International Experts' Workshop on

# GREEN TVET AND EDUCATION FOR SUSTAINABLE DEVELOPMENT: CAPACITY DEVELOPMENT NEEDS FOR WATER EDUCATION

Munich, Germany
September 13-17, 2010

Workshop Report

TABLE OF CONTENTS

# International Experts' Workshop on
# Green TVET and Education for Sustainable Development
# Capacity Development Needs for Water Education

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## INTRODUCTION

Among the greatest challenges we face in the world today are those of delivering, growing or securing affordable natural resources including water for every citizen. Achieving sustainable development requires a global change of mindset and behaviors. Indeed, it has long been recognized that education is crucial for achieving sustainable development. The UN Conference on the Human Environment ('Stockholm Conference') in 1972 emphasized education as a way of addressing human-environment problems. Agenda 21, the document adopted at the UN Conference on Environment and Development (UNCED, 'Rio Summit', Rio de Janeiro, 1992), likewise emphasized the need to promote education, public awareness and training in order to assist bringing about sustainable development. In particular, Chapter 36 on promoting education, public awareness and training states that, "Education and Training are vital for promoting sustainable development and improving the capacity of the people to address environment and development issues."

The Bonn Declaration (2004) in particular, gave special emphasis to the significance of education for the global development agenda and underlines the essential contribution of Education for Sustainable Development (ESD) to shaping the purpose, content and quality of all educations including TVET.

*The Bonn Declaration on Learning for Work, Citizenship and Sustainability*, argued that:

*. . . since education is considered the key to effective development strategies, technical and vocational education and training (TVET) must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development.*

Education for Sustainable Development (ESD) can contribute substantially to address key sustainable development challenges. Indeed, without reorienting education, successfully confronting issues like water and climate change, among many others, will not be possible. In this light, it is becoming the central agenda in various major education and development forums such as international conferences and negotiations including the G8, G20, Copenhagen Climate Change Conference (2009), EFA High-Level Group, UN Chief Executives Board and UNESCO World Conferences among many other ongoing events and activities.

The United Nations System sees an alternative future out of the crisis in terms of "Green Economy." The Inter-agency statement of 25 June 2009 on Green Economy:

*A transformation to address multiple cries clearly states, "The shift towards a green economy requires education for sustainable development". Indeed, building green economies and sustainable societies requires more than clean technologies. Humankind will not solve the problems it faces today with the same values and approaches that created them.*

Hence, the international community needs to understand green economies as sustainable societies, creating a balance between environmental, societal, cultural and economic considerations in the pursuit of enhanced quality of life. The educational process can facilitate an encouraging environment that in turn provide people with the chance to apply sustainable development principles and to better understand the multiple potential impacts of their actions and behaviors.

Further, water is an essential and cross-cutting theme for ESD being a foundation of economy, society and the environment. It is thus reflected as a priority by the UNESCO Member States among other emerging and recurrent issues. As concluded in the UN World Water Development Reports, the looming water crisis, more than a result of the availability of the resource, is a result of existing water governance approaches. Education at all levels and of all stakeholders has a decisive role to play in water governance and in integrated water management. Educational programmes requiring specific action needs to be developed in order to learn from each other's experiences.

It is increasingly acknowledged that sustainable solutions for water challenges strongly depend on the availability of adequately trained human resources, from high-level experts to communities and stakeholders. TVET needs to undertake action to create more exchange and knowledge platform for

water and education professionals and to develop needs assessments for capacity development, e.g. to set priorities, and establish pilot projects and programs to implement capacity development.

However, TVET in many countries remains a mere supplier of skilled labor to industry and is thereby unable to respond effectively to the needs of the sustainable development strategies. The complexity, breadth and diversity of Green TVET and Water Education in pursuit of ESD require that a wide range of stakeholders ought to become active and cohesive to implement the DESD through a partnership approach: governments, parliaments, non-governmental organizations, media, the private sector, education institutions, research institutes, individual educators and students, among others. In view of these, bottom-up and top-down strategies essential be combined.

As a result, the joint ILO and UNESCO Recommendations on TVET for the 21st Century stated that, as "a vital aspect of the educational process in all countries" TVET should:

a. Contribute to the achievement of the societal goals of greater democratization and social, cultural and economic development, while at the same time developing the potential of all individuals,both men and women, for active participation in the establishment and implementation of these goals, regardless of religion, race and age;
b. Lead to an understanding of the scientific and technological aspects of contemporary civilization in sucha way that people comprehend their environment and are capable of acting upon it while taking a critical view of the social, political and environmental implications of scientific and technological change;
c. Empower people to contribute to environmentally sound sustainable development through their occupations and other areas of their lives.

In this framework, TVET ought to open a window to the world and vice versa. For example, TVET institutions ought to explore and exchange information about innovative teaching and learning methods, such as programs on clean energy, clean water and clean technology, reorientation of TVET curricula, sustainable campus management programs and examples of innovative approaches to integrating learning in TVET with on-the-job training and offering community based services aimed at positive societal responses to bring the relevance and emphasis for a sustainable future.

Building upon these past and ongoing key initiatives, the 2010 International Experts Meeting on Green TVET and Education for Sustainable Development: Capacity Development Needs for Water Education was pursued to clarify the implications of such issues for TVET. The sharing of experiences in responding to such issues are used to identify lessons of leading practice, catalyze networks, and making plans for the enhancing the contributions of TVET to the changing world of work.

## PROGRAM AIMS & OBJECTIVES

The International Experts workshop session aimed to contribute to Greening TVET in support of DESD and the role of TVET for Water Sustainability within the context of the changing nature of industry and work, the pressures of global financial crisis and the limits and opportunities posed by climate change and other environmental imperatives. These changing circumstances created opportunities for TVET to contribute not only to enhanced productivity but also to social development, environmental protection and citizenship.

The meeting provided opportunities for participants to identify drivers of change in the workplace and the implication of these for policy and innovative practice in TVET in support of DESD. The program focused on the implications on the following TVET related emerging issues on:

- Greening TVET in Support of DESD
- TVET for Water Sustainability & Governance

The program also:

- reviewed current trends and international discourse for TVET and Water Education;
- comprehended country perspective of best practices in reorienting towards Green TVET in support of DESD;
- assimilated innovative and applied technologies in water sector for TVET;
- formulated policy directives and strategies for building capacity in reorienting towards Green TVET and Water Education in pursuit of ESD.

This workshop facilitated to foster South-South and North-South technical cooperation through national, regional and international collaboration by the implementation of training programs and projects.

