010, 1.7 gha per person were available. However, this assumes that no land is set aside to meet the needs of other species that consume the same biological material as humans (Global Footprint Network 2014). Ewing et al. (2010) and WWF (2014) demonstrated that no country has achieved a high level of development (as defined by the United Nations Development Programme [UNDP]) within the global biocapacity (Box 1).

Box 1. Human Development Index and Ecological Footprint, 2010

The UNDP defines a high level of development as a Human Development Index (HDI) score of 0.8 or above, while 1.8 gha is the average productive area available for each person on the planet. Countries with an HDI score of 0.8 or higher, and a footprint of 1.8 gha per person or lower, meet two minimum criteria for global sustainable development: a high level of development and an ecological footprint per person that could be globally replicated to a level less than the global biocapacity. Countries that meet both

criteria would be shown in the lower right quadrant. Despite growing adoption of sustainable development as an explicit policy goal, no country meets both minimum conditions.

Source Adapted from: Ewing et al. (2010: 21–22)

In addition, the disproportionate demand of the high-income countries leading to the decline of the health of the planet’s ecosystems has occurred at the expense of middle- and low-income countries (Box 2, Figs. 1 and 5).

Box 2. Per Capita Footprint of High-Income Countries

High-income countries have historically had the most rapid increase in “per capita footprint.” In contrast, middle- and low-income countries demanded less than the average per capita biocapacity available globally until 2006, when middle-income countries exceeded this value.

The Living Planet Index for high-income countries shows an increase of 10% in biodiversity between 1970 and 2010. This is likely to have been due to a combination of factors, not least being that these nations are able to purchase and import resources from lower income countries, thereby simultaneously degrading the biodiversity in those countries while maintaining the remaining biodiversity and ecosystems in their own “backyard.” In stark contrast, the index for low-income countries declined by 58%. This trend is potentially catastrophic, for biodiversity as well as for the people living in those countries.

Source Adapted from WWF (2014: 60)

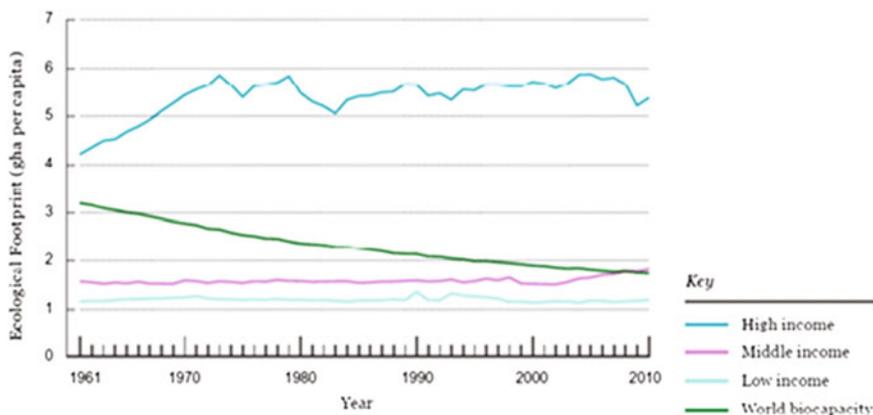


Fig. 1 Changes in the Ecological Footprint per Person in High-, Middle-, and Low-Income Countries, 1961–2010. *Note* The green line represents world average biocapacity in 2010. *Source* Global Footprint Network in WWF (2014).

Inclusive growth has different meanings depending on the national circumstances and level of development, the perspective of the representing body, and other factors. Inclusive growth has both an outcome and a process dimension, and the focus can be on both or either of the two (for an analysis of the concept, see Ranieri and Ramos 2013). It refers to participation and benefit-sharing—participation in the growth process, both in terms of decision-making to organize the growth progression as well as to participate in the growth itself; and benefit-sharing in terms of everyone equitably sharing the benefits of growth.

For some, inclusive growth addresses inequalities only in terms of poverty reduction and income disparities. For others, it includes issues such as access to quality public services including education and health care, political participation, and environmental equality. Inclusive growth also refers to addressing discrimination in gender, age, rural and indigenous populations, persons with disabilities, ethnic and racial minorities, and other marginalized people. In sum, inclusive growth can mean growth that reduces disadvantages and that embraces the non-income dimensions of well-being.

Work on the definition and indicators of inclusive growth are ongoing. The work of the UNDP International Policy Centre for Inclusive Growth starts from the premise that societies based on equality tend to perform better when it comes to economic development. For instance, countries with more equal income distribution are more likely to reduce poverty than countries with unequal income distribution. The OECD held its first Workshop on Inclusive Growth in April 2013¹ with the aim of defining and developing measures for inclusive growth, criteria for policies, and strategies for change. Their vision for inclusive growth is one that combines strong economic growth with improvements in living standards and quality of life outcomes (such as good health, jobs and skills, a clean environment, and community support). However, the OECD warns that, because the rise in inequality is so deeply embedded in our economic structures, it will be a challenge to aim for inclusive growth (OECD 2015: 21). The Asian Development Bank (ADB) states that inclusive growth has become a strategic pillar for guiding its activities. ADB advances a definition of inclusive growth as nondiscriminatory and disadvantage-reducing growth (Klasen 2010).

The combined concept of “sustainable and inclusive growth” is subject to a range of interpretations, with gradual shifts in focus on intersecting sliding scales, and with the three pillars being environment, society, and the economy. Sometimes the term is simply used as a synonym for “the green economy.” The European Union (EU) embraces the concept of “sustainable and inclusive growth” as its 2020 strategy, referring to environmental sustainability and growth that includes the disadvantaged and all European countries.

