



UNCRD - UNU-IAS Public Symposium on Rio+20
“Sustainable Urban Development: Challenges and Issues in Developing Countries”
22 March 2012, U Thant International Conference Hall, UNU, Tokyo, Japan

MEETING REPORT

I. INTRODUCTION

1. With rapid urbanization occurring, especially in Asia and Africa, sustainable urbanization will be one of the principal sub-themes dealt with at Rio+20 and the international community will be addressing how to promote an integrated and holistic approach to planning and building sustainable cities.

2. To contribute to the debate on this issue, the United Nations Centre for Regional Development (UNCRD) and the United Nations University Institute of Advanced Studies (UNU-IAS) co-organized a public symposium on the UN Conference on Sustainable Development (Rio+20) with the theme, “*Sustainable Urban Development: Challenges and Issues in Developing Countries: Challenges and Issues in Developing Countries*”. The Symposium explored sustainability issues in urban development as well as the role Japan could play in the transition towards sustainable cities. It was hoped that the debate will not only contribute to Rio+20, but also discuss how cities and their partners can successfully implement the outcomes of the Conference for a post Rio+20 sustainable urban developments. The Symposium, which was attended by more than 70 participants addressed the following three areas –

- Sustainable urban management
- Natural resource management for sustainable urban development
- Japanese experience in promoting sustainable cities – Case of Kitakyushu.

II. OPENING SESSION

3. Welcoming the participants on behalf of the United Nations University (UNU), **Prof. Govindan Parayil**, Vice Rector of UNU and Director of UNU-IAS, emphasized the need for innovative solutions for the emerging issues and challenges in the rapidly urbanizing world. In Asia alone, the urban population is expected to grow to 2.5 billion by 2025. The steep increase in urbanization forecast for the coming years can be expected to further exacerbate problems such as loss of biodiversity, increased pollution and other environmental problems unless innovative and far-reaching actions are taken to address them. The UNU-IAS has taken up sustainable urban futures as one of its highest priority programs. UNU is currently developing guidelines for the “Implementation of the Plan of Action on Sub-National Governments, Cities and Other Local Authorities for Biodiversity 2011-2020”.

4. **Mr. Hiroshi Matsuura**, Director, Global Issues Cooperation Division of the Ministry of Foreign Affairs of the Government of Japan, attached significant importance to a multi-disciplinary approach to address issues like growing urbanization, which is a central challenge to sustainable development. Expressing his deep appreciation to UNCRD and UNU-IAS in organizing the symposium, he reaffirmed the interest of the Government of Japan in promoting

sustainable cities. He expressed hope that urban issues will be effectively addressed at Rio+20 with the active participation of the international community.

5. Appreciating the continuous support of the Government of Japan to UNCRD, **Mr. Sha Zukang**, Secretary-General of UNCSD/Rio+20, in his opening video message, highlighted sustainable urban development as one of the key issues for the upcoming UNCSD/Rio+20. Underscoring the fact that more than one million people move from rural areas to the cities every week, he mentioned that the rapid urbanization largely taking place in developing countries is putting enormous pressure on cities in areas such as energy, water, transport, sanitation, housing, education, and healthcare. He stressed the importance of recognizing cities as “engines of growth and centres of innovation and creativity” that need to be well-equipped to address these sustainability challenges. In this regard, he recognized Japanese cities for successfully having dealt with the pressures of expanding population, industrial transformation, and environmental pollution. Given the fact that Japanese cities, including the notable achievements of the eco-city Kitakyushu serve as model examples on how to achieve economic development with minimum environmental impacts, he noted that Japan is well positioned to contribute to Rio+20.

