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Greening TVET in the context of climate change policy developments

Report of the UNESCO-UNEVOC
virtual conference
02 November – 13 November 2015

Moderated by Nick Sofroniou

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Foreword

The Paris Agreement is in action now. The effects of climate change on countries is driving collective action to formulate green growth agendas, transform economic, social and environmental development goals and achieve critical environment-sensitive targets, bills and legislations that enable the reduction of greenhouse gas emissions. Due to the complex nature of climate change, there is a need to shift to multi-stakeholder engagement. Indeed, issues related to climate change cannot be addressed by one viewpoint alone, but rather need multiple perspectives and cross-sectoral engagement.

Education and training plays an important role in this regard. Equipping youth and adults with technical and vocation skills for employment, decent jobs and entrepreneurship is an important target within the transformative education vision set out in Sustainable Development Goal (SDG) 4, namely that of "inclusive, equitable quality education and lifelong learning opportunities for all." In this context, the need to transform the TVET sector to maximize its potential to contribute to the fulfilment of the SDG 4, as well as the promotion of green and sustainable economies and societies, is of high relevance.

UNESCO-UNEVOC contributes to this process through a number of activities, including advocating for a whole institution transformational approach to Greening TVET, curriculum development and 'topping-up' of green skills in existing curricula, community-based approaches to promote social inclusion and sustainable development, and the sharing of promising practises. In this context, UNESCO-UNEVOC organized a virtual conference from 02 to 13 November 2015. Moderated by Dr Nick Sofroniou, Principal Research Fellow at the Institute for Employment Research of the University of Warwick and an expert in green skills development, this virtual conference acted as a forum to collect insights, hopes, expectations and concerns for raising TVET's relevance in the post-2015 development agenda. With an emphasis on action-oriented outcomes, the conference report provides an extra impetus as we are entering the phase of implementation of the Paris Agreement

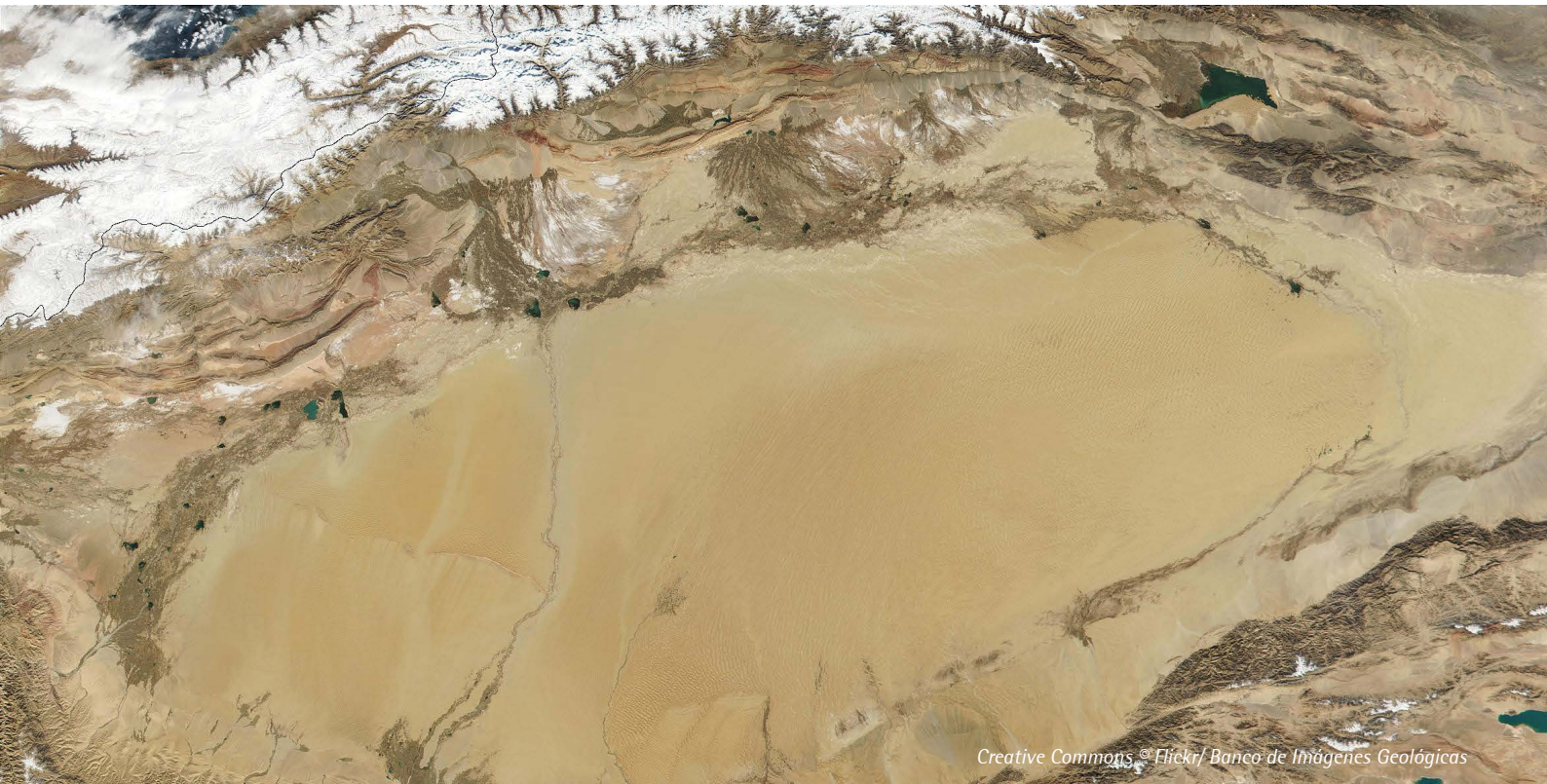
and will seek to define TVET's transformative role in developed, as well as developing countries, as well as its untapped capacities, through the sharing of promising practises and experiences.

