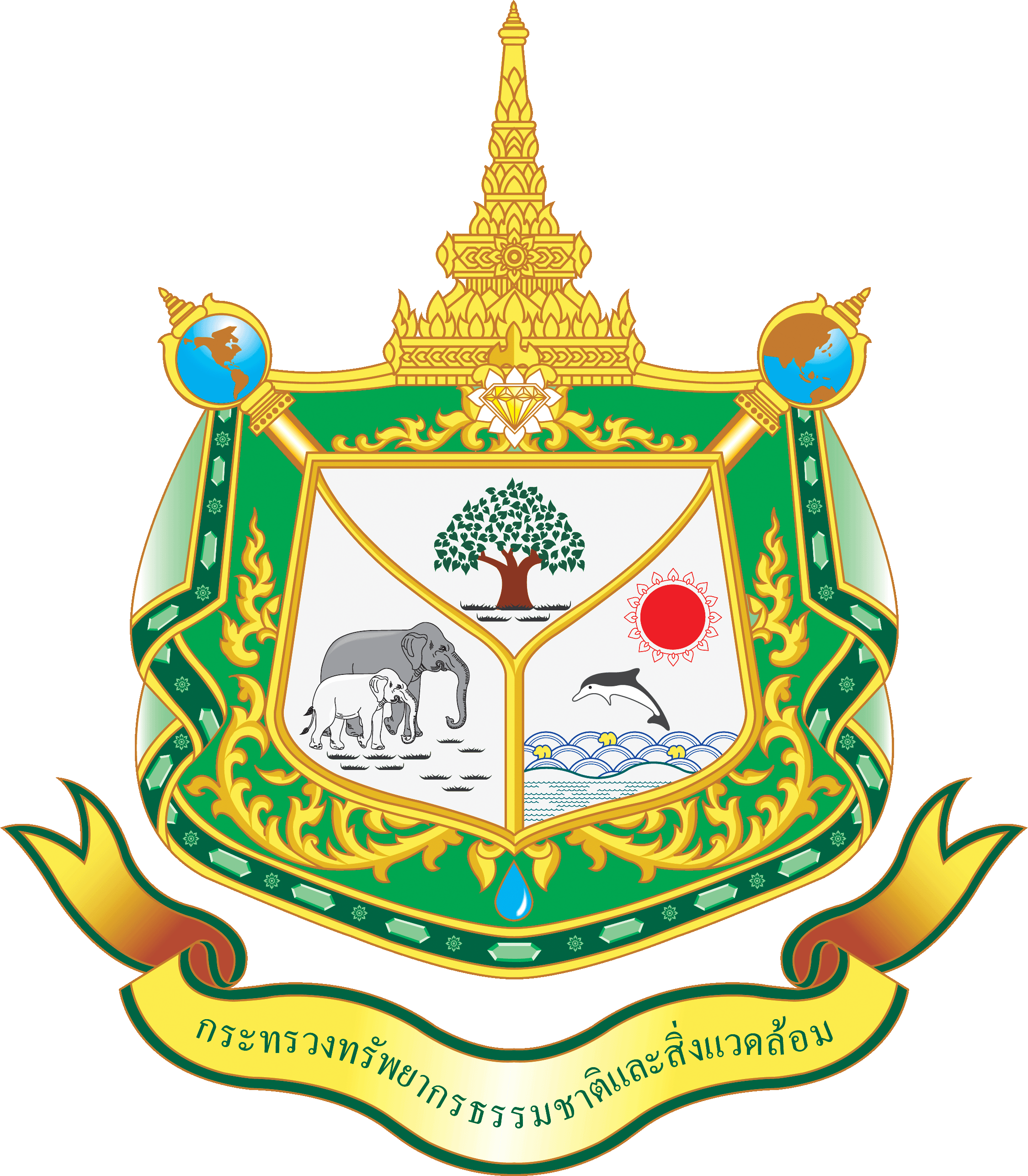
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**RCE Cha-am**

**Proceedings**

**4th ASEAN-Plus-Three Leadership Programme on**

**Sustainable Production and Consumption**

***6-7 October 2011***

***Maha Chula Building,* *Chulalongkorn University***

***Bangkok, Thailand***

***8 October 2011***

***Field Visit, The Sirindhorn International Environmental Park***

***Cha-am, Petchaburi Province, Thailand***

**United Nations University Institute of Advanced Studies**

**June 2012**

**BACKGROUND**

*The United Nations University Institute of Advanced Studies (UNU-AS) and the ASEAN Secretariat have over the years collaborated in organizing the ASEAN-Plus-Three Leadership Programmes on Sustainable Production and Consumption. These Leadership Programmes are offered under the framework of the ASEAN Environmental Education Action Plan (AEEAP 2008-2012) endorsed by Governments of the ten ASEAN Member States. One of the strategic actions of the Plan is on human resource capacity building, which prioritizes the offering of leadership training programs for key target groups.*

*The 1st and 2nd ASEAN-Plus-Three Leadership Programmes on Sustainable Production and Consumption (SPC) were held in Cha-am, Petchaburi Province of Thailand during 18-19 July 2008 and 8 August 2009, respectively, co-organized with the Ministry of Natural Resources and Environment of Thailand, the Sirindhorn International Environmental Park, and the Regional Centre of Expertise on Education for Sustainable Development (RCE Cha-am). The 3rd ASEAN-Plus-Three Leadership Programme on SPC was held in Manila, Philippines during 6-7 October 2010, co-organized with the Department of Environment and Natural Resources of the Philippines through the Environmental Management Bureau, and the ASEAN Centre for Biodiversity.*

*A consensus among past participants was that the ASEAN-Plus-Three Leadership Programme on Sustainable Production and Consumption should be extended to target groups from the business and industry sectors. Thus while the first and second offerings targeted participants from the ASEAN-Plus-Three Environment Ministries, the third offering was for business leaders and managers. Building on past experiences, the 4th ASEAN-Plus-Three Leadership Programme on SPC was specifically designed and targeted at participants mainly from business and industry sectors of the ASEAN Member States as well as China, Japan and the Republic of Korea.*

*The two-day ASEAN-Plus-Three Leadership Programme is designed as a response to the United Nations Decade of Education for Sustainable Development (UNDESD 2005-2014) and aligned to debates leading to the United Nations Conference on Sustainable Development in 2012 (Rio+20). It contributes towards debates on Green Economy, Green Growth and on the SPC strategies; including emphasis on greening supply chains, product responsibility, development of strategies for engaging with sustainable development along the value chain, and addressing how business can be part of a new global consensus on sustainable development. Green Economy is one that results in improved human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP). It is about economic development model based on sustainable development.*

*The aim is to equip business and industry leaders and managers with the necessary knowledge, skills and tools to develop strategies for sustainable development and corporate social responsibility in their own organizations in the context of Green Economy. Private enterprises are important stakeholders in promoting sustainable production and consumption, and their participation in the community of good practice are essential for creating sustainable societies.*

**MESSAGES AND EXPRESSIONS OF SUPPORT**

**United Nations University Institute of Advanced Studies (UNU-IAS)**

On behalf of UNU-IAS, *Prof. Mario T. Tabucanon, Visiting Professor* welcomed all participants as well as the distinguished speakers and session chairs and provided a brief history of the Leadership Programme, along with its aims and objectives and key target audiences, which is a UNU-IAS response to the UN Decade of Education for Sustainable Development and towards a cleaner and greener ASEAN Society. Key pressing challenges of sustainable development in the ASEAN-Plus-Three region hinge on important issues linked to economic activities, production and consumption of goods, services and resources. Expression of sincere thanks was made to all key partner organizations and resource persons who supported the planning and conduct of the program, mainly including the following organizations and network:

* + Chulalongkorn University
  + Ministry of Natural Resources and Environment, Thailand
  + United Nations University Institute of Advanced Studies (UNU-IAS)
  + United Nations Environment Programme (UNEP)
  + ASEAN Secretariat
  + The Sirindhorn International Environmental Park Foundation under the Patronage of HRH Princess Maha Chakri Sirindhorn
  + Regional Centre of Expertise on Education for Sustainable Development (RCE Cha-am)
  + Stockholm Environment Institute (SEI)

**Chulalongkorn University**

*Prof. Teerana Bhongmakapat, Dean, Faculty of Economics*, as the representative of the host for this year’s Leadership Programme, welcomed everyone to Chulalongkorn University (CU) and expressed the University’s thanks to UNU-IAS and all of the organizing and supporting partners for choosing the Faculty of Economics, CU to be the host. The topic of “Sustainable Production and Consumption” is, indeed, important in the midst of so many global concerns regarding the sustainability of the planet and the human race, and for the critical need for societal transformation to create a sustainable society. CU is Thailand’s first institute of higher education founded nearly a century ago (1917). As a national intellectual center, CU produces the highest quality graduates with a high level of knowledge and skills that they can use to positively contribute to society. From its inception until now, CU has been committed to ongoing development in programs, human resources, facilities and services. With the cooperation of its alumni, CU has been building an intellectual community devoted to serving Thai Society and the nation. CU, should not be thought of as just an honored institution of learning, but is determined to graduate the best qualified but persons under the credo, “The Pride of Chula is in serving the Public”. He wished the 4th ASEAN+3 Leadership Programme full success and expressed his hope that everyone who had come from abroad will enjoy staying in the CU campus and in Thailand.