III. SESSION 1: SUSTAINABLE URBAN MANAGEMENT

Facilitator: Prof. Yoshitsugu Hayashi, Graduate School of Environmental Studies, Nagoya University; and Director, International Research Center for Sustainable Transport and Cities Graduate School of Environmental Studies, Nagoya University

Panellists: Mr. Michael Replogle, Global Policy Director and Founder, Institute for Transportation and Development Policy;
Prof. Monte Cassim, Vice Chancellor, The Ritsumeikan Trust, Ritsumeikan University

6. Mr. Replogle highlighted that one of the most critical questions we face today is what kind of cities we should deliver to the citizens of the world. As we approach Rio+20, we are confronted with a number of sustainability issues, not just environmental and economic sustainability, but also social development and equitable economic development. Sustainable transport, being one of the key elements to sustainable urban development, provides the basis for building cities with a balance between human life, traffic, and equitable economic development. Under a business-as-usual forecast, by 2020 car ownership is expected to triple to over 2 billion.

7. Road fatalities, currently at 1.3 million/year (over 90% in developing countries with half of these being pedestrians & cyclists) are expected to increase by 80% in low/mid-income countries by 2020. Currently air pollution from transport contributes to premature deaths of at least 500,000 persons a year in the developing world. The key question for sustainable urban and transport development is what path developing countries should follow as they undergo rapid urbanization over the next 10 to 20 years.

8. Sustainable transport services, which are based on a quality of life approach that puts people first and is designed to meet the needs of women, children, the elderly and disabled persons as well to protect public health and safety, are characterized by: i) support for quality public transport systems; ii) protected road space for buses, pedestrians, cyclists, public space; iii) high efficiency rail or bus rapid transit (BRT) system organized in high demand corridors; iv) reorientation of new urban development around public transport nodes promoting transit oriented development (TOD); v) more equitable access for all; and vi) high efficiency freight logistics,

including shifting to more sustainable and efficient modes of transportation of goods and services, such as marine, rail, etc.

9. Transport is an area in which a large number of public sector institutions are responsible for making collective consumption choices as they guide planning and investment. However, there is a need to shift investment towards the new emergent avoid-shift-improve approach, which calls for: i) avoiding unnecessary or low value travel with smart pricing and other measures; ii) shifting travel to more efficient modes of transportation; and iii) improving efficiency by favouring more efficient, lighter, smaller, slower vehicles and lower carbon fuels and by operating transport networks with optimal speed and flow for remaining traffic.

10. The majority of financial flows, whether private, domestic or international financing or ODA, are still funding unsustainable transport. This presents a great opportunity for Rio+20 to help focus on: i) capacity building of the institutions; and ii) voluntary commitment of large stakeholders and partners involved in transport financing, service delivery and operations and policy development in support of sustainable transport.

11. Though there is significant reference made to sustainable transport in global sustainable development agendas, such as the Agenda 21 and Johannesburg Plan of Implementation (JPOI), very few achievements have been made since then in the transport sector. The Partnership for Sustainable Low Carbon Transport (SLoCaT), formed in 2010, aims to improve knowledge on sustainable, low carbon transport, help develop better policies and catalyze their implementation. It has brought together multilateral development banks, non-governmental organizations, research institutions, and various associations, which are committed to solving problems in this arena and more effectively mobilizing resources and institutional capacity. SLoCaT has mobilized a campaign to ensure that sustainable transport wins broader recognition at Rio+20 as a building block for sustainable development.

12. UNCRD, in close collaboration with national governments, international organizations, bilateral and multilateral donor agencies, has been providing valuable support in advancing sustainable transport through a series of high level Regional Environmentally Sustainable Transport (EST) Forums since 2005. The series of statements and declarations adopted by the city and national governments have called for sustainable transport to be supported through multilateral cooperation and national actions. The most recent one, the Bangkok 2020 Declaration, adopted by the Asian countries in 2010, has outlined twenty-three goals, which provide a basis for advancing sustainable transport at local and national level. As the international community is poised to put sustainable transport in the next generation of sustainable development, development banks such as ADB, IADB and WB have started shifting their funding to sustainable transport.