This virtual conference was the eleventh in a series of moderator-driven discussions introduced by UNESCO-UNEVOC in 2011. Conducted on the UNEVOC TVeT Forum – a global online community of over 4,000 members – and guided by an expert, these discussions provide a platform for sharing of experiences, expertise and feedback and wish to inspire people to take further action. We would like to thank Dr Nick Sofroniou for sharing his expertise on greening TVET with the wider community. I would also like to also pass on Nick's acknowledgements of Katerina Ananiadou, Kenneth Abraham Barrientos, Wouter De Regt and Max Ehlers' contributions during the virtual conference. Lastly, we would also like to extend our sincere gratitude to all participants who took the time to share their experiences on the topic and contributed to the development of this report.

Shyamal Majumdar

Head of UNESCO-UNEVOC International Centre

Introduction



Global climate change presents many challenges on the road to sustainable development. Responses to climate change require a transition to greener economies, impacting certain sectors of the economy by changing the nature of occupations and increasing the demand for new skills (Cedefop 2010, 2013; European Commission 2011; Strietska-Illina et al, 2011). Skills shortages act as obstacles to this transition as the cost of climate change mitigation and adaptation increases. This transition from high-to-low carbon intensive production will involve a redistribution of labour that demands adequate preparation and must enable people to take this up. Industries may need government support to efficiently adapt, while policy-makers and educationalists will need to ensure that skills and training are aligned with the coming transformations in the employment landscape. Examples of recent paradigm shifts include the recent Kuala Lumpur Declaration on Quality Education and Skills Development for Sustainable Future, August 2015, which includes recommendations for the integration of greening skills for sustainable development into technical and vocational education and training (TVET) programmes in the Asia and the Pacific region, while Majumdar (2011) has presented the case for greening TVET more generally.

Key challenges for green employment have been identified by the Inter-Agency Working Group on Greening Technical and Vocational Education and Training and Skills Development (January, 2013) which presented a set of policy recommendations, responding to the request from the G20 Development Working Group on the Human Resources Development Pillar. The recommendations refer to measures to be undertaken in education, training, employment and policy-making. They emphasize that there is a need for effective policy coordination and social dialogue, which will engage individuals, companies and institutions to take initiative. According to the policy recommendations, high quality education and training will contribute to this occupational change and improve the quality of jobs, while the private sector needs to adopt and generate new greener technologies. Importantly, greening TVET is a key point to be included in education and sustainable development agendas. Training providers are well placed to promote sustainability at a local level. In order to identify and anticipate skill needs, labour market information (LMI) systems need to be enriched with up-to-date statistics indicators. A methodology for mapping detailed occupational

skill profiles from the US O*NET classification to occupational data and forecasts for other countries (Dickerson, Wilson, Kik and Dhillon, 2012), has proved useful in this context. For example, it is utilized in the UK Commission for Employment and Skills' LMI for All¹ data portal for informing careers decisions. Cedefop (2015) has also explored their use for the EU Skills Panorama².

