

APPENDIX D

SUMMARY OF THEMATIC SESSION 1

Thematic Session 1A: Solid Waste Management

This session was co-chaired by Mr. Masayuki Karasawa, Environmental Management and Director, Office for Climate Change, Japan International Cooperation Agency (JICA) and Mr. Eddy Santana Putra, Mayor of Palembang City, Indonesia. A total of 8 presentations were made:

1. *ESC Model City Phnom Penh* by Mr. Chan Sam Ann, Vice Governor, Phnom Penh Capital Hall;
2. *Solid Waste Management in Palembang City* by Mr. Eddy Santana Putra, Mayor, Palembang City Government;
3. *Solid Waste Management in Surabaya City* by Ir. Satrio Eko Wibowo, M.Si, Head of Improvement and Development of Environmental Quality for the Board of Environment, Surabaya City Government;
4. *Waste Reduction by Composting* by Mr. Rudzaimair Malek, Head of the Environmental Health Division, Kuching North City Hall;
5. *Phitsanulok City Municipality Model: solid waste management* by Mr. Noppadon Sinpaisansomboon, Sanitation Engineering Director, Phitsanulok Municipality;
6. *Philippine Eco-Friendly and Healthy Cities* by Hon. Remedios L. Petilla, Municipal Mayor/Local Chief Executive, Local Government Unit of Palo, Leyte;
7. *Social Waste Management Centre in Battambang City* by Mr. Chau Kim Heng, Director General, COMPED; and
8. *Mekong Region Waste Refinery – International Partnership towards Achieving Zero Waste, Zero Landfill and Reduce Greenhouse Gas Emissions* by Dr. Muhammad Abu Yusuf, Project Director, Mekong Region Waste Refinery-International Partnership Project.

Presentation Summaries (in order of presentation)

On behalf of Mr. Chan Sam Ann, Vice Governor, Phnom Penh Capital Hall, **Mr. Chiek Ang, Director of Phnom Penh Environmental Department, Cambodia** presented 'ESC Model City Phnom Penh'. In achieving its dream of a 'Clean and Green City' Phnom Penh faces many challenges in waste management with low public awareness and capacity to change attitudes. There is frequent illegal littering; no waste separation and landfill sites are filling up. There have been a variety of programmes to tackle these challenges; the most recent being a drive to reduce plastic bag usage and waste separation at the market through fixed penalties. There has been strong collaboration across the community from public to private sector; nevertheless

challenges remain in public awareness and education. In the future the city intends to build on the best practices of the pilot project and extend the practices throughout the city.

Mr. Eddy Santana Putra, Mayor, Palembang City Government, Indonesia presented 'Solid Waste Management in Palembang City'. His presentation started with discussing the key issues in solid waste management in the city. These include waste collection coverage which is at around 74%, poor operation of landfill and low public participation. Best practices in solid waste management such as the promotion of composting at the household, market, community, school and office level were introduced. The city started a CDM project in 2008 for landfill gas capture at Sukawinatan landfill. Current programmes are: biogas production from human waste in Seberang, promotion of environmentally friendly villages, waste separation at source, 3Rs and composting, clean water, sanitation, and tree planting. Additionally, it is hoped that the establishment of the Solid Waste Bank project will increase public awareness of waste management and create more income for households, in addition to reducing the amount of waste sent to landfill. The Waste Bank uses 15% of its income on operational cost, distributing the rest to customers.

Ir. Satrio Eko Wibowo, M.Si, Head of Improvement and Development of Environmental Quality for the Board of Environment, Surabaya City Government, Indonesia presented 'Solid Waste Management in Surabaya City'. Surabaya has seen a significant decrease in solid waste since 2005, far exceeding previous estimates. The solid waste management system separates waste by type and also involves a composting system. Community-based waste management is based on the 3R concept of 'Reuse, Reduce, Recycle', and includes activities such as: socialisation; the formation of Environmental Cadre groups; and involvement in organic waste composting. Success of the system can also be attributed to the multiple stakeholder interests: local government, private organizations, and the community, all of which have a role.