There are clear challenges ahead with regard to the international agenda of “sustainable and inclusive growth” as part of the green economy movement. As Ewing et al. (2010: 21) state:

¹www.oecd.org/inclusive-growth/.

...even optimistic forecasts are still not sufficient to bring demand within the biological capacity of the Earth. Therefore, relying on a growing level of consumption to attain sustainable well-being for all is unrealistic, especially given the increasing global population. [Placing complete reliance on continued technological improvements] in the future does not represent good planning. Worse, the accumulated ecological debt from decades of ecological overspending is likely to start decreasing the biosphere's regenerative capacity at the same time we are increasing our demands on it. Realizing the "right to develop" of all countries [...] requires constructing new development pathways that place much less strain on the global environment than have historically been the case.

It is essential to be clear about the precise meaning of key terms such as green jobs, green skills, and inclusive growth adopted in this book. In this research study, **inclusive growth** is taken to mean growth that reaches and benefits all members of a community and society in concrete ways. **Green growth** refers to patterns of decent work and the production of goods and services that are environmentally friendly and that minimize destruction of the environment. Green jobs is defined in Box 3.

A comprehensive review of the research and related literature concerning education and skills for inclusive growth and green jobs can be found in the regional summary of this book.

Greening does not imply a new sector and does not necessarily mean the creation of new jobs but it suggests a restructuring of the employment market in ways such that some new employment opportunities would be created. These could include manufacturing of solar panels and pollution-control devices. In addition, some jobs would be substituted through change, for example, a shift from fossil fuels to renewables or landfilling and waste incineration to recycling. Certain jobs could also be eliminated with the discontinuation and banning of plastic bag production and use. Many jobs would be transformed and redefined such as those of plumbers, electricians, metal workers, and construction workers, as day-to-day skills sets, work methods, and profiles are greened (UNEP 2008).

Green jobs have implications across sectors and are not limited to the familiar renewable energy and energy efficiency sectors. Different shades of green jobs are manifested in infrastructure development and construction, power, transportation, travel and tourism, agriculture, and forestry.

Box 3. Definition of Green Jobs Adopted in this Research Study

Jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable, are termed green jobs. This comprises work in agriculture, industry, services, and administration that contributes to preserving or restoring the quality of the environment while also meeting requirements of decent work—adequate wages, safe conditions, workers' rights, social dialogue, and social protection. This definition is in keeping with that adopted by the International Labour Organization and relevant others (ILO/UNEP/IOE/ITUC 2008).

The Pro Enviro (2008) report found that moving to a low-carbon and resource-efficient economy (LCREE) required a fundamental transition in behavior and the application of new skills and knowledge. Understanding and awareness were also identified as a crucial issue. The report also found that the interchangeable use of terms such as “sustainable development,” “green,” “eco,” and “environmental” caused confusion. This was the case with the term “green jobs” in the context where sustainable employers considered all jobs to be green. The Pro Enviro report further identified a range of generic (cross-sector) and sector-specific skills as priorities. Many of the identified skills already existed, had increased demand, or needed application in new situations. The report concluded that the integration of LCREE skills into all training undertaken by companies is the key to mainstreaming sustainable understanding, knowledge, skills, and thinking.

Her Majesty’s Government (2011) report, *Skills for a Green Economy*, states that companies should be thinking about generic skills required to use resources efficiently and sustainably. Additionally, the report notes that there is demand for a workforce with generic green skills across all types of firms and sectors, and that some traditional skills require a distinctive green economy awareness and understanding. In addition, learning providers have shown interest in modifying curricula to accommodate new learning demands (Box 4).

The European Center for the Development of Vocational Training (CEDEFOP) (2010) study on green skills also argues that a balance of generic and generic green skills is needed for low-carbon jobs. Along with topping up existing job-related skills, this is much more important to developing a low-carbon economy than are more specialized, green skills. The CEDEFOP study draws parallels between green skills and information technology (IT) skills, which were once considered solely specialist skills but which are now pervasive through all fields of work and life. Research by the United Nations Educational, Scientific and Cultural Organization (UNESCO), and particularly by the UNESCO International Centre for Technical and Vocational Education and Training (UNESCO-UNEVOC) highlights the lack of understanding of the concept of green skills and green jobs in both the organized and the unorganized sectors. Majumdar (UNESCO-UNEVOC 2011) argues for a whole institutional approach toward TVET greening that focuses on curriculum, campus, community, research, and culture.

Box 4. Role of Learning Providers’ Research Study

Learning providers express enthusiasm and willingness to change the content of curricula to meet new demands. However, actions have been rather piecemeal and reactive so far, although less so among those providing tuition for new occupations such as energy auditors and solar photovoltaic installers. Some learning providers gave cautious responses because of concerns about insufficient demand, and others said that they would probably wait to see how the market developed before investing. Most learning providers do not yet include green skills in their learning strategy.

Source CEDEFOP 2012: 9

A recent study by Eccles et al. (2012) suggests that companies that are early adopters of sustainability practices are significantly more likely to establish formal stakeholder engagement processes compared with companies with a low focus on sustainability. Additionally, an understanding of standards and legislation, and the ability to implement these, and skills in auditing and assessment, are important for sustainability and green business practices.

Demand for skills specific to expanding industries such as renewable energy is growing, while demand for skills in fossil fuel-based industries is declining. There is also a demand for reskilling or upskilling jobs that are transforming due to the changing nature of businesses, regulations, and compliance toward energy-efficient technologies and practices.