A number of international agencies have undertaken research on the impacts of the green economy on employment and the role of green skills, including UNESCO-UNEVOC, UNITAR, International Labour Organization (ILO), Organisation for Economic Co-operation and Development (OECD), the European Commission, the European Centre for the Development of Vocational Training (Cedefop) and the European Training Foundation (ETF). Two Green Skills Fora were co-organized by OECD LEED and Cedefop in Paris. The first forum, Skills for a Low Carbon Economy (Martinez-Fernandez, Ranieri and Sharpe, 2013), fed into a variety of projects, including OECD LEED's work on Measuring the Potential of Green Growth³ and Improving the Effectiveness of Green Local Development⁴, Cedefop's Green Skills activities, the European Commission's initiative on New Skills for New Jobs⁵, the Rio+20 process and the G20 pillar on the Framework for Strong, Sustainable and Balanced Growth⁶. The second Green Skills Forum 2014 (Cedefop and OECD, 2015) discussed the transition of labour markets to greener employment growth among researchers, policy makers and experts in innovation, employability

1 <http://www.lmiforall.org.uk>

2 <http://euskills Panorama.cedefop.europa.eu>

3 <http://www.oecd.org/cfe/leed/lowcarbon.htm>

4 <http://www.oecd.org/cfe/leed/greendevlopment.htm>

5 <http://ec.europa.eu/social/main.jsp?catId=958>

6 <http://www.oecd.org/g20/topics/framework-strong-sustainable-balanced-growth>

and skills. It considered how governments at all levels may enable favourable conditions for the transition to and growth of low carbon activities, generating opportunities for including all members of the labour force. Examples of the integration of low carbon and inclusive employment were presented, and the role of training in greening the economy and the potential of the public and private sectors were also discussed.

The UNESCO (2014) Roadmap for implementing the Global Action Programme on Education for Sustainable Development places special emphasis on groups that are particularly vulnerable to the impacts of climate change, and development which is unsustainable. These groups include individuals such as girls and women facing persistent exclusion and inequality, as well as countries that will be hardest hit by climate change such as the Small Island Developing States (SIDS) and the continent of Africa experiencing rising sea levels and climate extremes including droughts and desertification that impact on the livelihoods and wellbeing of their citizens. While discussions concerning the greening of occupations often focus on high-skilled, well paid jobs such as in the industries of renewables, energy efficiency and mass transit, in practice green jobs include small-scale enterprises and traditional jobs that employ lower skilled workers in the fields of farming, eco-tourism and waste management. Policies targeting disadvantaged groups can address policy reduction objectives (for example gender disparity, within- and between-country inequality) as well as the Sustainable Development Goals (SDGs⁷) adopted recently by the United Nations. The SDGs are part of the 2030 Agenda for Sustainable Development, with SDG4 focussing on the Education 2030 Framework for Action agenda aiming to "ensure inclusive and quality education for all and promote lifelong learning". This includes TVET and skills for employment, decent jobs and entrepreneurship for youth and adults as an important sub-target. A transformation of the TVET sector will be necessary both to reach SDG4 and the wider goals of sustainable economies and society.

A hundred and ninety-five governments agreed to a long-term goal of restricting the increase in global average temperature to well below 2°C above pre-industrial levels, with a further aim to limit the increase to 1.5°C which would significantly reduce risks and the impacts of

7 <https://sustainabledevelopment.un.org>



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climate change⁸. This may be considered good news because of the commitments being made to limit emissions to 4 Gtonnes CO₂ (by 2030). It marks a move away from the 'business as usual' scenario sending a strong signal potentially yielding a virtuous circle in which technology change, capital shift and policy advance together. They also agreed on the need for global emissions to peak as soon as possible – recognizing this will take longer for developing countries – and thereafter to undertake rapid reductions consistent with the best available science. However, the expected global temperature corresponding to the Pledges is above the 2 °C ceiling thought necessary to avoid the most serious consequences of global warming, so further economic and societal adaptation will be required to reach this level (see also Eurostat, 2015, which considers EU targets and indicators in their wider global context). The Secretary General convened a high-level signature ceremony in New York, opening on 22 April 2016, where over 175 States signed the Paris Agreement. Further, 15 States deposited their instruments of ratification.

Objectives and scope

From 2 to 13 November 2015, UNESCO-UNEVOC TVeT Forum members and other stakeholders participated in a virtual conference on greening TVET in the context of global climate change policy developments. The virtual conference considered global frameworks and agreements of the UN Summit 2015 in New York and particularly those to be made at UNFCCC COP21 in Paris as they challenge TVET to expand quality skills provision and to ensure skills relevance not only for the world of work, but also to support lifelong learning, social inclusion and low-carbon transitions of economies and societies.

A hundred and thirty participants from 57 countries participated in the virtual conference; 37 from Africa, 8 from Arab States, 28 from Asia and the Pacific, 36 from Europe and North America, and 21 from Latin America and the Caribbean. Fifty three participants, accounting for 41% of participants, were female. The diversity of participants reflected the global nature of the UNESCO-UNEVOC TVeT forum and ensured a wide range of perspectives on the topic.

⁸ The 21st Conference of Parties (COP21) discussed Pledges from 162 countries' National Climate Change Plans yielding expected global temperature at 2.5 to 3 °C above pre-industrial levels by the year 2100. These Pledges are to be reviewed after 5 years.