**Ministry of Natural Resources and Environment, Thailand**

*Ms. Pornthip Puncharoen, Director-General, Department of Environmental Quality Promotion* expressed her deepest gratitude and welcomed all participants; in particular those who had travelled from abroad, including the ASEAN-Plus-Three member Countries. She also thanked all of the co-organizers that made this program happen. Given the challenges of 21st century, and cognizant that the world is moving at a faster rate, it is imperative to keep up with this accelerated pace as well as the rapid changes that are taking place in science and technology along with the increasing rate of natural resources consumption that is having significant effects on human life. Thus, ‘Sustainable Production and Consumption’ (SCP) becomes the main challenge and conveys responsibilities to governments and their citizens to ensure long-term sustainable development. She emphasized that this will require ASEAN-Plus-Three to review the present trends and extend the focus to reiterate the balance of the three pillars of SD; Environment, Society and Economic pillars. With regard to Environmental Management, many governments, including Thailand have promoted the concept of SCP. Finally she expressed the hope that the participants would apply means of implementation of SCP and modified the structure of production and consumption patterns to meet the needs of modern society; and contribute to a better quality of life through the ongoing development of human resources in ASEAN-Plus-Three region. She ended by wishing the 4th ASEAN Leadership Programme success and all participants to have an enjoyable stay in Thailand.

**United Nations Environment Programme (UNEP)**

*Dr. Young-Woo Park, Regional Director, UNEP Regional Office for Asia and the Pacific* expressed his utmost appreciation to the organizers for their invitation to UNEP to be involved in this program as a partner. One of biggest challenges of today’s world is related to the management of natural resources and production and consumption of goods and services. He said that “We all believe that economic growth is needed for developing countries to eradicate poverty and contribute to a better quality of life for the people, at the same time economic growth requires the utilization of natural resources but should not compromise the ability of future generations to serve their needs because we have limited natural resources, so we have to share with future generations.” He recommended to all sectors the urgent need to decouple economic growth from resource depletion, environmental degradation and generation of waste, stressing that the most important focuses in this decoupling is the need to change our perspectives and thinking paradigm regarding production and consumption of goods and services and the utilization of natural resources. It has been widely demonstrated that efficient technologies and approaches that create win-win situation exist and the applicability has been proved in many cases in many countries. The challenge is to incorporate these technologies, practices and approaches into the core of public decision-making mechanisms and public and private spending to create enabling policy frameworks that can help us to cope with the resources utilization.

UNEP has been working on sustainable consumption and production issues for decades. The National Cleaner Production Center, a joint partnership program with UNIDO is one of the best examples. Improving the capacity of governments, private sector and NGOs in the field of sustainable consumption and production is a core work of UNEP. He presented one recent example whereby UNEP has recently started to implement a 4-year project on supporting policy for sustainable consumption and production under the EU funded program in Southeast Asia. Capacity building is one of the main activities of the project and it is hoped that UNEP will have more opportunities to collaborate with the partners in this workshop in order to upstream and mainstream the sustainable consumption and production concept. Sustainable consumption and production is more important and urgent than ever, especially in the ASEAN region, considering the rapid economic growth and industrialization in this region. He wished that this workshop could provide opportunities and solutions that help ASEAN countries successfully implementing sustainable consumption and production in participants’ own countries. He finished his message by stressing that we all can achieve the ultimate common goal; sustainable development and poverty eradication. We are doing this not for business sake, not just for certain countries, but we are doing this for welfare of all the people on the planet, and those not yet born.

**ASEAN Secretariat**

*Ms. Natalia Derodofa, ASEAN Secretariat, ASEAN Socio-Cultural Community* expressed the ASEAN Secretariat’s sincere appreciation to all partners for co-organizing this 4th ASEAN-Plus-Three Leadership Programme on Sustainable Consumption and Production. She highlighted several key facts about ASEAN and its continuous endeavors to achieve a Green ASEAN. Apart from providing goods and services, natural resources of ASEAN member countries play an important role in sustaining economic activities and livelihoods. In terms of demography, ASEAN is a high-populated region, one of the highest in the world. The economy of the region hinges on three 3 main sectors - industry, service and agriculture - with industry and service sectors serving as the biggest GDP contributors. However, as elsewhere, ASEAN is also gravely affected by the unsustainable exploitation of natural resources and degradation of environmental services. ASEAN is fully aware of the dangers it will face if it follows the conventional path of development. As reflected in the ASEAN Charter, ASEAN is therefore committed to promoting sustainable development so as to ensure the protection of the region’s environment, the sustainability of the natural resources and high quality of life for the people. She mentioned some examples of efforts in several of the ASEAN countries as well as at the regional level, such as Cleaner Production (CP) initiatives and energy efficiency programs, which is being implemented in several countries, including Malaysia, Singapore, Vietnam, Philippines and Thailand. Also, there is currently work on eco-labeling schemes to encourage sustainable production in Vietnam, Singapore, Indonesia and Thailand. Lastly, she emphasized that ASEAN, with it’s three pillars of Sustainability, together with the world shall work together to collaborate, cooperate, and complement our efforts as we exercise our roles in realizing the vast opportunities of a green economy in its pursuit of a green ASEAN.

**The Sirindhorn International Environmental Park**

*Dr. Seree Supratid, Director* welcomed all participants to the program and expressed his honor to work with UNU-IAS as well as with the other partners. The Sirindhorn International Environmental Park (SIEP) was established on the occasion of Her Royal Highness Princess Maha Chakri Sirindhorn’s 48th birthday in 2003. SIEP aims to be a world-class international learning center on ecosystem rehabilitation (particularly mangrove forest and beach forest) and development of natural resources and environment. The promotion of energy conservation and development of renewable energy are other major task of the park so as to educate and train students, youths, citizens both in the community and region, including official of government agencies and private organizations, including Thais and foreign nationals. These goals are aimed at realizing energy and natural resource conservation as well as environmental restoration and preservation in order to reduce or slow down global climate change. Lastly he welcomed everyone to a field trip at SIEP on Saturday and wished the 4th ASEAN Leadership Programme to be a great success.

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**Day 1 – 6 October 2011**

**SESSION I**

1. **OVERVIEW OF CHALLENGES, ISSUES AND PRACTICES**

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* **Chair of Presentations and Discussion**:

*Aida N. Karazhanova, AIT-UNEP Regional Resource Centre for Asia and the Pacific, Asian Institute of Technology*

* **Keynote: Overview of Sustainable Production and Consumption in the Context of Green Economy**

*Zinaida Fadeeva, United Nations University Institute of Advanced Studies*

* **A Primer on Leadership**

*Mario T. Tabucanon, United Nations University Institute of Advanced Studies*

* **Leadership Systems Thinking for Sustainability**

*Robert Steele, Systainability Asia*

* **Discussions**

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* 1. **KEYNOTE: OVERVIEW OF SUSTAINABLE PRODUCTION AND CONSUMPTION IN THE CONTEXT OF GREEN ECONOMY**

***Zinaida Fadeeva,***

***United Nations University Institute of Advanced Studies***

Among the central themes of the upcoming Rio+20is ‘green economy’ in the context of sustainable development and poverty eradication and is now one of the priority institutional frameworks for sustainable development**.** At this juncture, part of a movie from the World Economic Forum was shown in which several different key business, international organization and public sector individuals were interviewed to find out what they understand about the idea of ‘green growth’, ‘green technology’ and ‘green economy’. To sum up, ‘green economy’ is an economy that generates increasing prosperity while maintaining the natural systems that sustain life. Some of the key messages were the need to build into the economy certain ‘green limits’ or boundaries of carrying capacity to allow nature to recover, the need to upscale, shifting perspectives, etc.