According to the OECD, there is considerable evidence that skills shortages may be impeding the transition to green growth in sectors such as energy-efficient construction and retrofitting, renewable energy, energy efficiency, and environmental services. Skills shortages already appear to be impeding the greening of growth. In the People's Republic of China (the PRC), as well as in India, rural electrification programs are suffering from a lack of skilled workers. Reasons for these shortages are the poor reputation and limited attractiveness of sectors such as waste management, and a limited number of teachers and trainers in environment-related services. Countries need to establish pathways for training, for skills development, and for advanced knowledge-building between skills development and TVET and higher education institutions (Box 5).

Box 5. Training Pathways—International Examples

According to the Slingenberget al. (2008), a number of countries have developed green job profiles to supplement career advice such as the Bureau of Labor Statistics within the United States Department of Labor and the United Kingdom National Career Service, which can draw on consistent systems of classification for wages and qualifications. These skills profiles provide an overview of the different phases in a sector, such as the design, manufacturing, installation, and maintenance phases and identifying the associated jobs and duties for each. The skills profiles also identify the education and training pathways into the careers and salary ranges. The National Association of Regional Councils in the United States has similar green job profiles that provide career ladder information and list specific training institutions delivering relevant vocational training including prerequisites. International industry associations and professional bodies have also developed green jobs profiles. The Australian Power Institute, for example, and some companies such as ENERCON identify key duties, responsibilities, and education and training pathways.

Source Slingenberget al. (2008)

2 Arguments Concerning the Role of Increased Employment and Productivity in Promoting Sustainable and Inclusive Growth

The prevailing view used to be that economic growth trickles down in society to lift populations out of poverty. Kuznets's hypothesis (1955) (Kanbur in Ranieri and Ramos 2013: 2) states that in the early stages of development, growth produces (and exploits) inequality, and as per capita income rises there comes a turning point after which inequality declines. It was argued that, at first, growth not only produces but necessitates income inequality. However, as Ranieri and Ramos (2013: 2) demonstrate, there has never been "consummate empirical evidence" of that being the case. In advanced economies, it can be seen that real per capita income grew steadily from 1950 to the late 2000s, but inequality also grew. In some developing countries, average income steadily grew, but in others, fast growth was accompanied by worsening inequality without the growth process reversing that trend. Instead, poverty rates persisted at high levels or even increased (Ranieri and Ramos 2013: 2).

The phenomenon of jobless growth has resulted in a deepening of existing inequalities and social exclusion, and the existence of the phenomenon of the working poor, where the majority of people—while working—remain poor and deprived (UNDP, UN Department of Economic and Social Affairs, and International Labour Organization (ILO), 2012: 4). Low growth is predicted for many large economies, and job creation will remain a challenge for some time. Moreover, the poor living in both rich and poor countries are most vulnerable to environmental degradation and climate change (OECD 2010a, b). Since low-income households spend a significant share of income on food and energy-related items, they are also more exposed to the impact of wasteful practices, overconsumption, and environmental degradation, including soil degradation, deforestation, overfishing, and fresh water shortage (ILO 2012a, b: 1).

In addition, globally, a link has been shown to exist between environmental pollution and social deprivation, with poorer communities being more exposed to environmental hazards. For example, the Commission of the European Communities found that Europe's poorest communities suffer the worst air quality, are more likely to be located near industrial sites, and are more exposed to the risk of flooding. In one study cited, people in deprived communities were exposed to 41% higher than average concentrations of nitrogen dioxide (NO₂), and in another it was found that half of municipal waste incinerators in the United Kingdom were located in the poorest 10% of communities (Commission of the European Communities 2005: 16). Other studies throughout Europe, the United States (e.g., Environmental Health News 2012), and in developing countries confirm this link.

ILO points to the need to pay attention to the quality of jobs, captured in the concept of "decent work," to help the working poor break out of the "vicious circle"

of exclusion from economic growth (ILO 2011a: 21–23). Moreover, it is now acknowledged that inequality matters, particularly for the long-term sustainability of growth (Ranieri and Ramos 2013: 4). Evidence is mounting that the business-as-usual (BAU) model bears high environmental costs, in particular as a consequence of climate change, as well as social costs, to a degree that peace and security are put at risk within nations and globally. A shortage of productive employment is considered to be a threat to social cohesion, since it produces social resentment and contributes to social and political instabilities. The aim is to facilitate access to employment for under-represented groups such as youth, older workers, women, and migrants. This requires “decent” work, that is, jobs that enable people to avoid and escape poverty. Beyond its fundamental economic role, work is acknowledged as a means to build identities and social cohesion, to participate in and contribute to society, to gain self-esteem, and to feel a sense of belonging to a community.

The current growth model is also economically unsustainable. Initial findings from the Economics of Ecosystems and Biodiversity series point out, for instance, that annual loss in biodiversity and ecosystem services due to deforestation and forest degradation is equivalent to \$25 trillion. In addition, higher concentrations of greenhouse gases (GHGs) in the atmosphere will entail considerable economic costs, notably in terms of reduced productivity. Projections indicate that, under a BAU scenario, productivity levels will be reduced by 2.4% in 2030 and by 7.2% in 2050 (ILO 2012a, b: 4) (Fig. 2).

Modelling by the United Nations Environment Programme (UNEP) (2011: 518–521) demonstrates that an overall decoupling of natural resource uses from economic growth is possible and that it can result in positive trends for employment, gross domestic product (GDP), poverty, nutrition, water stress, footprint, and bio-capacity. UNEP states that, depending on the investment simulated, and its timing, the global total net direct employment in green sectors may decline in the short term (primarily due to a decline in fishery and forestry sector employment) to converge on or rise above BAU employment in the medium to long run.

ILO, in collaboration with other agencies, has produced a significant body of evidence that shows that employment and decent work can facilitate the shift toward sustainable and inclusive growth. ILO (2012) emphasizes combining environmental policy with labor policy to bring about a double dividend of increases in employment and improvements to the environment. They argue that even immediate positive socioeconomic benefits are possible if environmental policies are accompanied by appropriate measures that mitigate possible negative consequences.