Main questions under discussion

- What is the role of TVET in the transition to low-carbon economies and in a changing climate?
- How can the greening of TVET institutions maximize their contribution to sustainable societies?
- In what way can TVET best meet the needs of vulnerable groups/Member State in the context of climate change?

Structure of the discussion

In the introductory phase, the aim was for participants to share their knowledge, insights, expectations and concerns to highlight the relevance of TVET in the context of policy to address climate change in the post-2015 development agenda.

During the second phase, sub-discussions considered the remaining questions, including the greening of TVET institutions and ensuring TVET addresses the needs of vulnerable groups and Member States as they remain at increased risk from climate change. Participants were encouraged to discuss practices, research, case-studies and innovations they had introduced or were aware of. Greening TVET is cross-cutting theme and an essential component for sustainable development. As summarized by Majumdar (2010), greening TVET refers to efforts that reorient and reinforce existing TVET institutions and policies in order to support the transition towards sustainable development. Importantly, the concept acknowledges the relationship between sustainable development and green development, and also clarifies different

definitions of green jobs and green skills. The same author (Majumdar, 2014) has extended this definition to include five pillars of Greening TVET: green campus, green curriculum, green community, green research and green culture.

In the final phase the virtual conference moved on to summarize the key ideas and suggestions in relation to international developments with the aim of informing TVET stakeholders, considering the community response and identifying critical challenges and ways forward.

Planned outcomes

The virtual conference discussions were intended to guide UNESCO-UNEVOC's work, currently premised on creating meaningful debates and developing research-based evidence to increase its knowledge base on green-oriented TVET development and develop tools to help TVET institutions

systematically take up greening TVET across all dimensions of their operations, as well as develop capacities in this area. The discussions sought to help the International Centre further move global greening TVET and skills developments forward, as well as inform the debate on 'Mitigating climate change with employment, training and economic development stakeholders' at UNFCCC COP21 in Paris. This was a side event that was co-organized by UNESCO and UNESCO-UNEVOC with the Asian Development Bank, ILO and French ministries and non-government organizations and offered a welcome opportunity to highlight the importance of TVET for sustainable economies and societies to policy makers and other stakeholders at COP21. Staff from UNESCO-UNEVOC presented those participants attending the side event with a concise summary version of the present document.



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Summary of virtual conference discussions

1. Role of TVET in a changing climate

The UNFCCC (2015) Synthesis Report on the aggregate effect of the intended nationally determined contributions summarizes 119 intended nationally determined contributions (INDCs) communicated by 147 Parties by 1 October 2015. Selected items in the report which relate to the discussion thread and that were used to contextualize discussion are:

- [item 156] Figure 7, presents priority areas for implementation highlighted in the intended nationally determined contributions (INDCs): renewable energies, energy efficiency, transport, methane and other non-CO2 gases, and land-use and forestry with a relatively small emphasis on carbon capture, use and storage.
- [item 158] Some countries communicated improving statistical and accounting systems for emissions as well as analytical capabilities among their priorities for example: improving statistical indicator systems, personnel training; quality of data, and establishing reporting mechanisms at the national, sub-national and entity levels.
- [item 282] Priority areas and sectors for adaptation actions included: water, agriculture, health, ecosystems, infrastructure, disaster risk reduction, energy, and forestry.
- [item 295] Many gave information on the means required, for example, finance, technology and capacity-building to support implementation of their adaptation actions.
- [item 296] considers specific support needs such as:
 1. Favourable enabling environments with appropriate institutional arrangements and legislation, including strengthening the engagement of the private sector;
 2. Sufficient financial resources to assess, plan, implement, monitor and evaluate adaptation actions;
 3. Technologies for adaptation, including the areas of climate observation and

monitoring, early warning systems, water resources (e.g. irrigation and waste water management), coastal zones, resilient transportation, sustainable agriculture, forestry and land management;

4. Training and building of institutional and human capacities and technical expertise, including the area of vulnerability and adaptation assessments;
 5. Research, data and information, including the area of climate forecasting and modelling;
 6. Education, raising awareness and outreach on climate change impacts and adaptation.
- [item 311] Looks at synergies between adaptation and mitigation as part of overall low-emission, climate-resilient development strategies with examples from agriculture, forestry and other land-use, including livestock, human settlements and infrastructure, water, energy and tourism. Table 1 provides examples of these adaptation and mitigation synergies.