13. Professor Cassim noted that beyond urban development issues, such as transport and others, there are a number of other important aspects that the international community needs to look into while addressing sustainability, such as the linkage between human habitat and sustainability and the convergence between rural and urban, as well as the linkages between catastrophes, development and ecosystem preservation.

14. In defining the 21st century, Professor Cassim noted that there has been a great deal of convergence of developed and developing countries, of disciplines, of peoples, of urban and rural settlements, of high technology/sophisticated designs and low cost technologies in the mass domain, and of value created in the virtual and real world. The 21st century is also characterized by cross-border dynamics, such as inclusion, diversity and creativity in a globalized world,

settlement networks sharing local knowledge on a global platform due to the emergence of information technology.

15. While there are many issues on the global stage, the key question that we face is how we promote healthy and sustainable development amid other issues, not always related to nature, such as global financial crisis, global resource and environmental crisis, global health and demographic crisis, and global terrorism and armed conflicts. But the encouraging trend is that Asia and other developing regions are witnessing emerging regionalism, which is expected to transform the whole decision-making process.

16. Sustainability Science, which has emerged over the last decades and is becoming more and more sophisticated over time, is a new discipline being born out of a novel approach based on problem solving. Solutions to global environmental problems, such as climate change, biodiversity loss, etc, particularly when the cause is of anthropogenic origin, have become the rallying points for experts from several disciplines to come together. It is an evolving “science” with the core objective of reconciling human welfare with impacts on the earth’s bio-physical environment that are likely to adversely affect the survival of life on earth. Its key elements are measuring transformations, charting inspiring responses, and creating win-win situations for humanity and the earth.

17. Sudden and unexpected catastrophes, such as the Great East Japan Earthquake, are major threats to sustainability. At the time of catastrophes, the local cities and rural areas serve as key nodes in the global supply chain. This was not only true in the case of Japan, but the same also holds true for nodes in emerging and developing economies. On the other hand, slow and invisible catastrophes, such as global climate change, which profoundly impact society and its well-being, pose serious challenges in terms of mitigation as well as adaptation, in particular for agriculture and food-security.

18. Better human development and social system design are indispensable to the societies and economies to withstand these global challenges. The human development lies at the cross-roads of innovation, enterprise, resiliency, and sustainability. For instance, Digital Discoveries Research Collaboratory (DDRC), an open innovation laboratory complex set up in Kyushu in Japan with the involvement of the private sector, provides a platform for building partnerships to transform knowledge into wisdom and wealth.

19. Open innovations and partnerships could nurture a generation of R&D leaders and their affiliated stakeholders beyond borders. For instance, shared innovations like controlled precision agronomy for enhanced functionality and value, and differentially controlled photonics can be used to enhance the value of agro-products by integrating medicinal properties into foods, enhancing nutritional benefits and improving tastes, flavours, aromatic properties, etc, thereby making valuable contributions to the local wisdom and economy in developing regions.

20. In order to create communities of science for sustainability, there is a need to identify underlying issues and seek creative solutions, transform devices into systems and knowledge into wisdom, and ensure that problem solving is transdisciplinary, transgenerational, and transnational.

[Q&A]

21. Professor Hayashi, the facilitator for this session, posed several questions to the presenters. Noting the differences in each country’s situation and the path that has been taken by developed countries, for example Japan and the US, he asked Mr. Replogle what sort of path

could be suggested for developing countries, for example Asian developing countries, to take in the near future, while taking financing into consideration. Professor Hayashi also noted his experience with Bangkok, which has now turned into a city where investment flows in for its infrastructure, but the city has not yet received any green funding. He asked for ideas about developing green funding mechanisms for developing countries.