## PARTICIPANTS

The international experts' workshop was well attended by representatives and international experts from Asia-Pacific region, representing national policy makers, curriculum planners and teacher educators, TVET institutions and their managers, teachers, industry leaders, as well as the UNEVOC Network members in Africa. This wide scope of participants invited by UNESCO-UNEVOC, InWEnt and CPSC, DWA was to ensure that the "Green TVET for Water Sustainability" becomes a key part of the agenda to in line with the UNESCO Strategy for the Second Half of the United Nations Decade of Education for Sustainable Development (Please see **Annex A** for a full list of the Participants)

## ADMINISTRATIVE ARRANGEMENTS

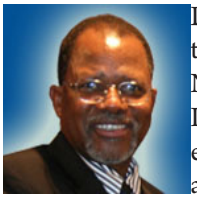
The responsibility for organizing this meeting was shared between the UNESCO-UNEVOC International Centre (Bonn, Germany), InWEnt (Magdeburg, Germany), CPSC (Manila, Philippines), and DWA -the German Association for Water, Wastewater and Waste, (Germany) and in collaboration with UNESCO-IHP International Hydrological Programme (Paris, France). In a good opportunity to avail of an enriching and enabling environment to achieve new perspectives in TVET for Water Sustainability, the workshop was organized on conjunction with the 2010 International Trade Fair for Water (IFAT) in Munich.

## ORGANIZERS

DR. SHYAMAL MAJUMDAR is the Director General of Colombo Plan Staff College for Technician Education (CPSC). He earned his Bachelor's Degree in Electronics and Communication Engineering, Master's Degree in Telecommunications Engineering and Doctorate Degree in Computer Science and Engineering. Prior to coming to CPSC, he was Professor and Head of the Department of Computer Science and Engineering at the National Institute of Technical Teachers Training and Research (NITTTR) in Kolkata, India. Dr. Majumdar has demonstrated interests, leadership and professional expertise in technical teacher training, ICT, web-based instruction, planning and management of TVET systems, knowledge management and quality management systems. Among his many international work and exposures were his involvement in various projects in Technical and Vocational Education and Training (TVET) through his close association with CPSC, UNESCO-Bangkok, UNESCO-China, UNESCO-Cairo, FAO-UN, ADB and ADBI. He was an international expert in Open and Distance Learning, Teachers Training, Multimedia and Educational Computing for UNESCO, UNEVOC, GTZ, CPSC, COL, ADB and FAO-UN. He was involved as expert and as Editor of the Regional Guidelines for Pedagogy-Technology Integration for the Asia and the Pacific region supported by the JFIT and UNESCO. He served as Vice President of IVETA for Asia Pacific from 2002-2006 and Governing Board-engaged Faculty of CPSC.

## WORKSHOP PRESENTORS AND FACILITATORS

DR. HARRY STOLTE is currently the Head of Division - Modern Media and Development of Vocational Training Curricula at InWEnt, Capacity Building International in Germany, a non-profit organization with worldwide operations dedicated to human resource development, advanced training and dialogue. He obtained his Doctoral Degree in Technical Vocational Education and Training in 1984. He graduated with a University Diploma in the field of Didactics of Technical and Vocational Education in 1981. He has been working in the field of TVET for 20 years now in cooperation with developing countries, countries in transition, and industrialized countries such as those in South East Asia and Eastern Europe. During the early years in his career, he was engaged as a part time professor for four (4) years at the University of Hamburg and University of Mandeburg. Dr. Stolte also handled managerial and administrative tasks as the Head of Division of different institutions. His line of work is on TVET as Curriculum Development, Development of Teaching and Learning Media, as well as TVET Teacher Training. He was also into design, formulation, implementation, and evaluation of international projects. Dr. Stolte is very familiar with projects funded both by the German government and other sources of funding such as fund raising and resource mobilization activities. He also led his institution to have partnership and collaboration with international and regional organization such as ILO and UNESCO.



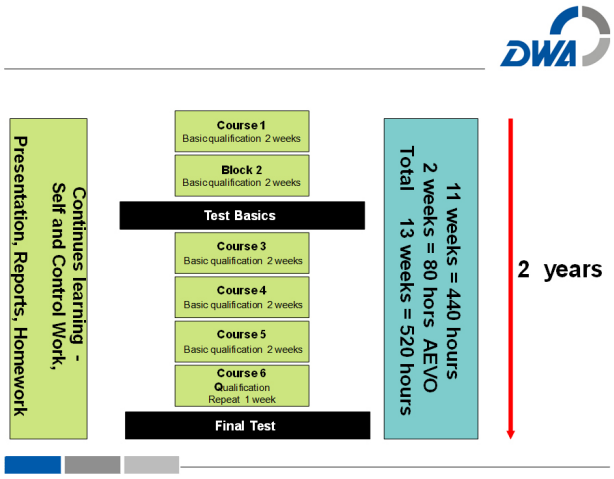
DR. L. EFISON MUNJAGANJA is the Officer-in-charge of UNEVOC Networks, UNESCO-UNEVOC International Centre for TVET. He earned his Doctor of Education (Ed. D) and Master of Arts in Education (MA Ed) from the University of Georgia. He completed a course in the Mediterranean Institute of Management onManpower Development in Nicosia, Cyprus and the Kennedy School of Government, Harvard University, USA. He worked as Programme Specialist in TVE & Head of UNEVOC Networks. He has organised and conducted numerous seminars and workshops in the area of Education and TVET in Africa, Asia-Pacific Region and Eastern Europe. Dr. Munjaganja has actively participated as speaker, moderator, rapporteur and chairperson at various international forums in particular the ILO African Region Conference, ILO Conferences, SADC Regional Training Council meetings, UNESCO General Conferences, UNESCO Asia-Pacific Regional Conferences, UNESCO Second International Congress on TVE; and UNESCO International Experts Meeting: Follow-up to the Second International Congress on TVE.

| | |
|---|---|
|  | **Prof. Shyamal Majumdar, Ph.D**<br>Director General<br>Colombo Plan Staff College for Technician Education |
|  | **Prof. Rajesh Khambayat, Ph.D.**<br>Chairperson, Training and Development Division, Colombo Plan Staff College for Technician Education |
|  | **Dr. Harry Stolte**<br>Head of Division<br>InWEnt, Capacity Building International |
|  | **Dipl.-Ing. RüdigerHeidebrecht**<br>Head of Department Training & International Cooperation |
|  | **Ms. Naing Yee Mar**<br>Program Officer<br>UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training |
|  | **Dipl.-Ing. Helene Optiz**<br>Team leader Drain and Sewer Systems<br>Dept of Trg& International Cooperation<br>DWA Germany |

## OPENING PROGRAM

The opening ceremony was spearheaded by the main organizers, with CPSC introducing the all participants of the program. The head of the training and international cooperation department of the German Association for Water, Wastewater and Water (DWA) Dipl.-Ing. Rüdiger Heidebrecht, welcomed all the international delegates and gave an overview on the German water treatment and sewerage industry, emphasizing that 95% of Germans Waste Water is treated in centralized wastewater treatment plants. In 1984 Germany developed a Green TVET system and created 3 occupations to operate and to maintain their water and waste facilities.