ILO cites environmental tax reform as the most prominent example. ILO modelling shows that if an eco-tax equivalent to 1% of GDP had been introduced in 2012, and labor taxes had been simultaneously reduced by the same amount, multifactor productivity would be 1.5% higher in 2020 compared with the case in which green taxes are not used to support employment. By 2050, multifactor

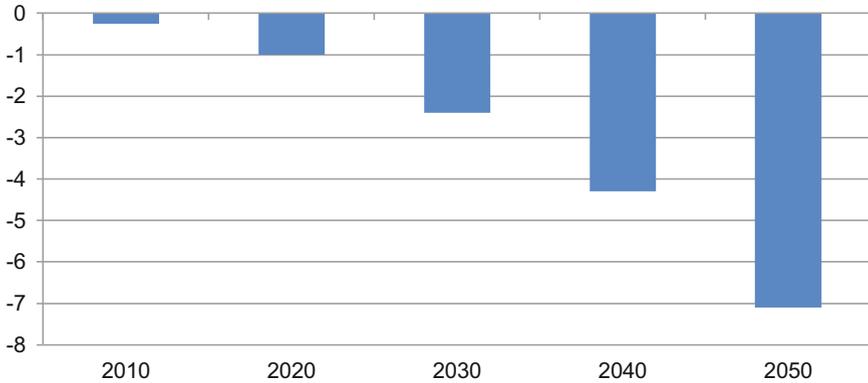


Fig. 2 Productivity Loss from Further Increases in Greenhouse Gases (%). *Note* The baseline scenario assumes that environmental damage remains at the level of the base year (2000). *Source* Bridji et al. in ILO (2012: 4)

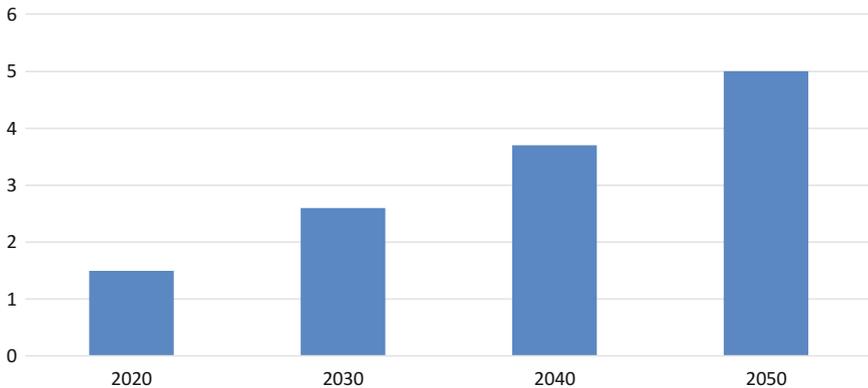


Fig. 3 Global Productivity Effects of Using Green Tax Revenues to Support Jobs (%). *Note* The figure shows the increase in multifactor productivity that is estimated to arise as a result of the use of revenues from green taxes (equivalent to 1% of gross domestic product) entirely to reduce labor taxes. *Source* Bridji et al. in ILO (2012: 168)

productivity would be 5% higher (Fig. 3). The idea is that lower labor taxes boost employment, in turn stimulating potential output and creating new investment opportunities. To amplify the positive effect, ILO suggests using tax revenues for skills development to meet the current skills shortage of green skills. (For more discussion and an overview of the empirical evidence, see ILO 2011b: 69–74.)

The concept of economic growth has lost its primacy in so far as it is now recognized that sustainable development has to build on social inclusion and preservation of the environment.

3 Conceptualization of “Green Jobs” and “Green Skills”

3.1 *Green Jobs*

The European Commission (2013: 7) has identified two approaches to defining green jobs that have emerged from the policy and research literature: the “eco-industry” approach, in which “jobs are green by nature of activity,” and the “transformation” approach, in which “all jobs are greening.” UNEP et al.’s definition sits along the lines of the eco-industry approach, referring to specific activities and sectors that contribute to improving the environment. They define green jobs as

...work in agricultural, manufacturing, research and development, administrative, and service activities that contributes substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high-efficiency strategies; decarbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution (UNEP, ILO, International Organisation of Employers (IOE), and International Trade Union Confederation (ITUC) 2008: 3).

An important element of this definition of green jobs is that the jobs need to be decent work, that is, productive, providing adequate income and social protection, safe working conditions, job security, reasonable career prospects, a respect for the rights of workers, and giving workers a say in decisions that will affect their lives (UNEP, ILO, IOE, and ITUC 2008: 3).

A later definition of ILO suggests that there is room for a job to be included in the definition of green jobs as long as the work is designed to reduce the environmental impact that the work would have under BAU conditions, and as long as the work is decent. They say that jobs are green jobs when they

...reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high-efficiency strategies; decarbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution (Keivani et al. 2010: ii).

Some jobs in high carbon-emitting industries could be included such as steel-workers producing wings for wind turbines. On the other hand, there are jobs in sectors that generally are understood to be part of the green industry but, because of the processes and practices they use, cannot be considered green jobs. Figure 4 visualizes the spectrum of green and decent work (e.g., UNEP et al. 2008: 3; ILO 2012a, b: 7).