Mr. Rudzaimair Malek, Head of the Environmental Health Division, Kuching North City Hall, Malaysia presented 'Waste Reduction by Composting'. To achieve its aim of reducing waste generation to 0.3 kilograms per capita per day by 2020, North Kuching has undertaken a large-scale two-part composting programme. Project 1, dealing with home composting using the EM Bokashi Method, started with a study trip to Kitakyushu, Japan, and further implementation of knowledge gained across 300 houses. Project 2 involved a study trip to Nonthaburi, Thailand, to learn about composting centres, resulting in an improvement in the composting process and the production of North Kuching's own EM solution. Results indicated for Project 1 achieved a 62% reduction in waste per household, while Project 2 increased the compost output 5-fold and improved the quality of the production of EM solution. The project results show that this type of local capacity sharing is very effective, and it is recommended that similar study tours be enabled through the support of regional and/or national governments. The lessons learned can be replicated in other cities with the coordination of provincial and national government.

Mr. Noppadon Sinpaisansomboon, Sanitation Engineering Director, Phitsanulok Municipality, Thailand presented 'Phitsanulok City Municipality Model: solid waste management'. Phitsanulok's community-based solid waste management (CBM) system has achieved successes since beginning in 1997 as a joint Thai-German programme. Initial barriers included a need to promote awareness among the public and a general lack of technological know-how, as well as the absence of cooperation between local authorities and central government departments. After a brief overview of the state of the current waste collection system in Phitsanulok, the importance of public participation was addressed. Different actors in the CBM system ensure the smooth overall performance of the system: mayors and city

councillors as decision makers; municipality staffs made responsible for implementation; and communities made responsible for CBM implementation in their area and households. The outcome of the activities has been a marked decrease in waste, services becoming more efficient, leading to the more effective use of funds: a win-win situation for the community and the local authority. Additionally, as a member of the ASEAN Model Cities programme, the city has undertaken the following activities: expanding the pool of trainers and disseminating training across 4 local administration authorities in the country. As a next step, it is planning to assist those cities in implementing the training modules as well as with the monitoring and evaluation of its progress.

Hon. Remedios L. Petilla, Municipal Mayor/Local Chief Executive, Local Government Unit of Palo, Leyte, Philippines presented 'Philippine Eco-Friendly and Healthy Cities'. In order to achieve its aim of becoming a green, clean and environmentally sustainable city, Palo has implemented several composting and recycling activities, and conducted awareness-raising campaigns to increase community involvement. Lessons they have learned so far are that the involvement and commitment of barangay officials and communities, as well as technical know-how are imperative. Systems also have to be put in place prior to social marketing. Additionally, the importance of context should be taken into account, for example in rural communities community-level composting has proven to be more viable than the centralized facilities used in urbanized areas. Solid waste management goals in Palo include increasing the waste diversion rate from 25% to 50%; intensify the education campaign; enforce a 'no-burning' of solid waste by 2012; and introducing and implementing low cost technologies for wastewater treatment in pilot barangays in 2012. Future plans include: the establishment of waste banks for recyclables in all barangays and schools, and of a central waste bank in the municipality.

Mr. Chau Kim Heng, Director General, COMPED presented 'Social Waste Management Centre in Battambang City'. The presentation covered their activities as a local NGO involved in solid waste management in Battambang city. It gave a brief introduction to COMPED, waste management situation in Battambang city and its decentralized and open turned window composting system. COMPED is a NGO which was formed in 2001 to handle solid waste management. The first project started in Phnom Penh City, but was ultimately closed due to an issue over municipal land ownership. However, Battambang city was also facing challenges in handling waste and landfill management; to reduce the waste coming to the landfill site, the city had to burn waste. So, to find an alternative and more environmentally-friendly solution, organic waste composting (which made up 65% of total waste) was introduced using land donated by the city. Using the decentralised window composting method, it now accepts 10 tonnes a day of waste from the market. However, it was identified that for decentralised composting to be a success, waste separation is required at source. An integrated approach with strong public awareness, supportive government policy, regulation and guidelines as well as incentives and subsidies are required.