The presentation provided a glimpse of how advanced the German technology is because of their preferences for the vocational education graduates to work in their industries. The end summarized the achievements of the DWA in their industry especially in protecting and providing water for every German citizen, and their continuous efforts to further improve the skills of their training recipients.




*Structure of the DWA Courses*

Ms. Naing Yee Mar of UESCO- UNEVOC in her opening remarks emphasized that many developing countries and the least developing countries are experiencing a rising gap between labor market demand in key sectors and the supply of adequately trained and qualified professionals, in particular serious skills shortages have emerged within the water supply and sanitation sectors. She further introduced the role of UNESCO-UNEVOC in promoting and supporting the development of skills, technical and institutional capacities that are essential for green economy.

Dr. Harry Stotle, Head, InWent, in his welcome remarks supported the speakers' statements, adding that global networking and cooperation for building capacity of TVET teachers and address the challenges and issues in ESD. To wrap up the opening program, Dr. Shyamal Majumdar, DG, CPSC cited the role of the Green TVET concept and its relevance to the DESD.

In his special remarks, Dr. Majumdar, CPSC, stressed the significance of Green TVET in the light of structural changes in economy for carbon neutral economy. Further,Dr. Majumdar stated that to achieve sustainable social development, it is imperative to ensure that economic globalization and economic growth benefit all countries and regions and people of all sectors.

Prof. Khambayat, CPSC, Faculty Member & Coordinator, introduced the workshop objectives and expectations of the event to all the participants. The opening program was attended by some of the notable leaders in the German water industry Mr. Robert Schmidt, CEO of the Munich Wastewater Company, and Johannes Lohaus, Managing Director of the DWA Head office and CEO of the European Water Association.

## SPECIAL PRESENTATION

The program involved special keynote presentation, panel discussion, country report perspectives and group discussions. Dr. Majumdar and Dr. Harry Stolte gave special keynote presentation under their theme. Every session allotted time for the exchange of ideas and innovations, which gave meaningful ideas to the current needs. Subsequently on the next day, each of the participants from the member countries presented their country-specific scenarios on ESD, which includes the challenges, best practices and the highlights of its implementation. A copy of the presentations was distributed to each participant through a pen drive provided by the organizers.

## WORKSHOP SESSION 1: WORLD TRENDS ON EDUCATION FOR SUSTAINABLE DEVELOPMENT AND ITS IMPLICATIONS IN TVET

Session Chair: Ms. Naing Yee Mar, UNESCO-UNEVOC.

Dr. Majumdar, in his special key presentation discussed a framework on "Green TVET: Connecting the Dots in TVET for Sustainable Development". He highlighted the five pillars such as Green Campus, Green Technology, Green Education & Community Outreach Program, Green Research and Green Culture. Lastly, he also shared insight on initiatives at CPSC on integrating green principles to promote Green TVET.


*Five Dimensions in Greening TVET*

By tackling the aspects of the green technology program in detail, Dr. Majumdar was able to present that Greening TVET is a possible and an achievable alternative in the implementation of sustainable development practices across the world. The emerging trends on green technology are also a viable opportunity for those who are seeking for greener, more sustainable occupations.

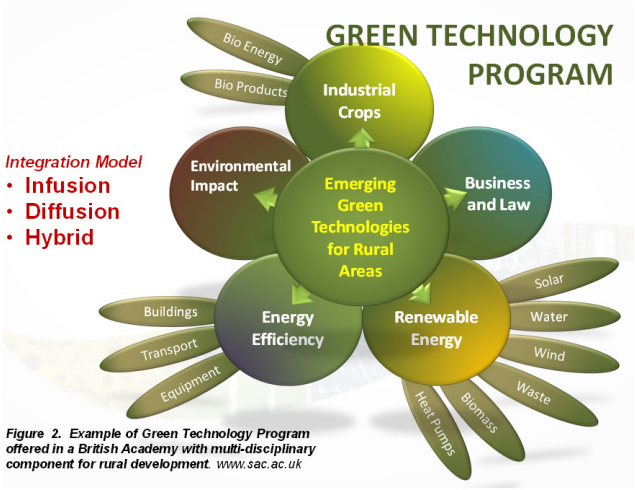



*Figure 2. Example of Green Technology Program offered in a British Academy with multi-disciplinary component for rural development. www.sac.ac.uk*

*Green Technology Program Model*

Dr. Majumdar also highlighted CPSC's role in the Green TVET advocacy by citing that it should be "a well-spring of knowledge and best practices with the ability to promote sustainable practices and principles in the field of TVET". The figure below discussed on the aspects of TVET that were restructured to be adaptable to the advocacy of greening TVET. He also discussed in detail the practices that CPSC is currently employing in adherence to the program.


*Greening CPSC practices*

Dr. Majumdar, further emphasized that SD in a holistic concept and at this critical juncture, we should all the more get united, follow the principle of openness, cooperation and mutual benefit, strengthen

coordination and work together to secure the momentum of promoting sustainable development through green TVET.

In behalf of CPSC, Dr. Majumdar discussed the ways on how to make TVET responsive to the environmental problems plaguing the world. He also elaborated on how SD can be anchored in TVET and the approaches needed to make TVET sector responsive in these issues.

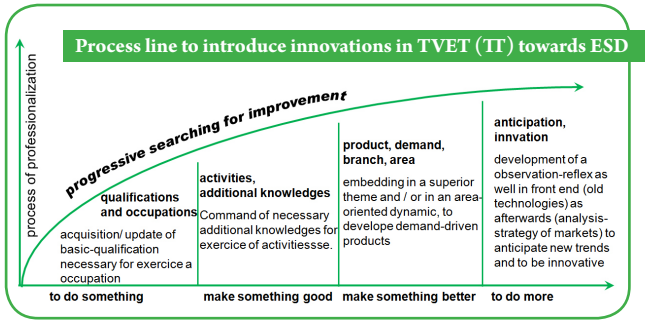
Dr. Harry Stolte, Head, InWEnt made a presentation on "World Trends on Education for Sustainable Development and it's Implications for TVET"and shared his ideas on Developing ESD Schools. Further, he highlighted nine Quality areas at ESD Schools.

## Quality Areas at ESD Schools

1. Learning Culture
2. Learning Groups
3. Competencies
4. School Culture
5. Opening of Schools to the Outside World
6. Schools Management
7. Schools Programme
8. Resources
9. Staff Development

*Developing ESD Schools*

Dr. Harry Stolte further discussed that process line to introduce innovations in TVET towards ESD.




*Innovations in TVET towards ESD*

This was followed by an interesting open discussion. The discussion paved the way for more understanding on TVET's important role in promoting sustainable development and an increased awareness of TVET as a resource for supporting the enhancement of water sustainability.

## IFAT EXHIBITION IN MUNICH


The participants then embarked on a study tour on the water, wastewater and sewer systems facilities in Munich organized by the DWA to further orient the participants on the scale of the technological advancement of Germany when it comes to water system preservation.