Activity-based definitions of green jobs are likely to focus on a too-narrow area of the economy (European Commission 2013: 8). The “transformation” approach on the other hand considers cross-sectoral impact and restructuring effects on the resource- and energy-intensive sectors. As the European Commission (EC) indicates, the transition to a greener economy is a dynamic process of transformation likely to affect the quantity and nature of work and skills needs across all sectors

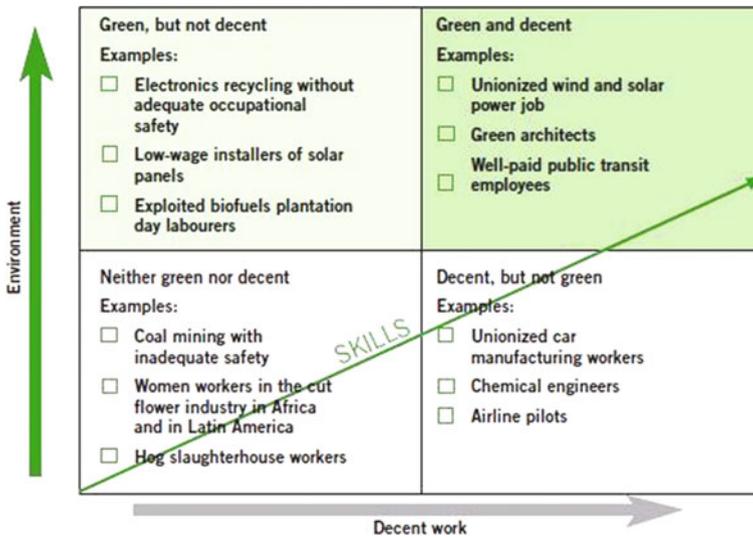


Fig. 4 Green and Decent Jobs—A Schematic Overview. *Source* ILO (2011a: 23)

and occupations (EC 2013: 7). As greener economies develop, the dividing line between “green” and “other” work can be expected to shift, so we can think of “shades of green” when it comes to different jobs. A set of broader definitions have therefore emerged, placing “green jobs” on a spectrum. Jobs or economic activity in this sense are seen as “green” as a consequence of the transformative process of “greening.” To this end, the EC defines green jobs as:

... covering all jobs that depend on the environment or are created, substituted, or redefined (in terms of skills sets, work methods, profiles greened, etc.) in the transition process towards a greener economy (EC 2013: 8).

The EC states that, although the two approaches are conceptually distinct, they are not mutually exclusive. The “eco-industry” approach allows us to identify a core subset of activities that are affected by environmental and low-carbon drivers. These are the kinds of jobs created through new technologies such as renewables, and the redefinition of existing jobs in eco-industries such as agricultural workers who are increasingly required to manage farmland habitats and features, or spatial planners who need to integrate the needs of habitats and species with those of human land uses (EC 2013: 8).

Countries have been developing their own national definitions of green jobs. The report of the OECD (2012: 117–119) provides a list of these. ILO is working on a standardized definition that can be applied by countries in all regions and at all stages of economic and social development (Stoevska in ILO 2012a, b: 7). Stoevska and Hunter (2012, Oct), labor statisticians for ILO, have developed a schematic classification where it is possible to identify which kinds of jobs are excluded or included in the definition for statistical purposes and to allow for comparisons.

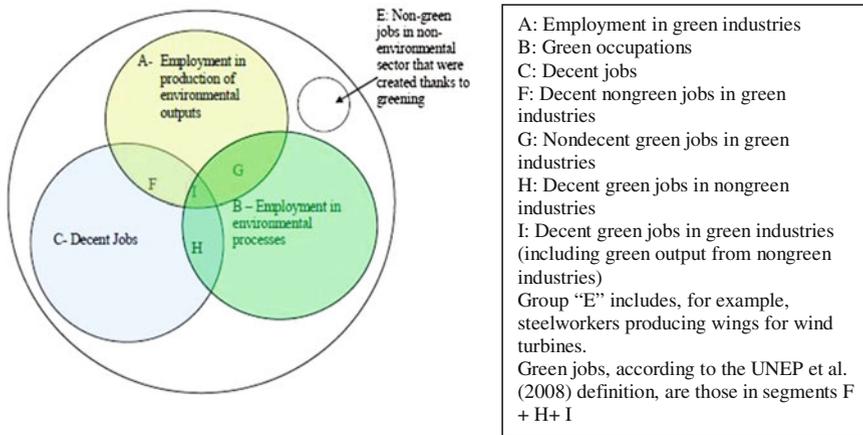


Fig. 5 Schematic Relationships among Total Employment, Green Jobs, and Decent Work. *Source* Adapted from ILO (2012a b: 7), Stoevska and Hunter (2012, Oct.: 16)

The core elements are jobs defined by environmental outputs and jobs defined by environmental processes (Fig. 5).

3.2 Green Skills

Conceptualizations of green skills range from the narrow technical skills required for very specific jobs to the broadest set of soft skills (ILO 2011a: 103). UNEP et al. highlight that employment and skills needs are affected in at least four ways as an economy is oriented toward greater sustainability:

In some cases, additional jobs will be created—as in the manufacturing of pollution-control devices added to existing production equipment.

Some employment will be substituted—as in shifting from fossil fuels to renewables, or from truck manufacturing to rail car manufacturing, or from land-filling and waste incineration to recycling.

Certain jobs may be eliminated without direct replacement—as when packaging materials are discouraged or banned and their production is discontinued.

It appears that many existing jobs (especially those such as plumbers, electricians, metal workers, and construction workers) will be transformed and redefined as day-to-day skills sets, work methods, and profiles are greened. (Or, for example, gas fitters move toward installing gas combined heat and power instead of traditional systems, or builders develop skills in retrofitting, EC 2013: 8, added by this author) (UNEP, ILO, IOE, and ITUC, 2008: 43).