Dr. Muhammad Abu Yusuf, Project Director, Mekong Region Waste Refinery Project, Asian Institute of Technology (AIT), Thailand presented 'Mekong Region Waste Refinery – International Partnership towards Achieving Zero Waste, Zero Landfill and Reduce Greenhouse Gas Emissions'. Rapid development and fast urbanization within the Mekong region has led to city waste generation doubling within 10 years, thus cities experiences difficulties in managing and disposing waste. Land has become scarce and expensive and communities don't want dump sites in the neighbourhood. In future, it will be difficult to obtain land for dump sites, thus the introduction of zero waste, zero landfill and reduce greenhouse gas emissions in the region are essential.

This project focused on awareness rising and capacity development of the city Mayor and officials on zero waste, zero land fill and reduce greenhouse gas concepts through study visits and technical training in Sweden. Feasibility studies of two dump sites will be conducted to ascertain the viability of the extraction of biogas from the landfill and the potential construction of a biogas plant. Two small scale biogas plants will be constructed at the community level to convert waste to biogas and biogas to electricity or to connect to households for cooking. The project will organise meetings to disseminate project results and lessons learned. Lessons learned from the past experience of solid waste management and managing similar projects are the need to change the mindset towards waste and consider waste as a resource; to teach school children about sustainable solid waste management; to showcase the results to convince the community members to practice it and implement small scale pilot project at the initial stage at the community level, instead of implementing a large centralised project.

Discussion

- All the presentations identified solid waste management as a growing environmental, social and economic issue in their cities.
- Most cities are practicing unsanitary landfill waste disposal methods and are finding new landfill sites difficult to obtain due to land shortage and high land costs.
- Participants identified the importance of national policies, legal framework on 3R
- Cities are endeavouring to introduce new waste reduction methods, such as source separation, waste banks at the community level, composting market waste and within communities, biogas, landfill gas capture and strong law enforcement and penalty campaigns.
- The difficulty in getting public participation in waste separation and reduction is noticeable in many cities.
- Technical and technology transfer, financial and national/international support is required for the successful application of the 3Rs.
- Strong commitment by communities, local governments and national governments are required.
- The selection of technology and the overall approach should be relevant to the local context, taking in account factors such as urban/rural, size of the city and development levels.
- City to city experiences and technical transfer is effective in scaling up and spreading the best practices.

Thematic Session 1B: Urban Water and Sanitation

This session was chaired by Dr. Wijarn Simachaya, Director General of the Pollution Control Department in the Ministry of Natural Resources and Environment, Thailand and co-chaired by Mr. Saengroaj Srisawaskraisom, Program Development Specialist, United States Agency for International Development (USAID). A total of 7 presentations were made:

1. *Lessons Learned on Domestic Wastewater Management in Thailand* by Dr. Wijarn Simachaya, Director General, Pollution Control Department, Ministry of Natural Resources and Environment, Thailand;
2. *Urban Water and Sanitation: Maehongson Municipality* by Hon. Pakorn Jeenakum, Mayor of Maehongson Municipality;
3. *Water and Sanitation Requirements for an Environmentally Sustainable Yangon City* by Mr. Kyaw Thar Sein, Assistant Head of the Pollution Control and Cleansing Department, Yangon Development City Committee (YCDC);
4. *Inputs and Outcome of the Corporation: Phnom Penh Water Supply Authority with Waterworks of Kitakyushu City* by Mr. Satoshi Kiyama, Director of Waterworks Bureau of Kitakyushu City;
5. *Tubig Para Sa Barangay: providing clean and affordable water to poor communities using a sustainable model and community participatory approach* by Ms. Carla May Berina-Kim, Head of Sustainable Development at Manila Water;
6. *Waterlinks: Partnerships for Better Water and Sanitation Services in Asian Cities* by Mr. Arijanto Istandar, Team Leader of Water and Sanitation, USAID; and
7. *Sustaining Sanitation Improvements in Asian Cities* by Mr. David Robbins, Senior Water and Sanitation Specialist, RTI International.
8. *City to City Cooperation towards Sustainable Wastewater and Water Management* by Dr. Bernadia Irawati Tjandradewi, Programme Director, CITYNET (The Regional Network of Local Authorities for the Management of Human Settlements)