A quote from Ulrich Beck about social risks is on how*“we are all trapped in a shared global space of threats – without exit.”*  It sums up what can be referred to as a ‘cosmopolitan moment’, in which we all begin to cooperate across national boundaries and culture to cooperate for a major transformation out of the situation that we find ourselves. There is now a global drive to question our existing business and economic models. ‘*Green* economy’, as defined by UNEP, is a new model of economic development aimed at achieving improved human wellbeing and social equity, while significantly reducing environmental risk and ecological. The term ‘green growth’ can be conceived as a strategic complement to existing environmental and economic policy reform priorities.

Rio + 20 meeting is an important step as a start of the global transition. Implications of Sustainable Production and Consumption are on:

* Technology and the society
* Call for diversity of SCP pathways
* Away from path dependencies
* Redefining “resource”
* Assessment of SCP contribution into green economy
* Change of economic argument
* Demand for different innovations
* Defining of the holistic framework
  1. **A PRIMER ON LEADERSHIP**

***Mario T. Tabucanon***

***United Nations University Institute of Advanced Studies***

**The Desired Future – Creating Sustainable Societies**

In the last two decades there have been a number of important international commitments strongly suggesting that the traditional development paradigm must change – e.g. the UN Conference on Environment and Development or UNCED (1992), the Rio Declaration and Agenda 21 (1992), the World Summit on Sustainable Development or WSSD (2002), and the UN Decade of Education for Sustainable Development or UNDESD 2005-2014, among others. In the Rio Declaration, for example, it was recognized that the current global patterns of consumption and production are not sustainable and if these continue, additional planets will be needed by 2050 and this is not possible. The world is indeed consuming more and more, faster and faster that the entire world population are living on ever decreasing natural capital. The livability of the planet is getting unsustainable, and this situation must be reversed. The world must switch to ‘green economy’ that is an environmentally sustainable economic growth for the wellbeing of all.

**Designing the Desired Future – Sustainable Production and Consumption**

Changing consumption and production patterns as an overarching strategy for green economy requires behavioral societal transformation through education to effectuate a change in public consumption behavior, increase resource-use efficiency by the production and service sectors, and a change in the way governments administer and manage national resources. Strategic options include advocacy and public awareness on product and service selection, creating a mechanism to support green product and service marketing, and integrating sustainable consumption concept into formal education at all levels. Promoting effective use of resource-base in production and service sectors include applying the ecological footprint concept, promoting research, development and application of clean and green technologies, promoting green design, strengthening a recycle market for industry, and promoting a product design for recycle, to mention some. Governments ought to develop a strategy to take care and protect the resource-base of the country.

**The Instrument - Leadership for Sustainability**

Leadership is the process of bringing the present state into the desired future state. So if the desired future state is to create sustainable societies, leadership must transform present societies into this desired future. The learning part of leadership is analyzing and gaining lessons from the past and present, but the desired future must be designed, which is the visioning attribute of leadership. Leaders are the transformative figures in this process of change.

Desired future conditions are reflected in international multilateral agreements and declarations such as the overarching goal of sustainable development that is ‘the satisfaction of present generation needs without compromising future generations to satisfy their own needs’. Another global consensus reflecting the desired future state is the Millennium Development Goals (MDGs). And in the education context, the thrusts of the UN Decade of Education for Sustainable Development are reflective of desired future societies.

The design of change must embrace beliefs in living within limits, shaping sustainable societies not sustainable consumers, addressing the public as citizens in society not simply as consumers, creating systems that lead to sustainable behavior, and above all, addressing holistically sustainable production and consumption.

**Leadership Qualities and Domains**

A leader must be visionary in order to effectuate change. A leader must not shy away from tackling current challenges; there cannot be business as usual if that usual is undesirable. Since the change process entails involvement of all, a good leader must be developer of people, articulator of organizational values, and causes people to want to follow. Leadership skill is not given but it can be learned and developed. But developing leadership skill cannot be accomplished by learning the theories only; these theories must be put to practice.

The foundation of good leadership is the human dimension – the mind, body and soul. It basically starts whether the leader can lead its own personal life. The hierarchies of leadership are personal, group, organizational and societal. But the principles of good leadership are valid in all these levels.

To be able to develop one’s leadership skills it is important to know the domains of leadership – namely, Personal, Relational, and Contextual and their common intersection constitutes the desired attribute space of a good leader.

**Personal Domain**

The personal domain constitutes human capital that is about individual expertise, experience and competence, social capital that is about social networking and relationships, and personality and style reflecting personal values aligned to the principles of sustainability and sense of obligation for the common good.

A leader must possess good decision-making skills. In an organization, there are only two types of tasks an individual performs – either the individual is in the process of a making decision, or he/she is implementing actions on a decision made. Decision-making constitutes an analytical process. First is in understanding of the overall problem; then establishing criteria and identifying decision options. Analyzing the overall problem usually entails decomposing it into sub-problems and then analyzing the sub-problems. Synthesizing is then done by recomposing the sub-problems into the overall problem, then applying the criteria and making a rational choice.

Leaders may also take the role of managers, thus being skillful in utilizing a management cycle or feedback loop – plan, do, check, adjust, and revisit the plan (if necessary) - is a requirement of enhanced leadership. The leader possesses a vision, makes a plan, capitalizes on strengths and overcomes barriers, and makes things a ‘win-win’ affair, if possible. ‘Win-win’ is an attitude towards life, a mental frame of mind than says all can win albeit in differing degrees. It is the foundation for getting along well with other people.

At the top level, a strategic plan is developed that answers the question of direction – ‘where to go’. At the middle level, there ought to be a tactical plan that answers the question of tactic – ‘how to do’. The lower level has an operational plan that answers operational question – ‘what to do’. The so-called business/development plan is normally a combination of strategic and tactical plans comprising mission statement, vision, goals, strategies, tactics, activities, resources, and key indicators. After having a plan, the normal management cycle of doing – organizing, staffing, directing, and establishing feedbacks – takes place.

Organizing is determining what work should be done, who should do it, and establishing division of responsibilities and chain of command. Staffing is providing the organization with people required to perform the work and matching people with tasks. Directing is getting people to carry out plans, integrating the efforts of group members, and providing information and influencing group dynamics. Establishing feedback is ensuring that plans become reality, assuring that the results of operations conform as closely as possible to established goals, providing timely information that may prompt revisions, and to achieve proper coordination among all the activities of the organization.

**Relational Domain**

Relational domain is about leader-follower relations, communication, negotiation, mediation, teamwork, inspiring, motivating, building relationships, and building trust.

Leaders need to communicate vision, strategic objectives, and values, so that people understand how their work contributes to a larger whole. Absence of sense of direction increases the probability of reactance and withdrawal. A good communicator understands different communication methods and styles, is a good listener, creates a favorable communication climate, and develops trust and rapport. Leaders should never assume that their goals and intentions are known to others, and that they are apparent and obvious. A good strategy is to communicate sooner rather than later.

Exercising leadership is the ability of leaders to inspire subordinates. Achievement, advancement, recognition, responsibility, and work content motivate and inspire people. It is important to exercise leadership constantly for a leader’s behavior and attitude represent a model for subordinates to follow. The ability to generate enthusiasm among subordinates, the willingness to accept responsibility, and the ability to communicate are attributes of a good leader. A leader must be flexible in style and must be able to apply the right style at the right time and at the right situation. It is advisable that leaders apply a style that suits a situation; it is not necessary to apply one style for all situations.

**Contextual Domain**

Contextual domain is about understanding organizational design and culture, knowing the economic, political and social landscapes, and familiarity with global perspectives and cultural differences. The leader must have sound understanding of the fundamentals, of the basic functions of the organization. The basic function of any organization (business, social, religious, or governmental, etc.) is to transform certain combination of available inputs (money, materials, manpower, energy, facilities, energy, information, etc.) into some form of desirable outputs (products and/or services) within a given environment (social, economic, political, legal, natural, etc.) through the utilization of existing technology (hard/soft) and leadership provides the internal dynamism for achieving this transformation through a process of rational decision making and sound management. It is important to see things holistically, to see the big picture, and to apply systems thinking.