22. Mr. Replogle responded that non-motorized travel accounts for the vast majority of the world's daily travel, especially in developing countries (approximately 23 billion non-motorized (NMT) trips/day, which is far excess of motor vehicle trips). These NMT users are often pushed to the side and neglected by the people who are operating and investing in the transport infrastructure system. Cities that have created a balanced transport have given better life and better environment for the communities. Limiting urban sprawl and fostering more efficient public transport system, creating dedicated walking and bicycling facilities, implementing smart-growth policies, smart pricing, and better investment, have potential for reducing GHG emissions from the transport sector. The efficient public transportation system in Japan and Korea, the congestion charging and vehicle quota system in Singapore and Shanghai, the BRT system in Guangzhou/China provide many good lessons on the beneficial aspects of the avoid-shift-improve approach.

23. Regarding the green funding mechanism, Mr. Replogle agreed that climate funding is under-utilized for the transport sector. There is a new green climate fund, but it is unclear whether it can be applied to transport. The Clean Technology Fund is starting to be used for transport, but it is still limited. There is a need to look at large scale conventional flows for infrastructure, private and domestic government funds. The key area for reform is whether countries are adopting sustainability criteria. If they are pursued rigorously, this will bring in a stream of new investment capital to finance and operate a managed system under concessions that make use of performance-based contracts. This will bring reliability to the transport sector and is a task for the next generation.

24. Professor Hayashi noted that compared with Mr. Replogle's presentation on the economic and physical system side of discussion on how to improve city functions, Professor Cassim sought more modest urbanization, harmonizing economic or human activities with agriculture and nature. Professor Hayashi asked Professor Cassim what innovations exist in this regard and how our way of thinking should be changed.

25. In response, Prof. Cassim stated that we will have a variety of settlements – large and small, rural and metropolitan. The past paradigm was that urban settlements are dependent on rural settlements for food. But the large urban settlements are generating kinds of emissions and environmental wastes that are causing problems. Work like that of Mr. Replogle, which tries to reduce emissions from transport, will ease the situation. However, with the speed of change that is taking place, adaptation will be necessary in regard to how the food supply system responds to these environmental changes. He suggested monitoring these changes wherever possible, and that this will generate innovation such as the new photonic system that was shown. The advanced photonic greenhouse does not have to be in rural area; it could also be in urban areas. So the food supply system needs to diversify in keeping with the diverse settlements landscapes.

IV. SESSION 2: NATURAL RESOURCE MANAGEMENT FOR SUSTAINABLE URBAN DEVELOPMENT

Facilitator: Prof. Kazuhiko Takeuchi, Vice Rector, United Nations University

Panellists: Mr. Kazuhiko Takemoto, Senior Advisor to the Minister, Ministry of the Environment of the Government of Japan; Senior Fellow and Programme Director, United Nations University Institute of Advanced Studies;
Ms. Aban Marker-Kabraji, Asia Regional Director, International Union for Conservation of Nature (IUCN)

26. Mr. Takemoto noted that the Japanese satoyama principles provide a useful basis for promoting sustainable urban development, and for addressing the importance of resiliency. The Japan Satoyama Satoumi Assessment defined ‘satoyama’ and ‘satoumi’ landscapes as dynamic mosaics of managed socio-ecological systems producing a number of ecosystem services for human well-being and poverty alleviation. Satoyama is a Japanese word referring to rural landscapes where people live in harmony with nature in a sustainable manner. These landscapes, referred to as ‘Socio-ecological Production Landscapes’ (SEPLs), usually consist of different types of habitats such as agricultural land, forests, mountains, inland-waters like ponds and coastal areas, and have been formed and maintained through long-term interactions between human and nature.

27. The *Satoyama* Initiative is a global effort to realise societies in harmony with nature for the benefit of both biodiversity and human well-being, and is in line with the three objectives of the Convention on Biological Diversity (CBD): i) conservation of biological diversity; ii) sustainable use of the components of biological diversity; and iii) fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

28. The International Partnership for the *Satoyama* Initiative (IPSI), which was launched at COP10 of CBD in Nagoya, Aichi, Japan on 19 Oct 2010, currently has a membership of 117 diverse organisations (as of 22 March 2012), including national and local governments, NGOs, indigenous communities, academic institutes, private sector organisations and the UN and international organisations. The objective of IPSI is to enhance understanding and raise awareness of the importance of SEPLs and promote the maintenance and the rebuilding of SEPLs through its five pillars of activities, namely policy research, knowledge sharing, development of indicators, on the ground activities and capacity building.