The new jobs in the green economy are likely to be medium- and high-skilled jobs (EC 2013: 22). ILO (2011a) summarizes that there is a tendency for emerging

occupations to require higher level qualifications, while low and medium skill-level jobs will experience changes. Many more jobs in existing occupations face skills changes than there will be jobs in newly emerging occupations. Whether a job is new or simply an existing job but with some new elements highly depends on the country context. For example, an energy auditor may be considered as a new green occupation in, for example, Indonesia or Viet Nam, but in Germany, it could be seen merely as a shift in the competences of an auditor, which is a long-established occupation (CEDEFOP 2010: 13–14).

Fundamental skills for the majority of green jobs already exist (CEDEFOP 2010: 8–9; Bird and Lawton 2009). The level of retraining required for workers to convert to an occupation in a greener industry may be less than expected. Rather than full retraining, it is more likely that workers may need some additional training to learn about new green concepts and practices, upskilling or adding to existing core skills. For example, workers with experience in shipbuilding and in the oil and gas sector are sought after in the wind-turbine industry for their skills in welding, surface treatment, and outfitting. Internationally, for the transition to a green economy, the skills that are in demand and that are missing are those that are in demand and missing in the economy in general: management and leadership skills; and technical, job-specific skills, including those in science, technology, engineering, and mathematics (Bird and Lawton 2009: 8; CEDEFOP 2010: 8).

According to other experts, specific skills profiles in the green economy exist. Examples of these are knowledge of sustainable materials, relevant traditional skills, carbon footprinting skills, environmental impact assessment skills (flora, fauna), and a good understanding of the “sound” sciences (CEDEFOP 2009: 26). Some core skills that apply in one way or another are those in improving energy and resource efficiency; complying with environmental legislation; reducing environmental pollution and waste; and adopting, adapting, implementing, and maintaining skills (for a list of core skills, see ILO 2011a: 107). Generic skills that are needed include strategic and leadership skills, adaptability and transferability skills, systems analysis, design, holistic approach, risk analysis, coordination skills, and entrepreneurship. The complexity of these skills increase with the complexity of the jobs (CEDEFOP 2009: 26).

Appendix A lists some generic green skills.

4 Background and Purpose

The prominence of Asian economies and corporations, together with globalization and technological innovation, are leading to long-term worldwide changes in trade, business, and labor markets. There is a rebalancing of power and influence, centered on the Asia and Pacific region.

The ADB report, *Asia 2050: Realizing the Asian Century (2011)*, indicates that Asia could account for 51% of world GDP by 2050 (compared with 27% in 2010) if it continues to grow at the same pace. This represents a sixfold increase in per capita

income, equivalent to European levels of today. Seven economies—the PRC, India, Indonesia, Japan, the Republic of Korea, Malaysia, and Thailand—are projected to account for 87% of GDP growth in Asia and almost 55% of global GDP growth between 2010 and 2050.

Trade within Asia is growing more rapidly than trade between Asia and the rest of the world, potentially leading to a deeper level of regional integration and cooperation, which is a major avenue for regional development. These developments for greater prosperity need to be maintained through inclusive and sustainable growth.

Some Asian countries have pursued policies of industrial upgrading and diversification toward more sophisticated products that add value and increase labor productivity. Others have pursued service-led growth. Countries in Asia need to align skills and training policies with economic and industrial policies to sustain growth, productivity, and competitiveness. Asian countries need to address problems of unemployment and underemployment, particularly among youth and the marginalized. A reengineered, modernized, and innovative skills development system, contributing to employability and sustainable livelihoods, is called for.

With most Asian countries now achieving good progress toward universal primary education, the priority is shifting to secondary and postsecondary education. Countries need to build strong and diversified skills training and higher education systems to supply the expanding needs of employers. In this regard, skills development for employability, particularly through TVET, is viewed as being particularly important (Maclean et al. 2012).

Ensuring that the resultant economic growth is distributed fairly, and does not damage the resource base upon which future growth depends, requires policies for inclusive and sustainable growth.

The transition to green growth for a carbon-constrained future currently focuses on matters such as efficient use of energy; consideration of secondary energy inputs (e.g., from fuel used for transportation of goods and services); greater use of renewable energy and associated investment in technology development; waste reduction leading to lower pollutant emissions; production processes that conserve, recycle, and reuse natural resources; and an understanding that environmental regulations, standards, and economic instruments are not a hindrance to production, but are essential for achieving inclusive and sustainable growth (Maclean et al. 2014).

Climate change is generating economic and environmental dislocations, and these pressures are set to increase in the coming years. These pressures also bring opportunities in the Asia and Pacific region through the necessity to develop new technologies for adjusting to a carbon-constrained future. This will see a reengineering of established production techniques and will increase demand for climate-compatible goods and services. Those places that best anticipate and respond to these needs will be positioned for significant growth in the years ahead.

Regarding inclusive growth and green jobs in Asia, a number of Asian countries have reached middle-income status (ADB 2011). These countries need to improve competitiveness to escape the “middle-income trap.” This requires strengthening

skills for new technologies and innovation.² Policy makers are acknowledging the importance of anticipating and building capacity for future needs (ILO 2010). However, the adoption of green growth policies is likely to require new skills to react to the needs of the labor market. Several governments are building policy foundations toward green growth and the need to prepare for the growth of green jobs and green skills through responsive education and training strategies (ADB 2012).

The ADB *Education Sector Operations Plan* (ADB 2010) seeks to align ADB support in education with the needs and priorities of its developing member countries (DMCs) and strengthen the quality, inclusiveness, and relevance of education. The plan emphasizes that ADB will support DMCs to diversify and expand higher education and TVET to match labor market needs.