* 1. **LEADERSHIP SYSTEMS THINKING FOR SUSTAINABILITY**

***Robert Steele***

***Systainability Asia***

System thinking concept, especially for leadership, is acritical way/ frame for thinking and a useful tool for leaders to transforming our human social systems including our economic system toward sustainability.” The global transformation that is currently taking place is increasingly accelerating in speed and growing in scale and complexity. Because of the speed of change, it is almost, or most certainly, overwhelming our ability to manage our world. So within this complex world, leaders must be able to think more integrative, holistically and systemically.

From an early age, and throughout most all of our formal educational experience, we are taught to think linearly, analytically and through a reductionist approach which came to us from the enlightenment period of western civilization. Basically, we have been taught to break things apart, to fragment our world to understand it. Of course it apparently makes the complex task/subject a lot more manageable, but we pay an enormous price when we are adults as we can no longer see the consequences of our action because we lose the intrinsic sense of connection to a larger sense of the whole. Basically, we are fixing on a part and that we miss understanding of the whole, like a story of 5 blind men on the road try to figure out the elephant they met (of course they don’t know this is an elephant because they are blind) by touching the part of the elephant in front of them.

We can see this tendency in our formal education systems, the way we fragment and set up our faculties and our departments, which essentially misses the thread that links everything together. So it is not very surprising that most corporations, governments are created and managed as separate parts. Most of our policies are based on analytical linear cause and effect thinking, basically meaning that A causes or links to B, B links to C and so on down a linear path way. Such as when we have traffic then we build more road, build a flyover or if we have insect problem in our crop we spray more pesticide or if we need to increase agricultural yields then we pump more water out of the ground or if we see decreases in fish catch then we build more boats, bigger boats, more sophisticated boats to catch those fish, etc. The problem with this type of thinking is it cannot tell us why we are getting these results that we are getting because the parts lose their meaning when they are separated from a holistic interaction, i.e. from the whole.

It can be explained how system dynamics and delays make it quite difficult for us to judge and measure the effectiveness of our actions over time and we often end up with ‘unintended consequences’ down the road. This problem is easily recognizable in the language we use, such as terms like ‘unintended consequences or side effect’. “Is there really such thing as a side effect?” Everything is an effect but we call ‘side effect’ because it is not in our scope of thinking or decision-making. In systems thinking we said ‘The Whole is greater than the sum of its parts’. The law of unintended consequences said “for any actions there will be more than one effects” and because of the way we make decision we only account for only 1 effect, A cause B, B cause C and so on. The law of unintended consequences said ‘there are a myriad of effects that happen’. Back to previous examples of cause & effect actions, the curse of linear thinking – unintended consequences- Building more lanes and reducing congestion attracts more home construction down the road, increasing traffic again; Spraying more chemicals damages the natural defense mechanisms of the crops and kills beneficial insects, leading to an eventual increase in infestations; Pumping more water from the ground eventually lowers the water level and raises costs of irrigation and increases the problem of salinity. Bigger and more sophisticated boats will quickly overharvest the breeding stock, and eventually there will be no catch at all.

Essentially systems are groups of discrete elements, things that we do not often see, that work together to make a whole. Systems are bound together by the laws of cause and effect, and governed by flows of information, energy and materials. An important note is people give definition to systems based on an idea of what should happen at a given point in time. Thus, in a human term, systems have a purpose.

A useful model or thinking tool called the ‘Systems Iceberg’ can help leaders to gain understanding of the thing that we do not see, the underline structure that shapes events, shapes these things that we do see. The systems iceberg (Figure 1) is a useful model to think about putting these parts together and think about what is underneath the surface of the thing that we see, especially for complex problems.

**Figure 1: The System Iceberg**

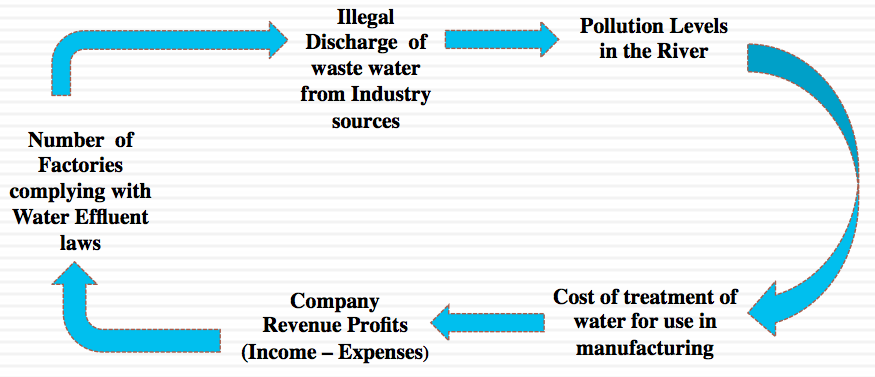


In describing the System Iceberg model, one could think of it as similar to the problem that the Titanic had when it hit the iceberg in the Atlantic. Why? Because it is only a piece of iceberg above the surface of the water, the 10% of the entire that we can see but really the whole bit underneath is the most important and can either cause the most damage or be the long-term cure to the problem.

If we start to look at the ***events*** such as Oil Spills, extreme weather, extinction of a species, social unrest, etc. what we usually do is to ask…what can we do to make change? And often time we do what we call ‘Knee-jerk action’ such as we fine the oil company, arrest the wildlife trafficker, etc., but that can stop the problem only at the beginning and usually it will get worse, in system thinking we always say “better before worse” so, we need to go a bit deeper to the pattern. These are stream of events that together form a pattern. This is ***pattern of behavior.*** These are the things that we can do or measure overtime to see if it’s repetition of this type of events and that give us increasing leverage to be able to change. If we would go deeper, what generate those behaviours are the ***system structures*** and to understand the system structure we need to understand the information that the pattern of behavior tell us because that will give us a conceptual view of what are the system structure and system dynamics that are driving that behavior so that given event deeper leverage to make change. “This is a design element” of change, we can design our systems to create new result. Event deeper is how we see the world? What we call ***Mental Models –*** our belief, our values and this is where the biggest leverage is and this is where we talk about “transformation/ transformative leaders”.

Another key element of systems is Feedback. In most cases, changing one factor will impact on another factor, which will then affect the first. Feedback will either reduce the impact of the change, or will amplify it as illustrated in the graphic depicted below in Figure 2.

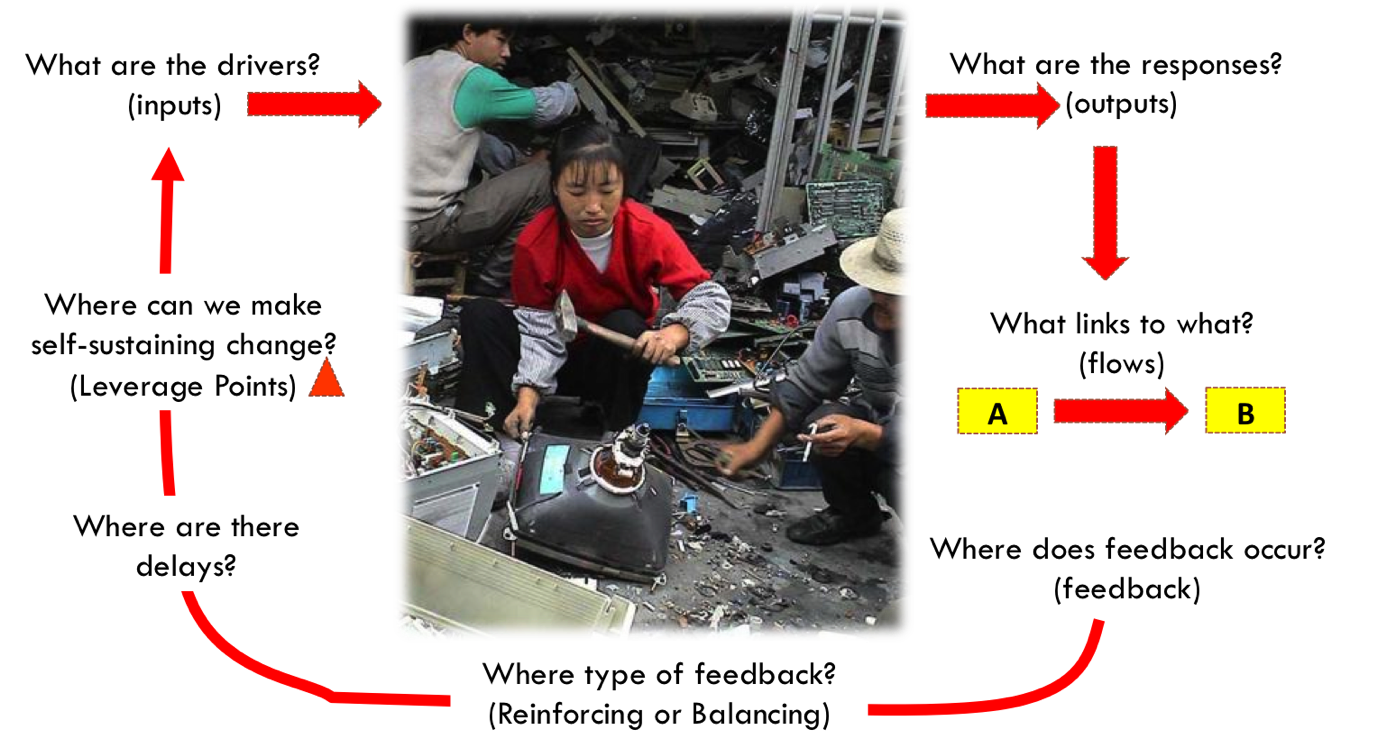
**Figure 2: An Example System Feedback Loop**