## WORKSHOP SESSION 2 & 3: COUNTRY PERSPECTIVES ON GREENING TVET IN SUPPORT OF DESD

Session Chair: Dr. Rajesh P. Khambayat, CPSC and Ms. Naing, UNESCO-UNEVOC.

On the subsequent day, each of the countries presented their own perspectives and experiences on Greening TVET in support of the DESD. This provided each of the participants with a picture of the scenarios being done on other parts of the world to promote environmental sustainability in TVET.
The session involved country reports presentation followed by open discussions.

### Afghanistan

Mr. Sarajuddin Dastiarmal, Director, Afghan-Korean Vocational Training Center, presented that the government of Afghanistanis developing TVET under various funding projects. He highlighted that Afghanistan prioritizes the promotion and development of ESD for TVET, foreseeing the need to increase the capacity of vocational education in building an economically strong nation, considering that it has a large labor force to be trained.

### Bangladesh

Mr. Kazi Md. Sawkat-ul Islam, in his presentation stressed that the government of Bangladesh prioritizes the promotion and development of ESD for TVET, foreseeing the need to increase the capacity of technical education in building an economically strong nation, considering that it has a large labor force potential. It was pointed that the key challenges associated with the promotion of ESD in TVET in a "labor surplus" country like So far, a lot of progress has been noted due to the project's implementation, including the increased participation from the beneficiaries and additional funding and loan assistance from development organizations and partners. However, many challenges are to be done in the development of ESD in TVET not only to address the disparity between the educational system and the labor market but also to raise awareness on the significance of TVET in ensuring sustainability and lifelong learning. It also discussed the importance of water conservation considering the scarce infrastructure and water resources in the area, specifically in Chittagong. Specifically, awareness and interaction among the stakeholders is a realistic solution to mitigate the harmful effects of water scarcity.

### Bhutan

Mr. Sangay Dorji, Chief Program Officer, Department of Human Resources, Ministry of Labour and Human Resources outlined in his presentation that the overall development theme of Bhutan is aligned towards poverty reduction and its goal towards "Bhutan 2020: a vision for peace, prosperity and happiness". This meant to address the unemployment issues currently hounding Bhutan's workforce. Other weak aspects of the workforce skill development are being addressed through the implementation of skills training in various places around the country and the region. In addition, he discussed the standards and the ways to assess TVET programs and accreditation.

Mr. Dorji further shared a comprehensive regional Definition of SD "A developmental policy which assures preservation of culture and tradition, maintain ecological balance, provide social security, promote human values and ethics while ensuring a better human life through continuous economic progress with a holistic approach to social, economic and environmental dimensions".

He stressed that the present approach towards TVET education is currently being overhauled from a traditional to the competency-based system. It promoted the rise of a new competitive state where government intervention has diminished in favor of market forces as the primary steering mechanism. The recent plans for capacity building in TVET is fostering PPP initiatives, diversifying training programs to meet market demand and the upgrading of the infrastructure, competencies and training of the personnel involved in TVET.

Mr. Dorji, highlighted the new initiatives of the ministry by introducing new programs such as e-waste management, Renewable energy, Hydro-power, Solar Energy, Bio-mass energy, Re-cycle process, Management of Natural Resources vis-a-vis water, forest etc.

## Côte d'Ivoire

Dr. Emile BIH, Director General, National Pedagogical Institute for Technical and Vocational Education stressed that reforms to develop the TVET system through diversification of opportunities and training, and the enhancement of industry-institution relations are the central agenda to improve TVET in their country. It was also discussed that reform on TVET, specifically enhancing TVET system governance is necessary to develop social accessibility, professional integration and a high qualification standards for TVET schools. It is also presented that educating people in the different areas of the green TVET and water sector is also an significant move in instilling the importance of coordinating water resources and TVET development.

## Fiji Islands

Mr. Tomasi Naborisi, Senior Education Officer, TVET Section, Ministry of Education,in his presentation discussed that being a signatory in the Mauritius declaration, Fiji is expected to reaffirm its commitment in promoting sustainable development among the island nations. In integrating ESD in TVET, several courses were included in the curriculum like marine studies. This course is suitable for its citizens given Fiji's geography and way of living, whichis closely tied to the ocean. Woodcraft technology, on the other hand, capitalizes on the natural resources available and maximizes the steady supply of timber products in the island. The last, the Start-your-own-business aims to train the recipients on how to start their own business on the expectation that they will be relaying them to other people as well.

## Gambia

Mrs. Bertha Jarju Johnson, Head of the Department "Bachelor of Community Building and Design", Gambia Technical Training Institute, in her presentation gave a brief overview of the present scenario of TVET in the country. It was emphasized that TVET is to provide individuals the skills to respond to the demands of the labor market in these modern times. The Gambian TVET system, specifically in the GTTI (Gambian Technical and Training Institute) forwards all its efforts in instilling the awareness to environmental protection through the promotion and integration of the aspects of green practices in TVET, with focus on water conservation and resource use.

*Gambian instruction of ESD practices*

Currently, only two departments in the institution namely, Construction and the Engineering departments, have done measures to use their water resources wisely, and it is hoped that the other departments will follow suit. The assistance from other richer countries such as Sweden is also deemed to be helpful in improving the overall water and

sewerage infrastructure, aside from providing the necessary training materials to the beneficiaries.

## India

Mr. R. C. Meena, Economic Adviser, Ministry of Human Resource Development, in his presentation highlighted that a rapidly growing population and the shortage of persons with adequate skills are one of the major issues that India faces in terms of Human Resource Development. However, it is still crucial for the Indian government to fulfill the green reforms in HRD despite all the challenges.

The approach to the digital age through the adoption of internet connectivity and development of suitable e-learning materials/ contents to spread digital literacy is now underway, with a target of increasing education expenditure to as much as 6% of the GDP from the present 3.67%, with 1.5% of it allotted in higher education.

## Kenya

Prof. John Simiyu, Ph.D. Centre Team Leader, in his presentation discussed the role of the Department of Technology Education at Moi University on raising the awareness among young people about ESD and giving them skills to put sustainable development into practice. It defines ESD as the "Development of the Curricula and Pedagogy to equip students with the skills and knowledge to live and work sustainably after they graduate". Curriculum greening through staff motivation and education on the importance of TVET is also being implemented. It also pointed out the measures being done to include ESD practices like prevention of erosion, usage of recyclable materials and environment-friendly instruction

In conclusion, the Department of Technology Education has a potential to integrate ESD practices in its TVET Program while identifying that support is needed by the staff and institution to further enhance ESD in the TVET curriculum,

## Maldives

Ms. Fathimath Zeena Ali, Assistant Director, TVET, Ministry of Human Resources, Youth & Sports, in her presentation pointed out that the rising youth unemployment, particularly in the regions outside the capital, led to the initiation of the project called Employment Skills Training Project (ESTP) developed in collaboration with the Asian Development Bank to increase the population's participation in the labor force and employment.