Table 1. Examples of adaptation measures with mitigation co-benefits in each sector

Sector	Examples of adaptation measures with mitigation co-benefits
Agriculture, forestry and other land-use, including livestock	<ul style="list-style-type: none"> • New crop varieties that allow for a decrease in the use of pesticides and are able to withstand water stress • Sustainable land management practices • Improved livestock production practices • Protection and restoration of forests • Afforestation, including of mangroves and drought-tolerant species
Human settlements and infrastructure	<ul style="list-style-type: none"> • Climate-smart and resilient urban centres • Waste and storm water management, including treatment
Water	<ul style="list-style-type: none"> • Integrated water resources management, including watershed protection
Energy	<ul style="list-style-type: none"> • Renewable energy • Energy efficiency
Tourism	<ul style="list-style-type: none"> • Ecotourism

Source: UNFCCC (2015, page 65)

Expanding TVET sectorial cover and skills set

Participants suggested that, in the context of adjusting to climate change policy and its implications for the changing occupational landscape, TVET will need to cover a wide range of sectors and skill sets. This goes beyond industrial manufacturing and the service sector, but also includes the provision of ecologically oriented courses and courses on sustainable agriculture and wider environmental courses. It also requires including sustainability, energy efficiency and resource saving into the wider curriculum. A suggestion made, that all programmes should include environmental aspects, ties in with an emphasis on embedding sustainability in all aspects of TVET. An example provided in the German context was informative concerning the coverage of ecological awareness and sustainability in the wider curriculum. The youththinkgreen⁹ project works "to empower the youth – together with partners and experts – enabling them to make their individual positive contribution in sustainable terms both locally and at a larger scale. (...) The aim is to promote competencies like critical thinking, crafting future scenarios as well as knowledge, skills and values necessary to shape a sustainable future".

New technologies such as modernized and renewable energy generation require new or additional skills sets transferred through technical and vocational training stream or advanced skills training. These skills are also needed to operate or maintain smart grids, vehicles using electric and fuel cell technologies, eco-design and low energy solutions for data processing and storage via cloud-based Information and Communication Technology (ICT). With low-carbon economies and adaptation to climate change as drivers of occupational change, altering the balance of existing and additional skills required in those occupations or new job creation, developing new skills altogether to match the needs of new jobs and then aligning TVET to meet these changes in work seems key. In response to a skeptical remark on greening TVET and recent events around vehicle manufacturers and emission regulations (participant contributed: "On the other side, one wonders what sense it makes to teach students/apprentices ecologic behavior and consideration, when on the other side, those intentions are contradicted by the interest of companies in

more and more profit – as recently experienced with [automobile manufacturer] which not only cheated but blew uncontrolled poisonous CO2 emissions into the air"), the case was made that the widespread knowledge of environmental and sustainable issues, entailed by the wider vision of Greening TVET, facilitates active reflection and discussion about how to implement appropriate change (Moderator response: "one might argue that the widespread knowledge of environmental and sustainable issues, entailed by the wider vision of greening TVET, facilitates active reflection and discussion about how to implement change, when organizations behave unethically or flout the rules. Hopefully, wider environmental and sustainable awareness among the workforce may help prevent this situation arising, as part of the internal checks and balances surrounding the introduction of a new product or process.").



The ethical dimension of work was elaborated when points were made concerning obsolescence and excess consumption which, perhaps, can be aligned with the move to a circular economy, with TVET enabling the transition through meeting direct training needs as well as wider societal engagement. A participant drew our attention to the Cradle to Cradle framework (also referred to as regenerative design), which is known as a biomimetic approach to the design of products and systems, whereby natural systems are used to elaborate models to solve complex human problems, including for example, materials in human industry as nutrients circulating in biological metabolisms. It provides an economic, industrial and social framework which is holistic and seeks to create systems that are both efficient and essentially waste free.

⁹ <http://www.youththinkgreen.org/en>

Reflections and findings from a recent green skills research study with UNEVOC Centres in the Asia-Pacific region were presented to give an example on green skills uptake in construction and agriculture TVET programmes (UNESCO-UNEVOC, 2015). The study indicates how policy bottlenecks and industry demand influence the degree of transfer of skills and sector-level responses. For example, green skills demand is not prominent in the region due to a lack of investment and uptake by medium-scale industries and enterprises, without a clear return on investment. This point was echoed by an association for business in the construction industry. Mechanisms to certify environmental skills in existing qualifications standards and include them in assessment systems are not well-established in many countries, with sporadic uptake and low scale outcomes as a consequence. However, there were welcome signs of greening TVET programmes in countries like Sri Lanka, Malaysia and the Philippines, which have adapted their national green policies. According to teacher perceptions, greening of TVET courses for the construction sector is influenced by the emergence of new occupations, as well as occupational processes and methods. Changing processes and methods in agriculture sector is also a main driver for greening programmes.