Let us explain how the field of systems thinking has generated a broad array of tools that let us: 1) graphically depict our understanding of a particular system’s structure and behavior, 2) communicate with others about your understandings, and 3) design high-leverage interventions for problematic system behavior and leverage is the key to change. Where can we make change within the systems that will have the most impact to create self-sustaining change systems. This is why understanding feedback is so crucial rather than a linear approach.

Here is an example close to the business world’s own context – a system loop built around the problem of electronic component recycling and e-waste, or what is more formally known as ‘waste electrical and electronic equipment, which we can see the below picture show the classic problems – unregulated, unsafe recycling. A systems approach can help us to ask and answer the right questions regarding how we can increase the rate of safe recycling? We start by looking at the inputs, including the components and the demand side drivers? We can also use the system iceberg to help us ask other questions such as “what other events, decisions and actions are contributing to this? What are the trends these things? What are the systems structures and mental model that are driving this type of behavior/event? Then we need to understand the effects/ responses and outputs and try to understand what links to what, and where does feedback occur so we can identify where responses feed back around to the stimulate the drivers again. Then we can begin to understand what type of feedback the system is showing: reinforcing feedback that create those exponential growth curves or is it balancing feedback. Knowing all of this helps us to know better where to make change (what we call ‘leverage points’) and what type of change to make.

**Figure 3: The E-waste recycling loop**

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A final message is that the deeper you go down into the iceberg the more impact the leverage will have in transforming that system, but also it’s more difficult to make that change. This is where other things like strong innovative ideas and good strategy comes into play. Green economy and sustainable production and consumption are examples of this.

**1.4 DISCUSSION**

**Question 1:** What is the biggest challenge for leaders in implementing this concept to the real world?

**Answer (Mario Tabucanon):** The biggest challenge is behavioral in nature because knowledge does not necessarily translate into a change in behavior. We cannot talk about sustainable consumption and production without changing the behavior of people. Transfer of knowledge does not automatically change human behavior. The UN Decade of Education for Sustainable Development (UNDESD) has realized this because the declared pathway to changing behavior is through education. The vision of UNDESD is to have a world where everyone has the opportunity for education and to learn the values, behaviors and lifestyle changes for a sustainable future and for positive societal transformation.

**Answer (Robert Steele):** At the present state,the challenge lies in increasing the youth movement,real involvementin the UN system and other frameworks. By bringing in the youth to the main policy and decision-making processes, more will push a more transformative type of behavior change. This is both a system structure and mindset change (deeper leverage and thus bigger impact). Youth perspectives and youth elements are very, very crucial. At the same time the basic structure is still the same, which is because the mindset is still the same; it is the reinforcing feedback loop that is hard to change among the world’s public and private sector decision-makers. Bringing younger people is one of the key ingredients.

**Question 2:** The sustainable development concept has been addressed for a long time (over 40 years). What do you think about the proposed concept by Schumacher, “Small is Beautiful”, about the importance of non-violence and ethics within economic systems?

**Answer (Zinaida Fadeeva):** We all know that the difference of time now and say 20 years ago is that the world is becoming much more unpredictable. Crisis after crisis, unexpected development of unexpected scale and scope, and all of that, the world is just not coping. Even if we try to predict and minimize the risk, risk still would be there no matter what; that is reality. Let us accept it and try to build a resilience society, which would be capable to cope with these. The point about morality is probably the crucial point for the building of a resilience society in the case of uncertainty and massive risks because value systems based on caring for others, for yourself, etc. are part of the sustainability equation. Thus, it is probably the only thing that keeps all of the actions together. There is no other foundation because planning is not possible (it may have been possible before, but it is not possible at the moment).

**Question 3:** As was mentioned regarding the economic argument about sustainable development and the mindset fixated on the present economic indicators, like GDP and others, and switching to other types of indicators, do we have any resource so we can share with other companies regarding this?

**Answer (Zinaida Fadeeva):** In addition to what the previous speakers have mentionedabout the importance ofbringing youth and focusing on mind and leadership skills, probably the keys would be the following:

* To empower the policy makers to make certain difficult decision, and this might not be a popular one. The whole notion, the whole discussion - political, economic, etc. - on the global economy, the whole basic value of it gives legitimacy to the policy makers/decision-makers of making certain risky decisions even if they are not that popular.
* It would be possible only if everyone would recognize the feasibilities of it (which is very difficult). Bringing the private sector and public sector to talk about success stories, probably would be necessary. An example: if we make our public transportation 10% lighter which is perfectly possible, just use a little bit different materials then the CO2 emission could be reduced by 7%. The point is to help enable policy makers to create the appropriate environment, which would probably be in the beginning quite a challenging one.

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**SESSION II**

1. **ALTERNATIVE MODELS OF DEVELOPMENT - PART I**

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* **Chair of Presentations and Discussion**:

*Zinaida Fadeeva, United Nations University Institute of Advanced Studies*

* + - **Green Economy**

*Stefanos Fotiou, United Nations Environment Programme*

* + - **Green Growth**

*Aneta Nikolova, United Nations Economic and Social Commission for Asia and the Pacific*