Major interventions as the Career Path Program (CPP) and the Gulhun (an employment training program) are being experimented so as to help the students find the career that are suited for their acquired skills. Some of the challenges include the cost of equipment and training, the resistance of some stakeholders to cooperate with the educators, and the unique geographical feature of the country, which hampers the delivery of crucial services, including TVET. A two-track, demand driven and standards-based TVET designed for the unique requirements of the country is being firmly in place, and it is gaining momentum for support in its success.

## Mongolia

Mr. Natsagdorj Byambasuren, Head of Agency of TVET elucidated that the TVET system in the country is largely guided by the set of new laws on vocational education and training adopted in February 13, 2009. It is based on the Comprehensive National Development Strategy for the fulfillment of the Millennium Development Goals. ESD practices are being implemented and prioritized, with the focus on the mining industry and development.

They key challenges of this framework are the development of a responsible mining industry with the realization of mining deposits through environmentally sound methods and establish heavy industry sector. It also targets to implement industrialization policies and develop intensified agriculture, infrastructure and governance while protecting the environment and strengthening human development.

The project also highlighted the milestones in ESD practices in TVET including the establishment of a mining school where it focused on the biological recovery works and agro-park creation. In conclusion, the future challenges of ESD in TVET in the country is more on reforming directions where there is a focus on ecology-friendly technology and the improvement and provision of training bases and labs that will be centered on ecologically sound practices.

**Myanmar**

Ms. Khin Latt, Associate professor, Technological University Monywa, in her presentation outlined that the water usage for different purposes undertaken by different departments of Myanmar. The government has given priority to implement water supply programs to the villages where inadequate water supply is a norm. A part of the government's efforts to ensure sustainability of water resources in the country is the establishment of forests and watersheds, as well as the relegation of the related tasks to government agencies that are responsible in addressing this concern.

The goals of TVET, executed by three important government agencies, is parallel to the guidelines set by the Head of State to enable every qualified citizen to be able to learn and study the advanced sciences and technologies. They are also making a good effort to carry our research and development programs to enhance productivity of the labor force and aid in the national economic development. Myanmar has a challenge to layout proper management and relevant policy for sustainable and continuous development to conserve nature and environment for the future.

**Philippines**

Mr. Conrado G. Bares, Regional Director, Technical Education and Skills Development Authority (TESDA), Philippines explained that it is not lacking in laws and initiatives to deal with environmental issues and concerns. In particular, the water resource situation in the Philippines is not spared from these unfortunate incidents. Several agencies were tasked to protect the water resources and allocate them for proper use. In any case, the TESDA paper identified that the present dispensation favors public and private partnership, and there is a need to look closer on its needs in terms of sustainable development.

The major challenge for TESDA now is to come up with the Green Training Regulations that will forge its role in the promotion of the concepts of environmental sustainability. It affirmed that the Philippines is a consistent follower of international protocols on climate change and environmental sustainability, and it is heading on the right direction as far as ESD is concerned.

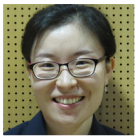
**Thailand**

Mr. Chaiyanum Sangma-Kar, College Director, Chonburi Technical College, in his presentation stressed that the Office of the Vocational Education Commission (OVEC) has been active in providing work force to the labor markets across Thailand. Some of the major programs being undertaken by the commission is the promotion of "The Brand of R People" which aims on improving the values and character of the TVET students. These will also a step to develop their skills for employability and to increase competitiveness, which will be crucial for their future employment. It also focused on making TVET attractive to the students through capacity building and intensive promotion. This aims to increase the participation of these students to the TVET programs. At present, Thailand being a top rank industrial country in ASEAN should continually invest in improving the quality and the employability of its workforce. It is therefore needed that enrollment in TVE should be boosted while keeping in mind the need to develop education for sustainable development.

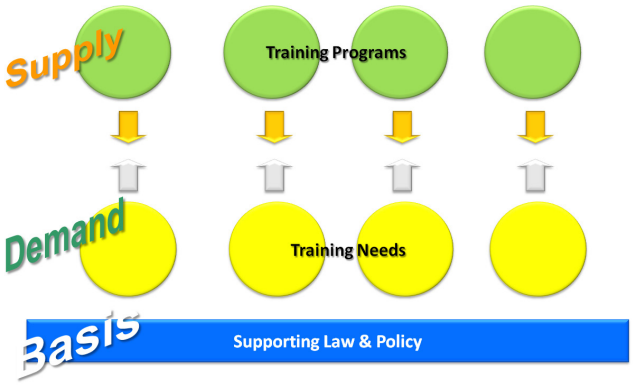
## WORKSHOP SESSION 4: TVET FOR WATER SUSTAINABILITY, GLOBAL AND REGIONAL

The workshop was conducted in the purpose of getting substantial ideas from the participants on how to integrate water sustainability practices in TVET. These highlighted several countries' experience on water conservation and water harvesting technologies.

## Korea



Ms. Hee Jung Son, Water Resources Training Team, K-Water Academy, Korea Water Resources Corporation in her presentation stated that the tapping of water resources has been a vital aspect of the Korean economic boom. The provision of water for agricultural industrial and household use is being supervised by the central government officials and the Korea Water Resources Corporation (K-Water). Water resource management is also heavily supported by laws pertaining to conservation, protection and preservation of the water supply.




*Structure of the K-Water Courses in Water Education*

Currently, K-water has embarked on several projects that has done by their training programs in achieving their desired methods and increasing awareness towards water resource conservation on TVET. This includes water training program for local officials, K-water expert program, CRP (Competency reinforcement plan) and water training course for foreign officials. This programs aim to boost the development of TVET for water sustainability and to provide support to the laws and policies mandated by the government which targets entire workers in the water industry to upgrade Korea's overall water technology level. A continuous upgrade of the training programs, as well as innovations in education is required to meet the self-evolving demands of the customer.

## Malaysia

Mr. Muhammad Rumzi Bin Namat, Principal Assistant Director, Curriculum Development and Evaluation Division, Department of Polytechnic Education discussed that a National Water Vision, which roughly states that Malaysia will be able to conserve and manage its water resources to ensure adequate and safe water, was its guiding principle in fulfilling the increase in the water resource needs in the years to come. The Ministry of Higher Education is taking steps to strengthen TVET institutions through various educational programs to address water sustainability.

The lack of the number of polytechnics running the environmental program in environmental engineering was discussed as a major challenge in the initiatives taken by educators in addressing sustainability education. It was then recommended that they learn from their neighboring counterparts on conducting more specialized programs of study in the areas of sustainable development and environmental conservation. The integration of water and sustainability issues into the existing curriculum is also a daunting task, since it should be responsive to the current issues and trends.