Presentation Summaries (in order of presentation)

Dr. Wijarn Simachaya, Director General, Pollution Control Department, Ministry of Natural Resources and Environment, Thailand presented 'Lessons Learned on Domestic Wastewater Management in Thailand'. Efficient management of domestic wastewater management is of primary interest in Thailand. National policy with regards to domestic wastewater management falls into three themes: the construction of new municipal wastewater systems; the reduction of wastewater at the source; and stricter law enforcement. Currently there are a total of 101 central treatment facilities in existence or being built; using a variety of different technologies and various types of collections systems that are based on land availability such as central treatment, clustering system and on-site treatment. However, only 12 municipalities have implemented central wastewater tariffs, a main obstacle for the operation and maintenance of the treatment facilities. However, from the state of domestic wastewater management in Thailand today, it is

clear that the country is still facing some constraints. For example: many urban communities lack appropriate domestic wastewater facilities and management; the community lacks awareness and understanding of issues; local administration organisations are still unable to manage domestic wastewater; and the lack of funds to build new wastewater collection, treatment and maintenance systems. In conclusion, it is noted that the concept of “Polluter Pay Principal” should be strictly implemented for wastewater management.

Mr. Poon Thiengburanathum, on behalf of **Hon. Pakorn Jeenakum, Mayor of Maehongson Municipality, Thailand** presented ‘Urban Water and Sanitation: Maehongson Municipality’. Maehongson’s vision to be a green, clean and peaceful city involves for a large part public participation. Over 3 years the city’s development plan will take public participation in the management of the city’s environment from strategy to implementation. In line with this is the PPP-based (polluter pays; precautionary; and public participation) Household Grease Trap Installation Project, resulting in higher quality urban waste water. Current outcomes from the Grease Trap project are threefold: social, economic and environmental. Although recognising some of the barriers are still challenging the wider implementation of the project, future aims are for project expansion and technology transfer.

Mr. Kyaw Thar Sein, Assistant Head of the Pollution Control and Cleansing Department, Yangon Development City Committee (YCDC), Myanmar presented ‘Water and Sanitation Requirements for an Environmentally Sustainable Yangon City’. Introducing the current status of water supply and sanitation in Yangon, the presentation provided an overview of the treatment plants and systems providing water to the city of Yangon. The city is facing several challenges on the road to achieving its 2040 Yangon vision master plan, of which water supply and sanitation are core components. The obstacles include: an increasing demand for water in urban areas; low public awareness of water issues and weak law enforcement; as well as various technical and financial issues impeding the investment into newer water supply and sanitation infrastructure. The short-term plan is to reduce water loss by repairing leakages and establish a new water processing plant. However, to meet the city’s long terms goals for 2040, an additional 3 sewage processing plants will be necessary to meet the projected demand of 520 million gallons of water a day.

Mr. Satoshi Kiyama, Director of Waterworks Bureau of Kitakyushu City, Japan presented ‘Inputs and Outcome of the Corporation: Phnom Penh Water Supply Authority with Waterworks of Kitakyushu City’. The presentation began with a brief summary of the state-of-affairs in Kitakyushu City and for the Waterworks of Kitakyushu City, before introducing the cooperation between the latter and Phnom Penh Water Supply Authority (PPWSA). This partnership in two phases: Capacity Building Phase I in Phnom Penh, and Capacity Building Phase II, extending to 8 provincial cities. Key areas of work were the reduction of ‘no revenue’ water, and how to operate and maintain the water treatment plant. Kitakyushu supported through their expertise, for example by setting up zone-monitoring systems. Key outcomes of the cooperation in Phases I and II include providing drinkable tap water to millions of people, streamlining operations, thereby keeping the cost of water low; reliable water supply in provincial areas; and stabilising finances and ensuring future investment in the network.