Re-conceptualizing TVET and its potentials

The notion of TVET as a 'system integrator' that facilitates the achievement of goals across the multiple domains of society, economy and environment was introduced. The dynamics of the labour market can be considered to reflect systemic links where both skills and technology gaps need to be addressed through appropriate education and training (tackling either in isolation is not sufficient). The suggestion was made that TVET can be conceptualized as a proactive force in the dynamics of labour markets. Rather than TVET only responding to the needs of the labour markets (reactive), the point being whether TVET can also lead and influence labour markets and the emergence and adaptation of jobs (proactive). Considering linkages to climate change policy developments, this shift in emphasis (from reactive to proactive) could also help the TVET sector not only to think about how policy developments influence its activities, but also how such activities can influence policy developments themselves.

Situating TVET in national roadmaps and strategies

The gap between intentions, the policy agenda and final implementation was discussed in relation to short-term versus long-term initiatives, that the experiences and challenges identified reflect recurrent issues and unmet targets at the 'implementation level'. The point was made that while debates, policy measures and practical interpretations that focus on the issues, challenges and opportunities impacting education and training have dominated climate change discussions for many years now, the problems remain the same, in huge proportions and perhaps now more than ever. This points us to the most alarming challenge, that solutions are just within reach, but because there are weak systems in place to mobilize adequate national-local-business synergies, frame long-term strategic solutions to avoid short-sighted initiatives and put more targeted investments in place, many decade-old solutions and commitments already identified just come to pass without getting implemented on the ground.

Long-term roadmaps and intermediate targets play an important role in making the link between aspirations and actual outcomes, otherwise it becomes possible for short-term emission targets to be met by small infrastructure changes (and side-effects of economic downturns) that leave a country's infrastructure ill prepared for the more severe changes required further down the line. Tinkering round the edges of the 'business as usual' economic and societal structures will not be able to deliver the substantial degree of change required. Whether one is looking directly at energy generation and utilization, or at sectors such as construction, agriculture, transport or tourism, it will be necessary to consider both the occupational and skills requirements as they may be expected to develop over time (long term), as well as meeting the immediate needs of the present labour market (short term). This was explored further in the context of monitoring and evaluation, both from COP21 and the Interagency Working Group on Greening TVET and skills development.



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2. Greening of TVET institutions

In this thread, the main theme was the greening of training institutions in the broader context of sustainable development. TVET institutions, in preparing workers and future leaders, need to become exemplars of green workspaces and leadership. Greening as an institutional concept goes beyond what is actually taught, to an institution's own energy, water and waste management processes, purchasing, food services and human resources policies. It also extends to social entrepreneurship, and engagement with employers, policy makers and the local community.

In the COP21 Synthesis Report (UNFCCC, 2015), as mentioned above, items 158 and 296 consider training, education and information needs. Three items (67, 146 and 162) discussed institutional arrangements, including structures and consultation processes, intersectoral/inter-agency dialogue, for example, involving sectoral ministries, businesses, environmental non-governmental organizations, academia and local governments, as well as the general public. For example, one item looked in detail at multi-stakeholder engagement:

- [item 162] "Intended Nationally Determined Contributions (INDCs) have led to the establishment of new institutional arrangements

and consultation processes, in some cases involving not only sectoral ministries, businesses, environmental non-governmental organizations, academia and local governments, but also the general public. Some Parties have put in place new processes to engage relevant public and private actors, such as sectoral dialogues, cross-cutting working groups, expert teams and technical peer review, or inviting written submissions as part of the national consultation process on their INDCs. Other examples of processes to engage stakeholders included the establishment of expert task forces and working groups, parliamentary hearings, large-scale public consultations, including workshops, targeted meetings and an invitation for written submissions, as well as awareness-raising campaigns. In one country such consultations reportedly involved more than 500 participants." Essentially, INDCs suggest new forms of institutional arrangement and consultation processes that engage public, private, civil society actors, and the general public to the largest extent.

Participants in the virtual conference discussed three possible modes/scenarios for developing greener curricula; first, integrate climate change considerations when designing the programme through a Job Analysis Workshop (JAW), or a

similar Developing A Curriculum (DACUM) process. Second, develop general competencies (or soft skills) on the integration of climate change considerations into the trade as a whole. Third, while providing a general understanding of climate change and its application to society, a crucial element is to provide (and encourage reflection upon) the links to the students' particular vocations. This might be in terms of current best practice, regulatory frameworks, or the expected future impact of climate change policy, adaptation and technology, upon the nature of work in a given occupation. Job Analysis covers various methodologies for identification and determination of particular job duties and requirements including the relative importance of these duties for a given job. Methods include interviews with workers and supervisors, questionnaires (structured and/or open-ended), observation, critical incident investigations, and other background information including duty statements or classification specifications. DACUM is a rapid occupational analysis method applicable to the development of training curricula. Using team work, teams are formed of workers with experience of a particular occupation of interest. Both JAW and DACUM provide analyses of occupations, including changes related to greening in the workplace.