To maintain growth rates in Asia, important concerns include increasing employment, facilitating appropriate skills provision for global competitiveness, and reducing inequality. A key factor affecting rising inequality is rapid globalization, which raises the need for new and appropriate skills (World Bank 2010). Economies need skills to serve knowledge-based industries, provide high-level skills to support technology absorption and further innovation, and broaden opportunities for skills development in new and emerging technology areas. Enhancing opportunities for skills training, particularly for poor and middle-income groups, women, and disadvantaged students, in line with the needs of fast-growing industries, will bring employment benefits and higher incomes, and will act as an important contributor to inclusive growth. Youth unemployment, underemployment, and provision of training in out-of-date, irrelevant skills are urgent issues to be addressed.

Maintaining economic growth sustainably is a policy challenge that Asia has begun to address. Awareness is increasing that green growth approaches are economically and politically feasible and profitable. A number of studies estimate that by 2030, 100 million green jobs³ will be available worldwide (ILO 2008)—about 2% of the global workforce. Of these, 50 million green jobs are anticipated in Asia. Green stimulus packages after the financial crisis of 2008 have led to increased public investment in green infrastructure, for example public transport, low-carbon energy production, smart electricity grids, energy-efficient buildings, and water and sanitation infrastructure (Anbumozhi and Bauer 2010). Examples of green jobs

²Analysts have described the “middle-income trap” as one where developing economies are not able to move beyond growth based on low-cost labor advantages in manufacturing for exports to growth that is capital and skill intensive, supports expanding domestic markets and the services sector, and brings greater value addition.

³Green jobs contribute to preserving or restoring the quality of the environment and can be in diverse sectors such as energy supply, recycling, agriculture, construction, and transportation. They reduce the environmental footprint of economic activity and help cut consumption of energy, raw materials, and water through high-efficiency strategies to decarbonize the economy and reduce GHG emissions, to minimize or avoid altogether all forms of waste and pollution, and to protect and restore ecosystems and biodiversity (UNEP).

include manufacturing fuel-efficient cars, solar panels, green-building construction work, renewable energy products, and green professionals such as energy auditors (Box 6).

Care needs to be taken to ensure that green jobs provide decent work, with adequate wages, safe working conditions, job security, career prospects, and worker rights.

Box 6. The United Nations and Policy Directions on Greening

Jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable, are termed green jobs. This comprises work in agriculture, industry, services, and administration that contributes to preserving or restoring the quality of the environment while also meeting the requirements of decent work—adequate wages, safe conditions, workers' rights, social dialogue, and social protection. This is in keeping with the definition adopted by agencies such as ILO and relevant others working in this area (ILO/UNEP/IOE/ITUC 2008).

Education and training need to meet the requirements of labor markets including those for green jobs. Enterprise surveys by the World Bank show that 50% of firms surveyed since 2000 in East Asia, Southeast Asia, and the Pacific are concerned about the quality of workers' education and skills, compared with 25% of firms surveyed in member countries of OECD (World Bank 2010). The survey found unemployment of graduates and fairly long time intervals to fill professional vacancies. This indicates that education and training systems are mismatched with the needs of the high-growth sectors. Skills training initiatives need to be supplemented with effective skills forecasting models that are responsive to industry plans and requirements.

Countries are evaluating the costs of adopting green growth measures, and industries are being encouraged to move to green production systems through incentives or regulatory requirements. Training is required in new and redefined skills to prepare the workforce for a green economy. New green jobs will become available, and job substitution will result from the greening of corporations and the shift from fossil fuels to renewable sources (UNEP 2008). Education and training institutions do not yet have effective response strategies for green jobs. The ILO Global Report (2011) concludes that in many developing countries governments and formal TVET have not yet responded to skills challenges associated with environmental issues and climate change. This is mainly due to the absence of well-developed mechanisms that help TVET to adjust to the changing needs of the labor market. Often companies account for the biggest share of skills provision, and nongovernment organizations (NGOs) are playing a key role in nonformal skills provision for green jobs. Training course offerings for green skills need to be developed in sectors that are key drivers of growth and employment. Green industries in Asia and the Pacific are currently fragmented. University offerings lack

cross-disciplinary breadth and the faculty to train future workers for the technical, economic, social, and managerial challenges in green industries.

Industry and business have initiated steps to train workers for green processes and products. However, governments, industries, and educational institutions have not yet developed coordinated actions to prepare the workforce in green skills. As countries in Asia and the Pacific put in place national policies and strategies for adapting to a carbon-constrained future, the capacities needed have not been adequately analyzed. Regional entities, such as the Association of Southeast Asian Nations, are supportive of bringing together business leaders in green industries. International commitment to clean and green growth requires green professionals in areas such as assessment, reporting, and certification. Currently they are primarily from developed countries.

The ILO (2011a, b) Skills for Employment Policy Brief identifies a number of challenges that countries face. These are summarized as follows:

Challenge 1: Skills shortages are hampering the transition to greener economies.

A lack of the skills needed to meet the requirements of changing and newly emerging occupations impedes green investment and hinders green economic development. Many countries lack teachers and trainers in environmental awareness and specialist areas such as renewable energy.

Challenge 2: Skills and environmental policies need to come together.

Most countries have drawn up environmental policies, but few have put in place the skills development strategies needed to implement these. Without coherence between skills and environmental policies, skills bottlenecks may impede the successful transition to greener production and consumption.

Challenge 3: Green structural change will be profound in certain sectors.

High carbon-emitting sectors are most likely to be negatively affected by green structural change. These include mining, fossil fuel-based energy generation, manufacturing, forestry, and agriculture. Workers moving out of declining sectors into growing ones will require retraining. The role of employment services in matching skills and jobs and in retraining workers and job seekers is thus crucial.

Challenge 4: Occupations will change at different rates and in different ways as economies go greener.