29. Satoyama principles and resiliency are intrinsically linked in the face of both frequent natural disasters and gradual environmental changes, such as global climate change. However, there is a limit on the extent to which large natural disasters can be prevented, and the concept of resilience with flexible adaptation to these situations is vital. There is increasing attention at an international level towards creating a "resilient society" that can respond both to sudden disasters, such as the Great East Japan Earthquake, and to gradual transformations (e.g. climate change). Societal resilience is also critically important to consider (e.g. establishing emergency evacuation routes and conducting disaster-prevention training). The “Sanriku Fukko (Reconstruction) National Park” in Japan provides a good example on how utilizing vulnerable land for farming and restoring natural marshlands could strengthen regional resilience, ecosystem recovery and tourism.

30. In line with the CBD/COP Decision X/22 on the “Plan of Action on Subnational Governments, Cities and Other Local Authorities for Biodiversity”, the Sustainable Urban Futures (SUF) program at UNU-IAS is focused on challenges to achieving sustainable development in urban settings and is currently helping to develop guidelines for the implementation of the Plan of Action.

31. Ms. Marker-Kabraji noted that there is an intrinsic relationship between urban development and natural resource management. While cities cover a mere 2% of land space worldwide, they consume 75% of the resources. The urban population of Africa and Asia alone is expected to double by 2030. While most of the fastest growing urban centres today are in China and India, the six most densely populated cities in the world, and fifteen of the world's twenty-six megacities, are in Asia. The rapid urbanization across the world has become one of the most important drivers of the global environmental change with direct implications on natural resources, ecology, biodiversity and pollution.

32. IUCN, through the World Commission on Protected Areas Urban Specialist Group, is also working towards a better understanding of the functioning of the urban centers and their linkages with natural resource management and the sustainable development agenda. Cities are not at all isolated from natural ecosystems, but in fact, have these very ecosystems as their foundation. Underneath these sprawling urban areas are the waterways, soil and the areas beyond the city boundaries.

33. Incorporation of 'Green Infrastructure' policies and practices would be effective means supporting sustainable development in urban areas. For instance, by promoting quality green space within cities, it is possible not only to protect, but also to enhance biodiversity. Beyond supporting a variety of species and habitats, urban green spaces contribute essential services including water filtration and absorption, nutrient cycling, air filtration and noise buffering.

34. Urban biodiversity could contribute in many ways, including, among others, reductions in local air pollution and noise; reductions in the urban 'heat island' effect, direct health benefits, and key environments for enhanced public ecological knowledge and awareness of local to global sustainability challenges. Furthermore, many recent studies show that sufficient and well-planned green spaces in urban centres have a beneficial impact not only on the physical health of humans, but also on their mental well-being and cognitive function. The green spaces also contribute positively towards social interaction, integration and the development of community cohesion.

35. Though the importance of green infrastructure in urban policy matters has risen up the agenda in recent years as a direct response to climate change and the need to move towards a low carbon economy, some studies show that 8% of terrestrial vertebrate species on the IUCN Red List are imperilled largely because of urban development. By 2030, 15 additional eco-regions are expected to lose more than 5% of their remaining undeveloped area, and these regions contain a staggering 118 vertebrate species found nowhere else. In addition, the distance between protected areas and cities is predicted to shrink dramatically. It is estimated that 88% of protected areas likely to be impacted by new urban growth are in countries of low to moderate income.