Ms. Carla May Berina-Kim, Head of Sustainable Development at Manila Water presented ‘Tubig Para Sa Barangay: providing clean and affordable water to poor communities using a sustainable model and community participatory approach’. Covering the entire water value chain from water treatment to water distribution, Manila Water provides services to 23 cities and municipalities, reaching over 6 million people. Manila Water has identified a pressing issue of

illegal connections to the water supply, leaks and poor service, which the urban poor are most susceptible to; and devised the solution of 'Tubig Para Sa Barangay' (Water for Poor Communities). This flagship programme reduces high systems losses as well as addressing the water needs of low-income communities, by making community members partners and co-owners of the programme. Awards and results have indicated the success of the programme, with 1.7 million people from low-income communities having reliable access to safe water. Practices are now being shared with others.

Mr. Arijanto Istandar, Team Leader of Water and Sanitation, USAID presented 'Waterlinks: partnerships for better water and sanitation services in Asian cities'. An outline of Waterlinks introduced key focus areas of the programme such as: water quality management; non-revenue water reduction; continuous water supply; climate change adaptation; and piped water for the urban poor. The programme has generated significant results, such as 50 partnerships facilitated across the Asia-Pacific and 150 practical innovations demonstrated and adopted, overall reaching more than 1 million people. Important lessons were highlighted and include the importance of mutual understanding between partners, especially across cultural and geographical boundaries, and the advantages of cost-sharing and limiting timeframes. Taking this into account, Waterlinks draws attention to the enormous value of peer learning, and notes that as the demand for partnerships is increasing, this is an opportune time to further collaborate with other city networks.

Mr. David Robbins, Senior Water and Sanitation Specialist, RTI International presented 'Sustaining Sanitation Improvements in Asian Cities'. Poor sanitation – a leading cause of which is uncontrolled wastewater discharges – costs SEA countries millions a year in health care, water resources, environmental degradation and lost tourism opportunities. RTI highlights that the key to achieving better sanitation through wastewater treatment is sustaining the process over time. This process is a triad of infrastructure, awareness-raising, and an enabling environment. RTI has developed a web page with tools and information city mayors and local government staff can use to take charge of their sanitation issues. It is an online forum where users can share case studies and best practice, available at: www.watsanexp.ning.com.

Dr. Bernadia Irawati Tjandradewi, Programme Director, CITYNET (The Regional Network of Local Authorities for the Management of Human Settlements) shared the statistical figures of poor sanitation provision in many developing countries, which showed that only 68% of the urban population in Asia has access to safe sanitation, and that MDGs would be missed by hundreds of millions of people. The Asian Sanitation Data Book 2008: Achieving Sanitation for All commissioned by CITYNET, ADB, Veolia Environnement, and UN-Habitat surveyed 27 cities in Asia as the first of its kind in an effort to compare the performances of sanitation provision. The data collected confirms that the current status of sanitation services in several Asian cities look grim. She shared the approaches and activities of CITYNET in relation to sanitation and water, including: City-to-City (C2C) cooperation, water supply's training in Yokohama and elsewhere, technology and best practices transfer on sanitation, and so on. She concluded that a willingness to invest in health and sanitation needs to be placed at the forefront; and that the prioritization of the city budget for healthy society should be considered a must. Technology transfer and institutional strengthening should be accompanied with continuous learning; and C2C cooperation has been a key tool used to transfer successful practices to many other places.

Discussion

- Water and sanitation remains a big development challenge for ESC cities
- Thailand presented its experience in managing centralized domestic wastewater treatment systems in 100 municipalities: key challenges from these system include high investment costs, tariff collection, operations and maintenance (O&M)
- Mae Hong Son city's household grease trap project could be a low-cost model for other small cities
- Yangon was supported by the ASEAN ESC Model Cities Programme in their planning an improved water supply and sewerage systems through training conducted by Penang Water Utility
- There are existing and proven initiatives/platforms that support cities in water and sanitation through twinning partnerships between cities (e.g. Kitakyushu-Phnom Penh, WaterLinks, CITYNET, RTI)
- Public-private partnership needs to be further utilized to achieve higher results
- ESC cities are encouraged to look into these successes and best practices from within the region in developing future year's programs