Not all greening will involve a fundamental change in occupations. Some occupations will not change. There will be far more established occupations requiring skills upgrades than new occupations. Where new occupations are created they often call for higher level qualifications, either because of their dependence on new technologies or because they require sophisticated skills.

Challenge 5: Skills required in a greener economy need to be identified.

Ways of classifying and measuring green jobs are only now being refined. In their absence, most countries have relied on qualitative data gathered through enterprise surveys, occupational research, or consultation with experts. There is thus a need to develop complementary quantitative methods to identify the specific occupational needs of a greening economy.

Challenge 6: Appropriate training needs to be put in place promptly.

Training systems need to respond quickly to demand. This is a particularly challenging requirement, given that the updating of courses usually takes time. Government-sponsored training programs have proved valuable, notably where they take advantage of formal education and training systems with well-established flows of information between industries and training institutions.

5 Research Design

5.1 Aims

The key objective of this ADB research study is to increase the knowledge and capacity of the four DMCs being examined (India, Indonesia, Sri Lanka, and Viet Nam) to match education and skills training to jobs, including for green occupations. The project aims to assist these four DMCs put in place timely and effective policies and strategies for skills development. It seeks to facilitate dialogue and networking among the public sector, business and sector councils, industry and occupational associations, and employee associations to assess gaps in policy and practice for the development of skills and to anticipate future needs. The research study addresses both technology-oriented high-end skills as well as middle- and lower end skills to ensure that issues of inclusiveness are addressed in the context of rapidly growing economic sectors, including greening sectors.

In terms of the governance of the four countries there are some important similarities and differences: India, with a population of 1.27 billion, is a democracy involving a union of 29 states and 7 territories; Indonesia, with a population of 242 million, is a presidential representative democratic republic with 34 provinces; Sri Lanka, with 20.5 million, is a presidential representative democratic republic; and Viet Nam, with a population of 93.4 million, is a single-party socialist republic with a centrally planned and controlled economy.

This ADB-Education University of Hong Kong (EdUHK) research study seeks to lead to improved knowledge and enhanced capacity in the DMCs to create an adequate skills base to support growth and employment and to serve green jobs in key industries. Education and training institutions should become aware of best practices for curricula and training approaches to respond to skills needs in key industries. The study addresses industries with potential for high employment, growth and greening, and those that face changes due to a carbon-constrained future. Selected industries have been examined, these being building and/or construction, transport, energy, hospitality, and one other important industry specific to each country's context. The study considers two sectors in detail in each country, not necessarily the same ones for each country, and the other three sectors are covered but in less detail to allow comparisons regionally.

5.2 Project Scope

For each of the four participating countries the scope of this study is to

- identify mismatches and gaps between training and employers' needs in green jobs;
- identify opportunities for strengthening green skills training as a means of reducing unemployment for all, including youth and women;
- provide case studies demonstrating good practices; and
- recommend policy and strategy options for skills development, with a focus on green jobs.

5.3 Methodology

Data for each of the four countries have been collected through

- surveys (100+ TVET providers and 100+ employers) in each country;
- interviews (50+ interviews in each country with representatives from government, NGOs, the private sector, and TVET providers);
- roundtable meetings (bringing together up to 20 stakeholders in each country for discussion sessions);
- inputs from the three international and 12 national consultants; and
- review of the research and related literature.

For information on the research instruments used see Appendix 3 for the Employers' Survey Instrument; Appendix D for the TVET Providers' Survey Instrument; Appendix E for the Employers' Interview Protocol; and Appendix 6 for the TVET Providers' Interview Protocol.

5.4 Limitations

This research study cannot meaningfully speak about "the economy" in India, Indonesia, Sri Lanka, or Viet Nam in overall, general terms, since there are, in a sense, many economies (or subeconomies) in each of these countries: the formal as well as the nonformal economy, the national economy, the various state economies, and the urban and rural economies.

This study focuses mainly on what is happening in the formal TVET sector, and some sectors of the formal economy, in India, Indonesia, Sri Lanka, and Viet Nam. However, the unorganized sector is very large, important, and influential in each of these countries, since it is reliably estimated that over two-thirds of economic activity occurs in the informal sector. This research also has not included such

important sectors as retail and agriculture, although a large portion of the population in each of the four countries works in these sectors.

Gathering reliable, representative statistics from government sources is a major challenge, because of the many shortcomings in the coverage, accuracy, and quality of data collected. It is not possible to generalize from government statistics for the whole workforce, since available data refer mainly to the formal sector of the economy. The identified skills are only indicative and are not comprehensive. The skills could not be fully mapped, with occupational standards being developed by the sector skills.

In each country, there were approximately 100 respondents to the survey questionnaire filled in by TVET providers, and a similar number filled in the survey of employers. In addition, in each country approximately 50 interviews were undertaken with employers, employers' associations, TVET providers, government representatives, and NGOs. Given the relatively small numbers, the reporting of the survey and interview data therefore needs to be treated with caution. It should not be assumed that the survey and interview findings are indicative for the countries as a whole. This should therefore be regarded as being an exploratory study, and so it will be up to other larger scale studies to test the wider generalizability of the findings reported on here.

5.5 Reporting Mechanism

The overall outcome of the study has been to develop mechanisms to improve and increase the availability of job-oriented courses and skills training, including for green occupations. The ADB goal is to see an increase and improvement in the number of courses and training curricula in skills development, including skills for green occupations, in the four countries by 2017.

5.6 Availability of Detailed Country Case Studies

The full detailed case studies of India, Indonesia, Sri Lanka, and Viet Nam are available for viewing and downloading from, www.cna-qatar.com/research/unesco-unevoc.

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