## Pakistan

Mr. Abdul Hafeez Kandhir, Assistant Professor, Government College of Technology stressed that the increasing pressure on the population, industrialization and irrigation, as well as shortage of rainwater and snowfall from the natural sources are the major natural challenges Pakistan is facing with regards to its water supply. On the other hand, the lack of water education and training, as well as the intensity of internal and external conflicts is having an adverse effect on the Pakistani water system management.

The 2010 floods that inundated parts of the Pakistani landscape has displaced millions and brought damage to property and livelihood. It is then, necessary that proper management of the water systems should be done to at least mitigate the effects of the loss of life and distribute the water resources more efficiently to the country's arid areas.

Contribution of Snow, Rain & Glaciers in Upper Indus Basin Flows

| Location | Snow (%) | Rain (%) | Glaciers (%) |
|---|---|---|---|
| River Indus Above Tarbela | 30-35 | 5-10 | 60-80 |
| River Jhelum Above Mangla | 65 | 35 | - |
| River Kabul Above Nowshera | 20-30 | 20-30 | 30-50 |

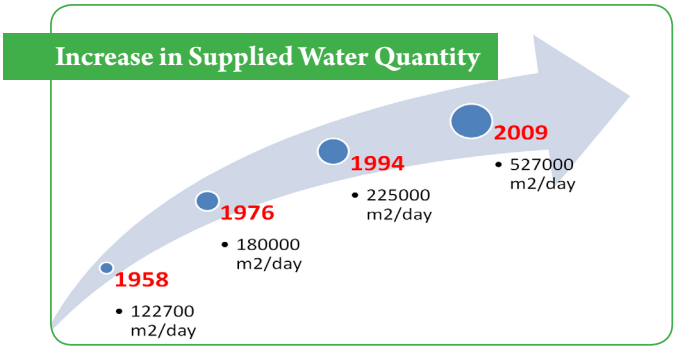
*Source: Reported By Snow & Ice Hydrology, Pakistan.*

***Pakistani Water Resources***

It was identified that Pakistan is in need of good water management to tap the vast potential of its water resources for commercial, agricultural and social purposes. It is emphasized that a Green TVET by integrating green practices on TVET is a crucial factor in achieving a green environment, green health and green country vision of Pakistan.

## Sri Lanka

Dr. Hewage Chithral Ambawatte, Director General, Department of Technical Education and Training, in his presentation reiterated the benefits brought by Sri Lanka's richness in natural resources. In particular, the water system has been in place for over 100 years and has been expanded and rehabilitated several times. Still, major problems remain like leakages and adverse effects brought by ageing infrastructure. To augment this difference, several programs in cooperation with donor agencies have been done to improve the delivery of water services. Aside from the replacement of ageing pipes and defective meters, it also aims to study the recommended methodologies and programs for the reduction of UFW and design courses in ESF and HRD that will train technicians who will handle the works such as consumer metering, organization, etc.




***Projected Demand in Sri Lankan Water Consumption***

This initiative will not only ensure safe and accessible water to the citizens of the island but also pave a way for a sustainable future by the assurance that the future generations will still receive the same quality of water that their ancestors enjoyed.

## INTERNATIONAL EXPERTS MEETING ON TVET AND ESD: APPROACHES AND IMPLEMENTATION SCHEMES IN THEORY AND PRACTICE

In addition, International Experts Meeting on TVET and ESD was held at Magdeburg, Germany from September 16-17, 2010. It was focused on Mid-term review of DESD. The event was opened by Ms. Naing Yee Mar, UNESCO-UNEVOC and Dr. Shyamal Majumdar. In his opening, delivered a presentation on "Moving into the Second Half of the UN DESD-Implications and strategies. He highlighted three challenges to overcome the limitation highlighted by Mid-term review of DESD. First challenge is Meaning and Scope of ESD. There is need to understand that SD is a holistic concept. Second challenge is Model to integrate SD in TVET curriculum. He suggested three different models namely Infusion, Diffusion and Hybrid model for integration of SD in TVET curriculum. The third challenge is How to integrate SD in TVET institutions. Greening TVET framework was highlighted to integrate SD in TVET institutions. He highlighted the five pillars such as Green campus, green technology, green education & community outreach program green research and green culture. Lastly, he also shared insight on initiatives at CPSC on integrating green principles to promote green TVET.

Dr. Majumdar, highlighted that to realize sustainable economic growth, it is imperative to develop green TVET, which deals with a resource-conserving and environment-friendly mode of production, the way of life and mode of consumption, and strikes a balance among economic growth, social progress and environmental protection. We should take into consideration the need for both immediate growth and long-term development. While restoring economic growth, we should optimize the energy mix, upgrade industries, develop green economy, and foster new growth areas, thus creating conditions for sustainable economic growth. Developed countries should provide financial, technological and capacity-building support to developing countries and enable them to get access to climate friendly technologies in order for such technologies to better serve the common interests of humankind. Developing members should,

in the light of the actual circumstances, explore a path of sustainable growth through green TVET suited to their own conditions and development stages.

Ms Naing introduced the implementation process of the UNESCO Strategy for the Second Half of the UN decade of Education for Sustainable Development and discussed the role of UNEVOC Networks with regard to significance of regional networking. Dr. Klaus Dieter-Mertineit of the IUB Hanover meanwhile, discussed the several approaches to initiate and implement ecological sustainability in TVET. The last speaker, Dr. Klaus Jenewein of the University of Magdeburg and Dr. Klaus Hahne of the BiBB, Bonn tackled the overview on TVET teacher training models and approaches to integrate sustainable development aspects.

In summary, the midterm review discussed the following findings on ESD;

i. Awareness, Meaning and Scope of ESD should be encouraged to broaden the knowledge of the beneficiaries
ii. There is a need to reorient the TVET curriculum to comply with ESD practices is their respective systems
iii. The promotion of capacity building on ESD should be prioritized
iv. Need to develop ESD Resources and material as a reference and guide to the projects. The use of local languages in these ESD resource materials hinders the wide dissemination of information and thus the sharing and application of best experiences of the countries involved.
v. A need to boost networking and cooperation among the partner organizations
vi. A need for further ESD related research to be used in the monitoring and evaluation of the programs and initiatives under ESD.

## FIELD VISITS

On the afternoon of September 13, 2010, the participants went to the "Specialist Field Trip" to the Water Supply Facilities around Munich to observe and be familiarized with the efficient, world-class standards of German water purification and use. The participants visited the Groundwater Catchment Facility in Reisach where a demonstration of the mechanisms for retrieving groundwater was demonstrated. The Hillside Water Catchment facility showed the participants how water was harvested from the slopes of the hills. It also included a tour on the "Sprial Tower" Thalham.

Multimedia presentations commenced after the tour, which included an overview of the history of the three German Watersheds was presented by Mr. Max von Pettenkofer. A short film on the German Facilities for Water Catchment and Support Program for Ecological Farming was also shown to the participants. To wrap up the tour, the participants observed the Photo Gallery of the DWA regarding the Historical Progress of Water Supply for Munich.