36. Access to safe drinking water is a precious urban asset. Currently, water shortages affect 40% of the world's population, while about 2.6 billion lack access to adequate sanitation. It is expected that by 2025 more than two-thirds of the world's population could face water shortages. While the urban population grows by two people every second, 27% of the total urban population in the developing world does not have piped water supply in their homes. Watersheds providing water for urban populations are facing numerous threats from pollution, development, fire, soil erosion, drought, and flooding, etc.

37. The production of surface water for municipal use is an ecosystem service that is generally neither paid for by cities nor individual water consumers, including industrial companies. By using the market based mechanism of Payment for Environmental Services (PES)

many cities worldwide have successfully safeguarded the natural water purification services of their watersheds and thereby avoided expensive treatment systems, thus saving their residents millions of dollars. In the past few years, interest in the development of PES programs has surged in Asia.

38. Another key aspect is to mainstream resiliency in the overall policy, planning and development at the city, local and national level. According to the IPCC Working Group 2 report, the most vulnerable urban settlements are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanisation is occurring. In this scenario, along with bioengineering solutions, one vital measure in urban land use planning could be the provision for urban protected areas. This could go a long way in not only providing habitats for biodiversity, air purification, water treatment, etc. but also enable ecosystem services to positively contribute towards reducing the risks through acting as barriers for high energy waves, cyclones, and flood regulation.

[Q&A]

39. Professor Takeuchi, the facilitator for the second session, posed two questions to each presenter. To Mr. Takemoto: 1) Such green economy particularly in the context of poverty alleviation will be discussed at the Rio+20, how could the *Satoyama* Initiative be combined with this green economy, particularly focusing on poverty alleviation? 2) What is the linkage between cities and satoyama-like landscapes; more specifically, how can the *Satoyama* Initiative contribute to the establishment of a sustainable urban future?

40. Mr. Takemoto responded that in regard to green economy, the *Satoyama* Initiative will contribute to poverty alleviation since benefits can be obtained from natural resources. For instance, rural or local communities can get economic benefit through sustainable use of socio-ecological landscapes. With regard to the linkage with cities, he responded that it is what the international partnership wishes to address. *Satoyama* means landscapes with nature, and cities also have lots of space for natural resources such as parks, trees, and water. Therefore it is a good opportunity for the *Satoyama* Initiative to take part in addressing sustainable cities. The *Satoyama* Initiative does not focus on rural areas; the Initiative would like to encourage its partners to address sustainability of urban areas, particularly biodiversity.

41. Professor Takeuchi then posed a couple of questions to Ms. Marker-Kabraji. Noting the success of COP10 of CBD in Nagoya in 2010 and the resulting Aichi Targets, he asked how biodiversity issues could be mainstreamed, particularly in the context of urban sustainable development, ensuring that people understand the importance of biodiversity and the conservation of biological resources.

42. Ms. Marker-Kabraji first noted that Japan did a lot of work for the Nagoya meeting and she considered it was the first time that any host country did this in such a planned fashion, where it was not just an incidental handing over from one CBD COP to another, but in this case IUCN had worked very closely with the Government of Japan for the Nagoya COP. Now IUCN is working with Japan in putting forward a number of ideas that came out of Nagoya for Hyderabad. One of the things that India is taking forward is a very strong focus on livelihoods and biodiversity. She considered it was very interesting because livelihoods and biodiversity from countries like India would have to take into consideration urban settlements. One cannot just focus on rural livelihoods, particularly for countries with economies growing so fast and where there was such a huge transition of people between rural and urban areas – including those who

are moving back and forth on a daily basis. Clearly, that depends on transportation and urban services, and it has an impact on the biodiversity of cities – how the roads and the transport systems are planned and what kind of impact they have. Therefore, there is a real opportunity now and this is particularly so for the *Satoyama* Initiative, and for satoumi in marine ecosystems, because the coastal cities are taking the greatest brunt in terms of climate change.