Thematic Session 1C: Sustainable, Low-Carbon and Green Cities

This session was chaired by Mr. Adnan Hameed Aliani, Chief of Section, Environment and Development Division, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). A total of 10 presentations were made:

1. *Towards Local Carbon, Green and Sustainable Cities* by Mr. Adnan Hameed Aliani Chief of Section, Environment and Development Division, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)
2. *Capacity Building Project for Green, Clean and Beautiful Xamneua* by Mr. Lianexay Bounmanivanh, Vice Governor, Xamneua District, Lao PDR
3. *Puerto Princesa - A Carbon Neutral City* by Ms. Jovenee Sagun, City Planning and Development Coordinator, City Government of Puerto Princesa, Philippines
4. *Low Carbon Activities in a Small City* by Mr. Somchai Chariyacharoen, Mayor, Muangklang Municipality, Thailand
5. *Development of Environmentally Sustainable Cao Lanh City* by Ms. Nguyen Thi Thanh Nga, Deputy, Resources and Environment Office, Cao Lanh City, Viet Nam
6. *Model of Environmentally Friendly Residential Area in Da Nang* by Ms. Nguyen Thi Thu Ha, Deputy Head/Technical Assistant at 02 Pilot Wards, General Affairs Division of the Environmental Protection Agency, Da Nang City, Viet Nam
7. *Singapore's Commitment to a Liveable and Sustainable City* by Ms. Tan Peng Ting, Senior Associate, Centre for Liveable Cities, Singapore
8. *Sustainable, Low-Carbon and Green Cities: Lessons Learned from UNCRD Programmes on EST, 3Rs and IPLA* by Dr. Choudhury Rudra Charan Mohanty, Environment Programme Coordinator / Expert, United Nations Centre for Regional Development (UNCRD)
9. *The ASEAN-German Technical Cooperation Programme: cities, environment, transport* by Mr. Roland Haas, Principal Advisor, German Society for International Cooperation (GIZ), ASEAN-German Technical Cooperation, Clean Air for Smaller Cities
10. *Data and Tools for Low Emission Cities Development in Asia* by Ms. May Ajero, Air Quality Program Manager, Clean Air Initiative for Asian Cities (CAI-Asia)

Presentation Summaries (in order of presentation)

Mr. Adnan Hameed Aliani, Chief of Section, Environment and Development Division, United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) presented 'Section Strategy: Sustainable Urban Development Section'. Since the 1980s the global trends of trade liberalisation and globalisation have had a large impact on the Asia Pacific region. Rapid economic development led by the cities has led to large inward migrations which, whilst leading to poverty reduction has also led to an increase in social problems and environmental degradation, mostly notably seen with climate change. For cities to be sustainable, they will need to be socially equitable, resilient and pursue green growth. In order

to achieve this, development gaps must be filled in legal and fiscal frameworks; financing; technology and process innovation; strategic planning and policy development; and institutional and human capacities. Whilst there are immense challenges there are also tremendous opportunities for partnership across sectors. The cost of doing nothing would be catastrophic.

Mr. Lianexay Bounmanivanh, Vice Governor, Xamneua District, Lao PDR presented 'Capacity Building Project for Green, Clean and Beautiful Xamneua'. Xamneua is a small regional town in the mountainous northeast area of Lao PDR with economic potential to become an eco-tourist town using potential power generation through the construction of hydro power dams. The town's immediate plans are to clean up the air and water, increase the area of green space within the city and implement the 3Rs. First year achievements include the training city officials, awareness raising amongst the citizenry, an increase in area of green public space and the start of small scale composting programme by 20 families. In order to maintain progress it will be necessary to ensure that training leads to clear results and that the town's objectives are linked to countrywide environmental plans.