Another important visit was on the International Trade Fair for Water held at New Munich Trade Fair Center, where the participants observed some 2,700 exhibits on advanced technologies and products on water resource procurement and conservation. This trade fair featured the modern ways of handling water and waste resources in the world. The event was recognized as a leading trade fair for environmental technology where the focus on water and waste largely seen as an important issue in this generation.

## CLOSING CEREMONY

The final leg of the symposium was held at Magdeburg on September 17, 2010. Dr. Majumdar, on his closing remarks, highlighted that a framework for green practices should be proposed to address the challenges concerning the Green TVET concept, He also urged every participant to adopt the green practices on TVET such as the promotion of a "Green Campus" which will instill a culture of sustainable development through "Green Research" and "Green Cultures". Dr. Borhene Chakroun, Chief, Section for TVET and Division for Education Strategies& Capacity Building, Paris meanwhile affirmed UNEVOC's commitment in investing on continuous capacity building and building international partnerships and alliances to forward the cause.

## WAY FORWARD

The 5-day meeting explored options to attain ESD practices in TVET and encourage the adoption of greener, more environment-friendly and more modern technologies for water conservation. The different approaches and themes with regards with ESD and Water Sustainability were tackled, focusing on these aspects:

i. Greening TVET in support of the ESD
ii. TVET for Water Sustainability: Global and Regional Network and Action
iii. TVET and ESD: Approaches and Implementation Schemes in Theory and in Practice

These topics gave an avenue to the participants to share their specific experiences on how they apply green ESD practices in their TVET curriculum. It also paved a way to analyze the strengths and weaknesses of their existing systems and solicited ways on how to improve it. The following key recommendations were suggested to forward the advocacy of Green TVET and ESD including environment-friendly practices.

- Evolve an integrated greening TVET framework.
- Promote Green Campus movement to reduce carbon footprint per campus.
- Initiate Clean & Green technology programs through TVET to reassure green jobs.
- Adopt green community through capacity building programs.
- Undertake Green research to develop green tools, techniques and programs.
- Inculcate Green Culture through community partnership.
- Formulate special Water education programs to promote awareness, appreciation, knowledge, and stewardship of water resources.
- Form a strong network among the participants for further discussion and sharing of experiences and information on our member countries.
- Initiate and execute follow up workshops with the participants once a year or two years to evaluate what is to be done to further improve the policies, as well as discuss the challenges that emerge and the ways to deal with them.
- Provide assistance in terms of technical, to help member countries who are ready to review their curriculum to cooperate green TVET.
- Encourage project proposals, provide fund, and provide funding for the implementation of green TVET practices or Action plans.
- Support the participating countries to have in-country Green TVET programs for sustainable development. Who will then help in the dissemination of Green TVET.

Likewise, the sharing of country experiences in responding in such issues prompted these specific recommendations and strategies to harmonize TVET and Green practices.

- Organization of regional seminars to the different stakeholders (NGO, education, etc.) focused on the practices, methods and guidelines for a Green TVET Curriculum.
- Integration of Green TVET issues and practices in the formulation of the TVET curriculum framework.
- Creationof regional organization body to promote, organize and evaluate activities in Green TVET and environment.
- Development of reeducation projects on the populations on the adverse effects of the environment-harming ways such as pollution, overcrowding and resource mismanagement.

Likewise, the meeting prompted the following actions in forwarding the cause for the adoption of practices for TVET in Water Education.

- Setting up a strong network among participants to set up a forum for the discussion of water related issues
- Introduction or strengthening of courses related to water education in the TVET institutions
- Introduction of short courses to re-skilling and re-briefing to encourage lifelong learning in water education
- Foster Public-Private Community partnerships to promote water education in the TVET sector
- Coordinate and conduct workshops/ seminars and meetings to create awareness on the importance of water resources and its uses
- Incorporate water education on the sustainability of the water resources.

## CLOSING REMARKS

Based upon a needs assessment of the Asian-Pacific region for achieving Green Growth:Sustainable TVET needs to be pursued. It must be implemented in conjunction with appropriate policy enablers and clear direction for a 'green' movement to run systems and approaches effectively. Towards this end, creating a critical mass as driver of sustainability is necessary. Green policies, moreover, will be effective enablers of sustainability.

While strides have been made towards sustainable growth of the region, meeting emerging development challenges will require profound structural reform, with greater cooperation from governments, the private sector, and civil society to enhance environmental stewardship. Given the increased demand for natural resources, promoting green TVET is crucially important for ensuring long-term economic sustainability, energy security and maintaining international competitiveness, while improving the overall well-being of society.

## FOLLOW-UP

The outcomes and the recommendations of the International Experts' Workshop on Green TVET and Education for Sustainable Development: Capacity Development Needs for Water Education will be made available to all of the participants and other TVET experts by the way of publishing the report and the participants' presentations through the UNESCO-UNEVOC, InWEnt and CPSC websites. A published copy will also be furnished to all of the representatives of the participant countries.

## PROGRAMME

| | |
|---|---|
| **Sunday, 12 September 2010: Arrival** | |
| 12:00 | Lunch |
| 18:30 | **Official Opening Festivity** |
| **Monday, 13 September 2010** | |
| 09:30-10:30 | **Workshop Inauguration, Orientation and Goal Setting**<br><br>Chaired by Dr. Shyamal Majumdar, CPSC |
| Tea break | |
| 11:00-12:30 | **Workshop Sesion 1:**<br>**The World Trends on Education for SD and its Implication for TVET**<br><br>• *Dr. Shyamal Majumdar, CPSC*<br>• *Dr. Harry Stolte, Inwent*<br><br>Chaired by Ms. Naing Yee Mar, UNESCO-UNEVOC |
| Lunch | |
| 13:45-18:00 | **Study Visit "Specialist Field Trip"**<br><br>The 3 excursions in parallel<br>• *Wastewater Treatment*<br>• *Water Supply*<br>• *Sewer System* |
| 18:30-20:00 | **Evening Dinner** |

| | |
|---|---|
| **Tuesday, 14 September 2010** | |
| 09:30-10:45 | **Workshop Session 2:**<br>**Country Perspectives on Greening TVET in support of DESD**<br><br>Chaired by Dr. Rajesh P. Khambayat, CPSC |
| 10:45-12:00 | **Workshop Session 3:**<br>**Country Perspectives on Greening TVET in support of DESD**<br><br>Chaired by Dr. Rajesh P. Khambayat, CPSC |
| Lunch | |
| 13:30-14:00 | **Workshop Session 4:**<br>**TVET for Water Sustainability: Global & Regional Network and Actions**<br><br>Country Perspectives on TVET Water Sustainability<br><br>Country Presentation<br><br>Chaired by Dr. Rajesh P. Khambayat, CPSC |
| 14:15-15:45 | **25 Years of German TVT Experience in the Water Sector and Solid Waste Management**<br><br>*Welcome in Munich at IFAT and by DWA, by Robert Schmidt, member of the managing board of DWA, Chairman of the Committee for Training and International Cooperation and CEO of the Munich Wastewater Company and Johannes Lohaus, Managing Director of the DWA Head Office*<br><br>*25 years TVET in Wastewater Sector in Germany by Rüdiger Heidebrecht, Head of Department Training and Intern. Cooperation, DWA*<br><br>*Practical Task complementing the Dual System made in Germany and its implementation in the environmental sector: The Bavarian School of Administration by Dr. Andreas Lenz, Head of the Department "Environment" at the BVS, Bavarian School of Administration* |