43. In posing the second question, Professor Takeuchi noted that since most of Asia's mega cities are located along the coast, it is extremely important to try to combine the urban sustainable future with the conservation of a marine ecosystem and marine biodiversity. He asked how we could consider the importance of the coastal marine biodiversity in the context of a sustainable urban future.

44. Ms. Marker-Kabraji agreed with Prof. Takeuchi. She noted that it gained extreme prominence at the time of the Asian Tsunami. She also pointed out that some lessons had already fed into some of the rehabilitation experiences in Tohoku after the tragic tsunami of last year. What was observed from the great deal of data that came out was that where you had coastal settlements, which were buffered by some kind of natural infrastructure, such as mangrove forests, casuarina forests, coastal forests and coral reefs, the impact of the tsunami and the death and devastation rates were dramatically lower. There are case studies from Sri Lanka, where one village that had cleared the mangroves was completely devastated and the surge went in miles whereas another village, a few hundred yards down, that had maintained the mangrove forests, remained reasonably intact. Also in Bangladesh, after suffering from the storms and typhoons in the 1970s, they had a policy of replanting mangroves in the delta. In the last 10-15 years, there has not been that kind of massive devastation and loss of life although the storms are just the same, if anything worse, and the typhoons go up the Bay of Bengal every year. Partly it is an emergency response strategy, but also it is from the replanting of mangrove forests. Where IUCN is working, for example in Viet Nam, as barriers to climate change, hard engineering solutions like dykes are combined with mangroves and tree plantations, so that the soil infrastructure is much more stable and the regeneration of the protective barrier is low cost because the trees grow back.

45. Before opening the floor to all the participants, Professor Takeuchi posed two questions to Professor Cassim. First, drawing from the case in Sri Lanka, he asked how traditional knowledge could be used in the process of strengthening resilience. Second, how differently did Sri Lanka and Japan react in facing tsunami?

46. Professor Cassim stated that Prof. Takeuchi hit two very important areas, which were underappreciated and often overlooked. Giving an example, he emphasized the importance of the relationship between biodiversity and home garden. When Sri Lanka was not self-sufficient in food and decided to look again at its large, old irrigation system, and started to settle people once more in the north and the east of Sri Lanka, there were many people who did not get land through the scheme and thus became squatters. But very often, in squatter settlements home gardens were better managed than the formal settlers' home gardens, and once the Government realized this, they authorized the squatter settlements. The home garden tradition is very much like that of satoyama in Sri Lanka, where normal home garden production is only on two-thirds and one-third is the contiguous forests behind, and the last one-third is used only in emergency. It is for the resilience. So satoyama and the study of traditional home gardens bordering the large nature reserve are very useful.

47. He continued to say that with regard to the tsunami, as Ms. Marker had already partially responded, the natural dune system and the natural mangrove systems, where they were not

destroyed for hotel development or similar activities, protected the settlements behind them. The other aspect of the tsunami was that large animals, such as elephants and bears, seemed to have been able to sense the vibration and started moving away. He suggested that close observation of nature would have given indications warning of the tsunami.

48. Then Mr. Replogle asked the panellists how we should scale the creation of stronger government structures and institutional capacity to manage land use both formally and informally. Professor Takeuchi agreed that governance is another important issue to be discussed at Rio+20.

49. Mr. Takemoto responded that the combination was very important. The national government should develop a framework, taking into account the international perspective. Land ownership is dependent on a variety of local circumstances. The local community and the local government need to work together. Reiterating, he stated that the framework should be developed under government initiative, while local authorities should be delegated from such kinds of globally-based instruction.