* + - **Sufficiency Economy Philosophy**

*Charas Suwanwela, Chulalongkorn University*

* + - **Discussion**

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* 1. **GREEN ECONOMY**

***Stefanos Fotiou***

***United Nations Environment Programme***

**Introduction**

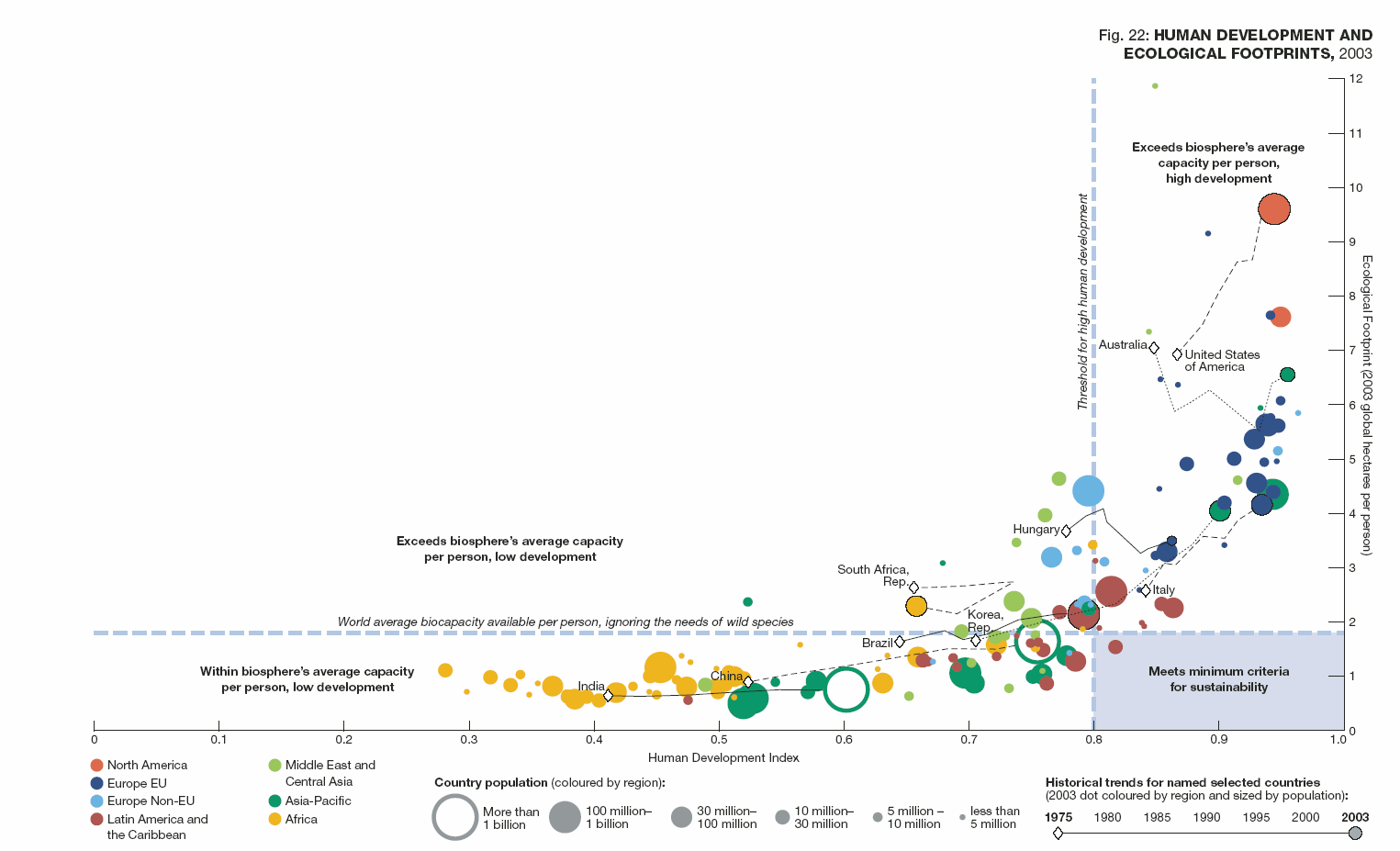
This is an overview of the Green Economy Initiative of UNEP, primarily focusing on the specific activities by UNEP in partnership with other agencies of the UN community.

Basically, the UNEP-defined Green Economy initiative started because of the triple “F” crisis over the last three and a half years. The triple ‘F’ stands for: 1) Financial Crisis, 2) Food Crisis, and 3) Fuel Crisis. The middle of September 2008, when Lehman Brothers collapsed, was a very iconic event linking Green Economy to other systemic responses (e.g. higher prices) in food and fuel, leading to the failure of the current economic system. UNEP quickly saw that this crisis could be an opportunity to revise and reset the world economy and change the way economics is understood and practised. UNEP came up with the idea of ‘Green Economy’, which still focuses on growth (because of the understanding that at least for a developing country, growth is a non-negotiable characteristic of their future), supports employment, and is a solution to poverty because green investment is related to the income of the poor.

It took months of debate to come to this definition of Green Economy, finally settling on – *“one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.”* Essentially, Green Economy is still linked to all three pillars of sustainability, though the focus of Green Economy does lie more heavily on the economic and environment parts, and tackling the social issues within the area of employment, because green economy generates jobs and thus has a strong effect on the overall social development and social stabilization.

There is a need to decouple economic growth from environmental degradation. In Figure 4, the horizontal axis represents the human development index (HDI), produced by UNDP. It includes education and things that are people’s basic needs. From the vertical axis, ecological footprint, it can be seen that as HDI increases the ecological footprint increases also. What is most interesting in this graph is the bottom right-hand corner where there is large HDI and small ecological footprint (the minimum criteria for sustainability). However, this is not happening in any country at the present time. It may have occurred in the past for a few countries, and it is not easy to happen, but there are some solutions that can kick-off this shifting to take the high income countries and move them down into this corner, which means drastically reducing their level of environmental impacts and shifting to high income. It is difficult but can be done.

**Figure 4: Human Development Index vs. Ecological Footprint**



(Source: UNDP)

What can be done to move countries in this way? First of all, there is a need to have a good study and report to understand if this idea can be done. Can there be growth and at the same time preserve the environment? Also there is a question of how much will it cost and how much will it give benefit. UNEP’s approach is to select 10 specific key sectors - critical or highly material for greening the global economy and to focus on a qualitative model that can give some prediction on what will be the effect to green economy and also on the enabling conditions that can support such a green economy, such as finance, subsidies, taxes, regulations, and related reforms that achieve the green economy objectives.

**An Example on Fisheries Sector**

Here is an example from the fisheries sector of various types of subsidies, which can be characteristically called “the good, the bad, and the ugly”. Basically, the idea is to shift these subsidies to move parts of bad and ugly subsidies and make them to be good subsidy. There is no intention to take money out of the economy, but instead shift the bad subsidies to become good subsidies or even increase subsidies and use them in a good practice. These are shown in Table 1.

**Table 1: The Good, the Bad and the Ugly of Economic Subsidies**

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of Subsidies** | **Impact** | **Example** | **Amount**  **(US Dollars in 2003)** |
| **Good** | Enhance the conservation of fish stocks over time | Funding fisheries management/ Using government spending to operate marine protected areas | $ 7.9 Bn |
| **Bad** | Lead to overcapacity and excessive catches | Fuel subsidies | $ 16.2 Bn |
| **Ugly** | Can either conserve a fish-stock or deplete it further | Buyback (or decommissioning) to fishing vessel to reduce a fleet size | $ 3 Bn |

(UNEP, Green Economy Report, 2011)

Here are some of the findings from UNEP’s green economy report: There is a need to invest 2% of global GDP into ten key sectors for a transition towards a low- carbon, resource-efficient economy. Investing in natural capital, resource and energy efficiencycan lead to higher rates of GDP growth over time and enhanced wealth, reduced poverty, and decent employmentThe most important thing is that Green Economy can reduce poverty as is shown in Table 2 of three rapidly developing countries, namely Brazil, Indonesia and India.

**Table 2: Green Economy and Poverty Reduction Estimates**

|  |  |  |  |
| --- | --- | --- | --- |
| **Natural-resource dependent sectors and ESS (2005)** | **Brazil** | **Indonesia** | **India** |
| **Original share of GDP (%): agriculture, forestry, fisheries** | **6%** | **11%** | **17%** |
| **Adjusted share of GDP (%): including non market/ESS** | **17%** | **15%** | **20%** |
| **Share of ESS/non market goods of total income of the poor (%)** | **90%** | **75%** | **47%** |

(UNEP, Green Economy Report, 2011)

As example to reduce poverty, factoring in ‘Ecosystem Services’ its role for total income generation of the poor is increased (Brazil 90%, Indonesia 75%, India 47%). The key finding is that within 5 years, Green Economy will be catching up with ‘business as usual’ scenario, and eventually surpassing, whilst reducing ecological scarcities and environmental risks.

**Enabling Conditions**

There is a need of enabling conditions for a green economy including establishing sound regulatory frameworks, removing harmful subsidies in energy, water, fisheries and agriculture, prioritizing green investment, utilizing smart market mechanisms and taxation, and building capacity through training and technology transfer.

Investments in the range of $1.3 trillion/year are required globally. This is about 10% of total investment in physical capital, and it is a big amount, but it can be done. But of course there is need for innovative mechanisms and tools that some sectors and organizations already possess, such as Green Climate Fund, Payments for Ecosystem Services (e.g. REDD+ and Environment), social and governance reporting.

Green Economy is a vision that is feasible and pragmatic. It needs money and capital, but this capital is achievable because if it is considered an investment for a sustainable life in the future, then it will have a ROI (rate of return) eventually. What is needed is to change the way societies think, and to start designing policies that serve the needs of the people, not necessarily the needs of the corporations.