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| | *Introduction into the Practical Task "Safe Entry into and Operation in the Sewer System" by Hélène Opitz, DWA*<br><br>Chaired by Ms. Naing Yee Mar, UNESCO-UNEVOC |
| Tea Break | |
| 16:00-17:30 | **Practical Task "Competition - Safe Entry into and Operation in the Sewer System"** |
| 19:00-22:30 | Bavarian Dinner |
| **Wednesday, 15 September 2010** | |
| 09:30-09:45 | **Workshop Session 5:**<br>**TVET for Water Sustainability: Global & Regional Network and Actions**<br><br>Presentation by Ms. Naing Yee Mar, UNESCO-UNEVOC |
| 09:45-11:00 | **Break-out Session 1:**<br>**Working Groups on** *What can we learn from each other?*<br><br>Greeing TVET in Support of DESD<br>TVET for Water Sustainability & Governance<br><br>Chaired by Dr. Harry Stolte, InWEnt |
| 11:00-12:30 | **Break-out Session 2:**<br>**Group Presentation and Discussins on** *What can we learn from each other?*<br><br>Chaired by Dr. Rajesh P. Khambayat, CPSC |
| Lunch | |
| 14:00-15:00 | Delegates visit IFAT Trade Fair |
| 15:30 | Departure to Magdeburg |
| **International Experts' Meeting on TVET and ESD:** *Approaches and Implementation Schemes in Theory and Practice* | |
| **Thursday, 16 September 2010** | |
| 09:00-09:15 | **Dr. Harry Stolte**, InWEnt Magdeburt<br><br>*"Welcome & Introduction of the UNEVOC Centre Magdeburg with priority on TVET for ESD"* |
| 09:20-09:50 | **Ms. Naing Yee Mar**, UNESCO-UNEVOC International Centre, Bonn<br>**Dr. Shyamal Majumdar**, Colombo Plan Staff College for Technician Education, Philippines<br><br>*"Moving into the Second Half of the UN DESD - Implications and Strategies for TVET"* |
| 09:50-10:20 | **Dr. Klaus-Dieter Mertineit**, IUB Hannover<br><br>*"Approaches to initiative and implement ecological sustainability in TVET"* |
| Tea Break | |
| 10:30-11:30 | **Prof. Klaus Jenewein**, University of Magdeburg<br>**Dr. Klaus Hahne**, BiBB, Bonn<br><br>*"Overview on TVET Teacher Training Models (B.SC/M.Sc.) and approaches to integrate SD aspects"* |
| 11:30-13:00 | **Lunch Break orgnized by InWEnt** *(with representatives of Provincial Government)* |
| 13:30-16:00 | **Field Visit:**<br><br>*"Applied technologies in renewable energies combined with TVET programmes for workers, technicians and engineers"* |
| 16:00-18:00 | Cultural Excursion |
| 18:00-onward | Official launching of the UNEVOC Centre Magdeburg |
| **Friday, 17 September 2010** | |
| 09:00-11:30 | **Field visit:**<br>*Approaches/Examples on Sustainable Rural Development supported by TVET*<br>*"Green Campus" Model* |
| Lunch | |
| 12:30-14:00 | Final Discussion and Closing Remarks:<br><br>• Dr. Shyamal Majumdar, CPSC<br>• Dr. Harry Stolte, InWEnt<br>• Dr. Borhene Chakroun, TVET Section, UNESCO<br><br>Chaired by Ms. Naing Yee Mar, UNESCO-Unevoc |

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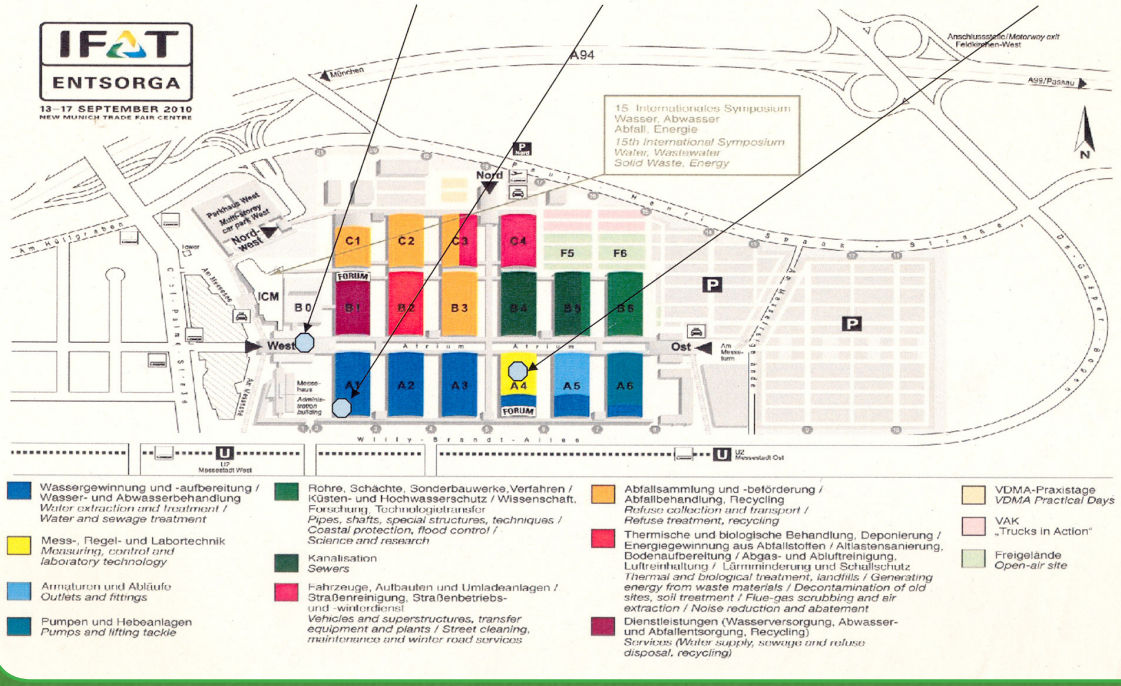
Entrance West –
DWA Stand for lunch
and coffee break

Hall A1 Room A 12
– Conference room

Forum Hall A4
UNESCO-UNEVOC Booth
Stand 203/304





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