50. Ms. Marker-Kabraji agreed that it was not easy. For her, the issue of scaling up was really the answer. If the successes in addressing the problems could be scaled up, and brought to policies and political support, many problems would be greatly reduced. But she pointed out that there was nothing like a disaster to focus the mind. If one works quickly and produces the models five years after the disaster, there would be a tremendous amount of political receptivity and civil society support. She gave an example of an IUCN initiative called “mangroves for the future” that was started after the Asian Tsunami. She mentioned that now in the countries where IUCN was working, any kind of planning that would destroy the mangroves would be immediately picked up by the press and civil society. She explained that it was because people have understood that they were vital in terms of resilience to climate change. She added that mangroves were an extremely interesting ecosystem because not only are coastal fisheries dependent on them, but also they have now proven to be the best sink of carbon of any tree in the world. The amount of carbon that mangroves capture, both in anoxic soil and its own biology, is one of the best so far.

51. Prof. Takeuchi concluded the session by saying that some sort of consensus was achieved as to recognize the importance of strength and resilience in pursuing harmony with nature.

V. SESSION 3: JAPANESE EXPERIENCE IN PROMOTING SUSTAINABLE CITIES: CASE STUDY OF KITAKYUSHU

Presenter: Mr. Reiji Hitsumoto, Director, International Environment Strategies Division, Office for International Environmental Strategies, Environment Bureau, City of Kitakyushu

52. Mr. Hitsumoto presented how Kitakyushu came to be known as an eco-model city and introduced some of the key problems. Kitakyushu was selected as an eco-model city by the national government in 2008. The experience of Kitakyushu City showed how the city was transformed since the 1950s in terms of reducing land, water, and air pollution, while maintaining economic prosperity, through a range of measures, including greening of the industries through technological intervention, raising public awareness by sensitizing the citizens, good environmental governance, and implementing projects and initiatives aimed at lowering waste and CO₂ emissions through alternative energy facilities, promotion of mass transit, and residential recycling and composting programmes.

53. The Kitakyushu experience also shows that effective multi-stakeholder partnerships with the involvement of residents, women, local governments, private enterprises, academic and research organizations are key to realizing eco-cities. The commitment of the residents of Kitakyushu for creating a city with true wealth and prosperity, inherited by future generations as well as the successful implementation of the Green Frontier Plan demonstrate the harmony between the city's policies, governance, and the participation of local multi-stakeholders. With the aim of a 50% CO₂ reduction by 2050, the city is promoting a range of low carbon urban infrastructures and policies, such as photovoltaic generation, green roofing, introduction of electric and eco-vehicles, car free days, electric bicycle lending program, multi-modal integration in public transport, wind power, zero emission buildings, smart buildings, smart school, natural gas co-generation system, hydrogen fuel network, and programs for promoting energy saving measures in SMEs, among others.

54. With an investment of US\$190 million between 2010 and 2014, the city aims to increase its renewable energy share up to 10%. The "Kitakyushu Smart Community~Local Energy System" works towards realization of optimized energy use per region, through coordination between new and mainstay energy sources and introduction of a control system for both energy supply and demand

55. The city's industrial policy aims to promote green growth in industries – making both production processes and products green. The exemplary green industrialization policy of the city mainly covers the recycling industry, pollution control industry, and energy industry. The city also attaches significant importance to city-to-city environmental cooperation in knowledge transfer in building eco-cities. For instance, a number of Asian cities have benefited from cooperation with Kitakyushu City in a number of areas, such as the establishment of an environmental demonstration zone, water supply improvement, composting techniques, energy conservation and saving techniques, sanitary land-filling, among others. The establishment of the Kitakyushu Asian Centre for Low Carbon Society also demonstrates the city's commitment towards climate mitigation. All these initiatives of Kitakyushu City provide an exemplary model for other Asian cities to pursue green growth.

VI. CLOSING SESSION

56. Delivering the closing remarks, Ms. Chikako Takase, Director of UNCRD, urged for concerted efforts at all levels to realize sustainable cities. Unless urbanization is brought to a sustainable level, it will be difficult to achieve sustainable development in a true sense. Referring to exemplary initiatives by Kitakyushu City, she encouraged the international community to enrich its understanding of sustainability issues in urban development as well as its contribution to the outcome document of the forthcoming Rio+20.