**2.2 GREEN GROWTH**

***Aneta Nikolova***

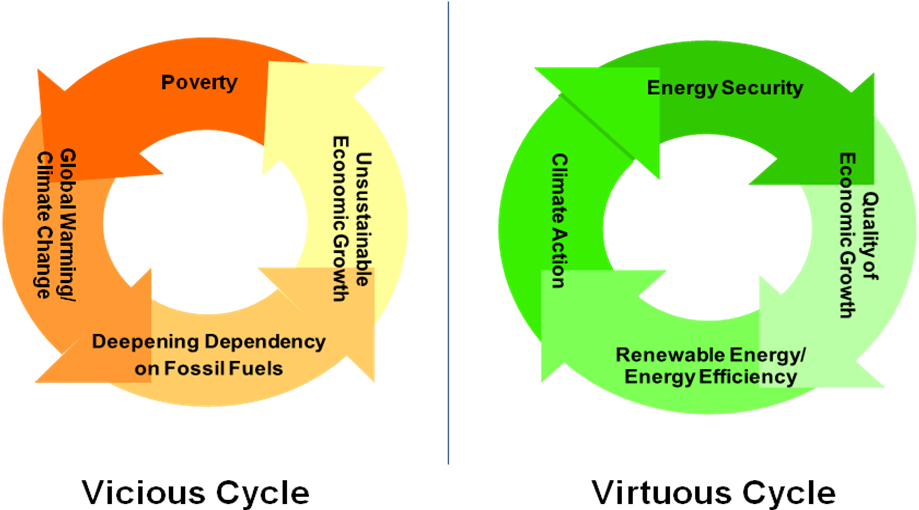
***United Nations Economic and Social Commission for Asia and the Pacific***

What is Green Growth? What is Green Economy? What is the difference between these two? “Green Growth” is not a UNESCAP program alone, but that it is a goal shared by the entire Asia-Pacific region, where it first originated. In 2005, UNESCAP conducted a research study with a number of private sector corporations and country-level cooperating agencies that clearly showed that the Asia-Pacific region is in a state of over capacity with respect to both production and consumption levels and with respect to the region’s biological production capacity and land space. This has been driven by policy that focuses solely on the drive for economic growth, which is tied to people’s belief (mindsets, world views) that economic growth always results in poverty reduction and strengthens the middle class.

However, this same economic growth is increasingly taking stocks from natural resources that are diminishing in an accelerated and unsustainable manner. At the same time, there has not sufficient investment into increasing access and quality for social protection of the people in the region, resulting in increasing joblessness as economic investment increasingly is turned towards built capital (machine) investment, rather than in social capital investment (i.e. human capacity).This makes the region’s economic development very vulnerable to a number of vicious cycles like volatile prices of fossil fuel, natural resources, food prices, natural disasters and climate change impacts; all representing risks and uncertainties.

Many countries are starting to ask questions about sustainability vulnerability and risk assessments within the economic sector discussions and negotiations. In 2005, and again in 2010, there were several conferences convened that confirmed that there is a need for a new economic system. UNEP is supporting this global argument because this region is the largest, with 58 countries (more than half of the world’s population) being located in Asia-Pacific. However, it is imperative that the developed countries (mainly in the west) support the greening of the economic system. The economic reality will need to change in the Asia-Pacific region, as well as all over the world, to realize a new and strong current of positive green investment along with low resource-use intensive technology.

There is a recent study on resources and resilience published by UNESCAP and ADB, which shows the various resource-use trends and risks in this region. What it shows is resource efficiency decreasing while resource-use accelerating, with resource intensity three times bigger than the rest of the world combined. This means that 1USD of GDP is produced by using three times the resources that other regions use (see Figure 5).



**Figure 5: The economic growth vicious cycle**

There is another recent article from the European Union in which some observers from the economic perspective see that maybe companies will start shifting to Asia more with the carbon intensive production because they have to register emissions so stringently in Europe. So, if this is the case, what will this mean for the Asia-Pacific region in the near and long-term future? Can Asia-Pacific afford to increase regional emissions load and consumption of natural capital at an even higher rate and scale? And why should this be done?

There is a need to look at resource-use intensity more acutely. This is a concept that UNESCAP is promoting quite a lot now. There is also need to look at the “quality” of the economic growth, as well as the economic parts, ecological parts and social parts, as inter-linked and interconnected parts of the whole.

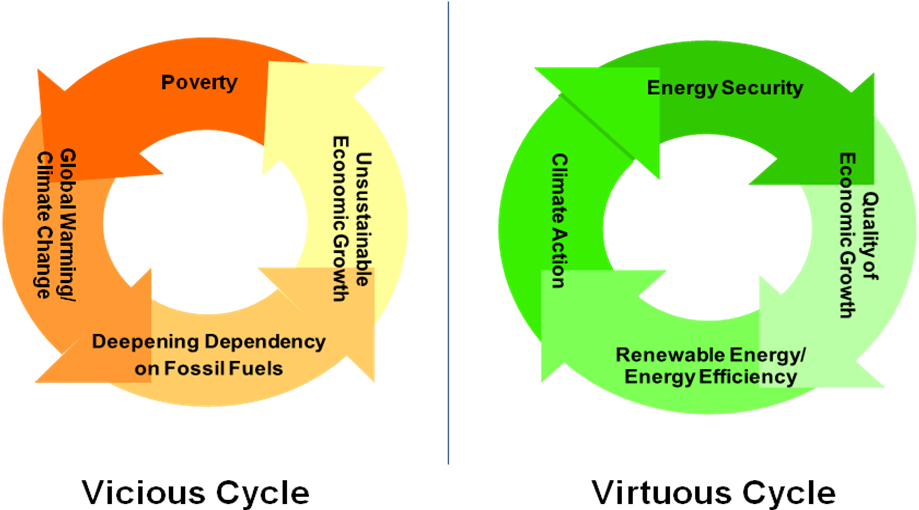
Another particularity seen is that the Asia-Pacific region is now the dominant production center of the world. This has come about primarily because the region’s resources and labor are cheaper, which could mean that there has not been internalization of the social and ecological parts into production processes and accounting practices. This means labor is not protected, and therefore, there is a real lack of social protection, no health insurance to speak of, and these result in the cost of health coverage for the employed being much, much higher than other competing regions.

The economic system change being talked about is more focused on human wellbeing in a holistic sense. Of course there is want for poverty reduction, but the benefits in terms of people’s overall well-being just is not being realized, and the social component is very weak because there is not enough investment for it. Studies on the relationships between the environment and poverty have shown that people in poverty need good environment - forests, rivers, biodiversity, etc. - for their survival. Hence the natural environment should not be developed into another high-rise complex. There is a need to do a system-wide revision to find out what we have as resources in each given country, what are our strengths, where and why is there a lack of investment and how can we improve this situation?

There must be focus on both the visible and invisible factors as well as linkages within the economic infrastructures based on eco-resource-use efficiency principles. The invisible infrastructure consists of the market instruments such as demand, supply and social values. The visible is the infrastructure (i.e. built capital) that represents the biggest share of economic development. Of course this investment into infrastructure can generate a lot of jobs and opportunities but how to carry out this development is very important because the planning perspective is 50-60 years into the future. So it means that effects for the next 60 years are to be foreseen when building infrastructure that are going to be resources/energy-intensive.

The important question is: “What can be done in this region to make the necessary economic system changes?” There is a need to have good examples or ‘good practice’ case studies to highlight where green growth or green economy is being carried out successfully so they can be replicated elsewhere. Green growth is a whole system change and it has not been really done, as a whole system approach, anywhere in the world. There are examples that show different approaches and how these can be economically as well as socially beneficial. However, there is no country where this is happening completely, but there is a need to start to try. There should be a break from standardized approaches and follow other tested models that are more environmentally viable.

An important question for us: “Is ‘green growth’ really applicable to developing countries?” Most of the region’s economies are very much based on fossil fuel use, which will be an increasing risk factor in the future. For example, using benzene and gasoline is unsustainable economically as it needs lots of subsidies to make it economically viable for most people. However, there are alternatives. In Southeast Asia, in particular, there is abundance of solar energy potential, a good climate and increasing opportunities for heat capturing, and there is space for all of these renewable technologies to be scaled up and thus make them even more profitable.



**Figure 6: A ‘Green Growth’ closed loop system.**

Consumption and production are the basics of economic growth; they are the measures of GDP, so if there is change in use of resources - to be more efficiently, implement closed loop waste recycling, use life-cycle principles, improve eco-efficiency, energy efficiency, dematerialization, etc. - then there can be greener growth. Figure 6 shows that the input, output, waste and end of production and consumption processes can all be enclosed within a closed-loop system, producing a so-called ‘virtuous cycle’ rather than a ‘vicious cycle’. Industrial ecology is a very successful approach; it is embedded in some eco-industrial parks that exist already throughout the world.

One of the important economic instruments within the ‘green growth’ portfolio is called “Environmental Taxes Reform” or “Green Taxes and Budget Reform”, which represents a complete package. One must start by looking at the taxes and fees that exists, then decide how to use the revenue. First thing to do is to look at the subsidies. There is a study that shows the relation of energy demand, if using taxes for the positive effect, on income and energy-use behavior. By charging for the over-use of excises, fuel doubles and triples exponentially, which put pressure on consumers of energy to improve their behavior and increase revenue that can be invested back into improving the overall production processes.