Examples of green courses were provided for ecotourism in Greece and the development of irrigation projects in Brazil through technical courses to poor backlanders, whose content develops a population knowledgeable about sustainable development. Both examples provide contexts that illustrate the sometimes challenging environments in which TVET operates and can make worthwhile contributions.

In the context of institution-based greening of TVET, it involves both making institutions environmentally friendly in terms of resources used, saving on water, energy, recycling, sustainable transport for staff and students, as well as ensuring it is a decent place to work and study. This requires bringing on board all members of an institution: leaders, managers, instructors, program delivery personnel, as well as students themselves. The complexities of TVET in relation to multi-stakeholder engagement were highlighted, whereby educational institutions can learn from different local examples which do not necessarily follow the same pattern as international frameworks (Participant contribution: "At the ministerial level, TVET is often governed by

various ministries (education, labour, youth etc.). Similarly, addressing issues like global warming and greening TVET cannot be addressed without multi-stakeholder engagement. But because these issues are often complex and involve multiple factors, how can we identify which actors need to be approached? Are there any good examples of multi-stakeholder frameworks? I know there are some international frameworks, but these can't always be implemented in similar ways at the local level..."). UNESCO-UNEVOC is prototyping approaches to the topping up of skills in TVET curricula and developing a practical guide for Greening TVET institutions, building on earlier work (for example, Majumdar 2011). Themes highlighted by participants included piloting initiatives, possibly on a small scale, monitoring performance/ action plans and disseminating gains and results of applying greening processes and approaches in the many aspects of institutional operations. This draws attention to benefits to be gained from defining incremental steps that can be measured or rated, and actions which can be shared as examples of good practice, when successful in a given context.

3. TVET, vulnerable groups and Member States

The initial Thread 1 discussions touched upon the topic of vulnerability of Small Island Developing States (SIDS) such as those in the Caribbean. In this thread the virtual conference explored the topic further considering how TVET may address the needs of both vulnerable groups and Member States as they remain at increased risk from climate change.

The impact of climate change on vulnerable groups and countries is discussed in the UNFCCC (2015) Synthesis Report on INDCs and was considered as a basis for discussion in the context of TVET. For example, items 60, 259 and 290 considered vulnerable populations including rural populations; poorest segments of society; women, youth, the elderly and the disabled and vulnerable sectors and zones including areas liable to drought and desertification, low-lying coastal areas and small islands; land-locked countries and mountains. Item 62 discussed the involvement of relevant stakeholders in planning and implementation of adaptation, including vulnerable communities among these. Item 247 explored their population dynamics in relation to climate change and adaptation, e.g., high population density, growth,

high proportion of youth, and concentrations of population in vulnerable areas. Item 249 looked at specific development indicators, including people employed in vulnerable sectors, people with access to electricity, sanitation, drinking water and basic services and health care; the number of people living in poverty, lacking in food security and infants malnutrition. Item 259 looked at key impacts and vulnerabilities in adaptation components, including estimates of past socioeconomic losses due to extreme weather events and interconnections between climate risks and non-climatic factors, such as food insecurity and rapid urbanization. Two items gave specific illustrations of mass population impact entailed by climate change as follows:

- [item 263] "... Several Parties provided quantitative estimates of vulnerable people or communities, sometimes using specific indicators. For instance, one Party identified 319 municipalities as highly vulnerable, while another one stated that 42 million people might be affected by sea level rise due to its long coastline."
- [item 287] "Disaster risk reduction has been addressed concomitantly to adaptation by several Parties and they reported on their current and future efforts relating to disaster reduction, the strengthening of early warning systems and contingency plans. Some mentioned the development of insurance schemes as one of their measures, in particular to protect the most vulnerable communities. A few Parties intend to resettle part of their population highly exposed to climate risk in safer areas. In this context, one Party announced that it is preparing its people for emigration owing to the country's high vulnerability to sea level rise."

These entries highlight the vulnerabilities of certain groups in society and how certain countries are particularly sensitive to climate change impacts.

The discussion of TVET in the context of SIDS emphasized the need to include information and training for adaptation to climate change. The requirement for sufficient capital commitments is one key aspect of negotiations in COP21 with related resource and technology inputs being highly relevant. Certain participants to the virtual conference discussed agriculture (including disaster risk management) and hospitality sectors and their sensitivity to climate change from the Caribbean

region perspective There was discussion of the need to bring about sustainable development via TVET in the farming villages and coastlines of Jamaica, and at the same time the need to implement policy change at the national level.