Ms. Jovenee Sagun, City Planning and Development Coordinator, City Government of Puerto Princesa, Philippines presented 'Puerto Princesa – A Carbon Neutral City'. Puerto Princesa is the main gateway to the Philippine's last ecological frontier. The city is known for its bountiful natural resources and pristine environment. Only two major economic industries are heavily promoted in the city: tourism and agriculture. Its key management thrusts are Protect, Rehabilitate and Plan. The city has been certified as the first carbon-neutral city in the Philippines. A GHG inventory showed the City emitting only 206 kT CO₂-eq. and sequestering 1,663 kT of the same gas for a total of net emission of -1,456kT CO₂-eq. The City believes that pursuing a low carbon pathway is morally correct. Under the Model Cities Programme of the ASEAN ESC, the City implemented a Capability Building Program on Community-Based Ecological Management. There are 8 capability building activities designed for community leaders and champions, NGO representatives, the academe and city government staff. Activities include: renewable energy (RE)-orientation of the community leaders on their roles under the Ecological Solid Waste Management Act and introduction to the use of Effective Micro-organism Extended (EME, Bokashi and Takakura Methods of Composting); coordination meetings among the stakeholders; capability building workshops for the core teams of pilot villages, appropriate technology on treatment of domestic wastewater, recycling of residuals and agricultural-waste and large scale composting. The next activities to be undertaken are the monitoring and evaluation activities by an NGO partner and paralegal training on clean air management enforcement. Key success factors include: the active participation of the various sectors of the community; involving the stakeholders in the program development and implementation, coordination and transparency were maintained at various level of implementation; and the political will and full commitment of the highest policy maker.

Mr. Somchai Chariyachoen, Mayor, Muangklang Municipality, Thailand presented 'Low Carbon Activities in a Small City'. Muangklang, as a small city with a population of 20,000 whose main industry is agriculture, is undertaking activities in five broad areas with the aim of becoming a low-carbon city. In transport, the emphasis is on eco-friendly transport and fuel saving. For example, public transport in the city has now switched to using liquefied natural gas. Urban agriculture, particularly rice harvest, is promoted in the downtown area to increase the greenery areas as well as for income generation. Waste management in the city focuses on sorting solid waste using a low-cost conveyor system, using food waste for feedstock, converting organic waste into compost and biogas which is used in slaughterhouses. Water management involves the introduction of grease traps, including new regulations making them

mandatory in new housing constructions. The collected grease is also used as supplemental fuel. In this way, Muangklang Municipality is heading towards becoming a self-sufficient low carbon city.

Ms. Nguyen Thi Thanh Nga, Deputy, Resources and Environment Office, Cao Lanh City, Viet Nam presented 'Development of Environmentally Sustainable Cao Lanh City'. Cao Lanh city is a small city in the southwest of Vietnam with a population of around 160,000 which has been implementing projects ranging from infrastructure to sanitation and waste management. During the first year of the ASEAN ESC Model Cities project it has engaged the local community by assessing the environmental status by interviewing households and training teachers and local stakeholders about ESC, organising dissemination activities within the community and at school, as well as publicising ESC via local mass media. Going forward greater emphasis will be placed on consensus building, training and guidance on implementing new models and an understanding that time and patience are required for publicity and associated work.

Ms. Nguyen Thi Thu Ha, Deputy Head/Technical Assistant at 02 Pilot Wards, General Affairs Division of the Environmental Protection Agency, Da Nang City, Viet Nam presented 'Model of Environmentally Friendly Residential Area in Da Nang'. Da Nang is an economic and cultural hub within central Vietnam and one of the largest cities in Vietnam. It suffers from air and water pollution as well as poor solid waste management. These issues will be tackled through sound policies, capacity building and awareness-raising. This year work has started in two pilot areas where the aim is to create Environmentally Friendly Residential Areas. Workshops were held to develop action plans for 2 pilot wards with the engagement of communities. The model has been successful and will be expanded over the next two years.