Different levels of uptake of particular TVET courses by each gender were highlighted ("differences in career choice by gender may be related to financial instability. Bearing in mind that tourism is usually a seasonal occupation, with intense periods of work in Summer and very little work in Winter (speaking about Greece), women professionals are financially vulnerable to a number of factors ranging from changes in tourism patterns to extreme weather conditions related to climate change. Perhaps, looking into TVET and gender, or more specifically the association between TVET leading to financially stable professions and gender, can shed some light into this issue."). This approach can be further informed by research (e.g., the annotated bibliography of UNESCO-UNEVOC, 2014) looking at the attractiveness of TVET that may be explored in relation to vulnerable groups such as girls and women, disadvantaged social backgrounds and migrants. The need was indicated for a shift to an inclusive vocational training system addressing the root causes of social unrest and poverty by providing specialized training facilities, careers guidance counselling, as well as certification of current skills through recognition of prior learning. The notion of intra-generational equity was introduced and the potential highlighted for community based projects as a suitable vehicle for TVET provision.

There was emphasis on models of growth that are less dependent on cheap materials and energy, able to restore and regenerate natural capital. This requires bringing new paradigms of

ecological business systems thinking into school and TVET curricula. The discussion was broadened to unemployment, food and nutrition insecurity, areas of conflict, natural disasters and migration, including the role that TVET can play in bringing about innovative solutions, using technology and communication tools, and new developments in agriculture. Relevant here are small and micro-businesses benefiting from entrepreneurial skills and innovative financing models such as microfinance for those businesses lacking access to conventional banking and financial services.

Conclusions and recommendations

The virtual conference gathered input from the UNESCO-UNEVOC TVET Forum community over a two-week period prior to UNFCCC COP21, providing engaging insights and shared experiences to reflect on and carry into the future. The following key-points and recommendations arose during discussions:

- The connection was made between the global level commitments on climate change and their multifaceted implications for country level implementation;
- There was an emphasis on effective change with current practices by simply, mediating both national and local levels and making synergetic actions;
- There is a need for effective policy coordination and social dialogue, which will engage individuals, companies and institutions to take initiative;
- Greening TVET is a key point to be included in education and sustainable development agendas;
- In adjusting to climate change policy and a changing occupational landscape, TVET needs to cover a wide range of sectors and skill sets;
- Retraining workers in jobs anticipated to change, and preparation of new labour entrants with optimum skills to take up emerging jobs, are important contributions for TVET to accelerate moving to low carbon economies;
- Research and policy discussions on the greening of occupations often focus on high-skilled, well paid jobs (for example in renewables, energy efficiency and mass

transit), but in practice many green jobs are within existing traditional jobs occupied by farmers and lower skilled workers as well small-scale industries and enterprises engaged in eco-tourism and waste management;

- The discussion advocated reviewing all programmes and incorporating environmental aspects, which ties in with embedding sustainability and relevant skill sets that can fill and upgrade existing jobs and influence the expansion of occupational sectors;
- TVET institutions need to adapt their capacities through greening, exploring skills and institutional monitoring mechanisms to ensure that they are prepared to equip learners and the workforce;
- This wider notion of institutional greening also extends to social entrepreneurship, and engagement with employers, policy makers and the local community;
- Participants highlighted the vulnerabilities of certain groups in society and how certain countries are particularly sensitive to climate change impacts. Policies targeting disadvantage groups can address policy reduction objectives as well as sustainable development goals;
- TVET, by providing skills and knowledge for disadvantaged and vulnerable groups, can facilitate a just transition to sustainable societies.

A concise summary version of the present document was presented at the side event on 'Mitigating climate change with employment,

training and economic development stakeholders' at UNFCCC COP21 in Paris.

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About the moderator



The virtual conference will be moderated by Dr Nick Sofroniou, Principal Research Fellow at Institute for Employment Research of the University of Warwick and an expert in green skills development. Nick has

significant experience in policy-relevant research and analysis on education, training and skills and has worked as an expert in socio-economic research and analysis at Cedefop, the European Union agency for the development of vocational education and training (VET), Thessaloniki. There he carried out policy-relevant research and analysis on education, training and skills, including the role of VET and lifelong learning in developing individuals' skills and careers, as well as the impact of these phenomena on Europe's competitiveness and socio-economic development.

He represented the EU on the Interagency Working Group on Greening TVET that includes UNESCO, OECD, World Bank and the International Labour Organisation. Prior to joining to Cedefop he worked at University of Dublin, Trinity College, where he directed the Irish Longitudinal Study of Ageing and for the national Educational Research Centre in Dublin, Ireland coordinating analyses of the OECD PISA studies, TIMSS and national assessments of mathematics and reading. He co-developed the resource allocation model for Disadvantaged schools in Ireland with the Irish Department of Education. As Head of Research at the Welsh Joint Examination Committee in Cardiff he worked on setting and maintaining standards for the UK second-level public examinations.



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