Ms. Tan Peng Ting, Senior Associate, Centre for Liveable Cities, Singapore presented 'Singapore's Commitment to a Liveable and Sustainable City'. In response to the sustainable cities agenda, Singapore produced a blueprint for sustainable cities in 2009 and also set up the Centre for Liveable Cities in 2008. Singapore has achieved sustainability through planning clean development opportunities, reducing travel demand whilst increasing public transport and preserving greenery whilst balancing the environment and development, creating a high quality living environment. Singapore will improve resilience by increasing the amount of potable water, ensuring food security and diversifying energy sources. Future challenges include the construction of underground developments, increasing urban greenery through sky-rise greenery and catering to the needs of an ageing population.

Dr. Choudhury Rudra Charan Mohanty, Environment Programme Coordinator / Expert, United Nations Centre for Regional Development (UNCRD) presented "Sustainable, Low-Carbon and Green Cities: Lessons Learned from UNCRD Programmes on EST, 3Rs and IPLA". UNCRD's environmental program and activities cover Regional EST Forum in Asia and Latin America, Regional 3R Forum in Asia, and the International Partnership for Expanding Waste Management Services of Local Authorities (IPLA). UNCRD, through the Bangkok 2020 Declaration agreed by 22 Asian countries, aims to mainstream environmentally sustainable transport (EST) in the overall policy, planning, and development. The Goals of the Bangkok 2020 Declaration, which are based on integrated strategies (Avoid, Shift, and Improve), provides the required basis and political framework for Asian countries and cities in addressing multi-sectoral environment and transport issues, including climate change. The 3R Initiative together with the newly launched international partnership on waste management, IPLA, is addressing policies and programs aiming to achieve resource efficient and zero waste society in Asia. While the high level Regional 3R Forum in Asia seeks to

address measures to promote 3R at the national level by Asian countries, the objectives of IPLA is to mainly foster public-private-partnerships at local and city level in the world. Currently, IPLA has more than hundreds of registered partners and members comprising of national governments, city authorities, municipalities, private sectors, donors, NGOs, and scientific research and development institutions.

Mr. Roland Haas, Programme Director, German International Cooperation (GIZ) presented The ASEAN-German Technical Cooperation Programme 'Cities, Environment and Transport'. The programme has three main components: "Clean Air for Smaller Cities"; 'Sustainable Port Development'; and "Energy Efficiency and Climate Change Mitigation in the Land Transport Sector". The former two projects are ongoing and most likely to be extended to 2015 and the latter is on the verge of being launched. Next steps include the selection of international and regional/local experts, setting up a management structure, with regional kick-off workshops to start from May this year.

Ms. May Ajero, Air Quality Program Manager, Clean Air Initiative for Asian Cities (CAI-Asia), Philippines presented 'Data and Tools for Low Emission Cities Development in Asia'. Air pollution remains a significant problem in Asia that cities need to address to fully say that they are environmentally sustainable. More than half of the cities covered in CAI-Asia database of air quality levels do not even meet World Health Organization's (WHO) most lenient interim air quality guidelines target. Air quality monitoring in ASEAN is weak as less than 15% of almost 300 cities in CAI-Asia database have AQ data. It makes sense then to promote low emissions development which covers both carbon dioxide and traditional air pollutants. An important area of focus to assist cities in low emissions development is providing data and tools to help them assess their major carbon and AP (air pollutant) emissions based on their current land-use and future land-use forms.

Discussion

- Achieving the goal of low-carbon sustainable cities requires adoption of holistic approaches that integrate green growth, social equity and resilience in urban planning.
- Sustained and committed political leadership that champions change, as well as strategic and/or master planning are essential for sustainable development.
- Development of long-term policies requires involvement of all relevant stakeholders in the decision-making process including partnerships with local academic and research institutions that can help setting the appropriate policies.
- Defining baselines and indicators is important to measure the progress and outcomes and national level institutions can play a key role by setting such policies and guidelines that local governments can follow.
- Sharing best practices, successes and barriers from the experiences of other cities is also useful which can also be facilitated by national level institutions.
- Utilizing online sources of information has also proved useful. Human resources capacity development is essential to support adoption and implementation of sustainable development policies.

- Changing attitudes is the hardest aspect of capacity development and which requires continuous communications.
- There is no one solution to a particular challenge. A mix of solutions and options are needed to achieve success.

(end)