There are some examples of green growth-related success stories, as follows:

* Trash is Cash in Bangladesh, Sri Lanka and Vietnam - This is the business opportunity for poor even if they live in the dumping sites. With good practices they can be given clothes, which could exist as a community cooperative and runs as a profitable social enterprise;
  + Paying for the service, not for the hardware, Lao PDR - This is a community-based business approach. The community established a series of solar panels to charge lanterns and they sell their services to the local community, which is cheaper than buying kerosene every month;
  + Medium-size successful story is from ISA Tan Tec – Lite Leather: Green Tanneries in Vietnam and China are generating their own energy from mixed renewable energy sources. They do not use energy from the grid or energy from burning wood, but they generate their own energy from heat capture, solar, wind and other processes, and they are very profitable;
  + Wind Power India;
  + National Innovation Agency, Thailand, provides some funds for innovations and these people take these innovations from the grassroots and develop and commercialized them, and even help them to market and sell their products abroad;
  + Green Subsidy Reform, Indonesia and Green Tax and Budget Reform (GTBR) Thailand;
  + Sustainable transport in Malaysia and Thailand (solar Tuk Tuk)
  + Micro-Hydro, very feasible rather than relying on the building of big dams;
  + Solar power generation even in the agriculture area;
  + Parabolic Solar Power Australia;
  + Green building in Malaysia, Mongolia.
  + Green roof in Singapore;
  + Electricity buses system for the expo in Beijing that has now expanded to the city. Also fully solar electric buses and green taxes in China;
  + Eco-Industrial Park in China that are closed loop and self-sufficient;
  + Electric vehicles - The Tesla Roadster sport is built to prove that electric vehicle has the ability to accelerate from 0-100 km/h in 3.7 seconds and has a range of 400 kms. There goes the myth that EV’s are slow and inefficient.

**2.3 SUFFICIENCY ECONOMY PHILOSOPHY**

***Charas Suwanwela***

***Chulalongkorn University***

The present global model of economic development is based upon a combination of capitalism, consumerism, materialism and individualism. Capitalism creates motivation, competition and economic growth, while materialism and consumerism use the market mechanism and advertisement to contribute to improving the quality of life of people. Individualism provides the basis for rights and freedom, leading to human satisfaction. This move has served the people well until they were carried too far, creating environmental pollution, natural resources depletion, inequity and social disruption.

Take the case of the current Thai Government’s ‘first car policy’, subsidized by various public means with an aim to improve the livelihoods of low-income people as well as increase their productivity. This program has as its secondary aim to stimulate the automobile business so as to increase car sales, which in turn would stimulate car manufacturing and car parts industry. Economic recovery and growth of the country is the ultimate goal. At the same time, it would satisfy people’s needs and perhaps also their wants. The election campaign promise would be fulfilled. This policy is problematic since the situation by which the benefactors - those who get the benefit from this scheme - will get it for luxury and non-productive use. They derive the benefit from this policy without considering the capacity of the target consumers to pay their monthly car loans, as well as their ability to pay for fuel and maintenance costs of the car. Eventually they would be loaded with personal debts while the country goes into national debt from an increase of consumption, and of course more imports.

If one looks around, one will see a myriad of the desire based-trade, based upon beauty, anti-ageing, youthfulness, immortality, recreation, gambling and excitement of many kinds. The businesses come in the form of cosmetics, health, health food, spas, exercise, weight control, sports, lottery and many others. Advertisements and sales promotions are effective and very strong, but they also use partial information, wrong information, or deliberate misinformation to achieve their objective - i.e. for people to consume their products and services. It is safe to say that society is suffering from an epidemic, which can be called “affluenza”, meaning epidemic of affluences that is spreading faster and more dangerous than influenza. The necessities in life, namely food, energy, water, transportation, communication, housing and many others, are all possible targets of excesses.

With regards to energy consumption, electricity, fossil fuel and petroleum production and consumption, these things urgently need mankind’s re-thinking. For example, in a developing country the need for adequate infrastructure makes the situation much more difficult to handle. An example is on one billboard along Bangkok expressway with a big baby face that says, “do you want to see your baby’s face before birth?” The Ultrasound Technology has made this possible and it is now very real, but it is also an unnecessary expense made to appear necessary due to commercially induced desire. It mainly benefits the owners of the equipment and the care providers.

Another example is that a Bangkok newspaper on 14th July 2007 carried a full-page advertorial entitled “Catching cancer before it kills”. It was after an investment in installing PET Scan equipment in a Bangkok hospital. The message practically says: “Do you want to know whether you have a hidden cancer?” The use of the machine for this medication is not recommended medically. This represents a commercially induced desire, working on fear of having cancer; it is not only costly, but it can be harmful.

His Majesty the King of Thailand, Bumibhol Adulyadej, proposed the “Sufficiency Economy” Philosophy or Theory in 2003, but actually he has been using this approach since the beginning of his social development programs going back to the 1950s and 1960s. His 60 years’ effort of social development for the Thai people began in 1946, and could be roughly divided into three periods. During the first 20 years, he spent efforts and time learning about the Thai people’s plight in all corners of Thailand by direct contact, responding to their needs, helping them to solve problems, including health, education, production and consumption issues. Practical approaches and an emphasis on moderation has been HM’s approach to development. In 1992, during an economic boom period for Thailand, he warned against history jumping into the wings of the Asian Tiger.

During the second 20 years, HM tackled the root causes of the problems he saw, namely land and water management. Since the mid 1980s the King proposed the basic principles behind his ideas on development, beginning with the new theory for agriculture, which is a balance use of land for family and community in agriculture area. The name “Sufficiency Economy” was first mentioned in his annual birthday speech in 1997. In order to correctly understand HM’s idea Thailand’s National Economic and Social Development Board formulated its version of the theory, which was reviewed by his majesty the King himself. There are 5 components: 1) Moderation and the middle path, 2) Rationality, or sound reasoning including knowledge-based and evident-based, 3) Immunity against future threats or unexpected changes, and those previous three components would be based on 4) Knowledge, Wisdom and 5) Ethics and Morality, including honesty and many others virtues.

To cope with ‘affluenza’, moderation and the middle path are the answers. For the individual or consumer, self-control of desire, human processes or natural desires such as longevity, youthfulness, beauty, ease of living, enjoyment, recreation and others, are desired. The individual must avoid excesses over consumption behaviors. One should not deny necessities in life that are affordable, while unnecessary desires are those to be contained. There should be moderation of providers and producers; they must practice restraint against profit from coercion for luxury and from desire-based trade over-promotion.

Here is how the global knowledge pool has exploded and connected people through information communication technology available to those who can access and use. Developing country depends on them for development and for problem solving, which are increasingly knowledge-based. However, gaps are widening though knowledge is universal and the uses are contextual, situational, locational, and time-dependent. The barriers that exist are due to inefficient capacity for access, validation and valuation of knowledge. Partial information, wrong information and misinformation complicate the picture. Transfer of technologies does a serious problem creating both waste and harm. Wisdom and ethical values governing technology assessment and imports must be sound and must include sustainability and environmental consequences. Thus, consumers must have knowledge and wisdom for rational decision-making and immunity against seduction and addiction.

There are examples of excessive level of desire beyond the means of specific situation creating unwanted consequences. Advertisements of anti-oxidants food supplements or anti-oxidant drugs or potions claiming to delay aging, decrease heart diseases, prevent dementia, memory loss and prevent cancer, have led to widespread use of non-proven benefits, even with potential harm, through improper information and intentional misinformation. One example is red wine, which has resveratrol - an anti-oxidant- but the advertisement does not tell you that you need to drink 12 bottles of wine a day for many years to get that benefit. Critical thinking and immunity is certainly required.

Another example is “obesity”; it is an outcome of access, quantity and quality of food consumption together with wrong lifestyle. This has led to many diseases and suffering in Thailand. Up to 30% of adults and adolescents have reached an “obese” range. From 1986 to 2008, evidence has shown that the situation is getting worse, apparently from a change of food habits away from rice, vegetables and fruits to western style of processed food. Motivation for attention through weight control has been very effective. Obesity is preventable and controllable through food and exercise habits. One can see soaring sales of “food supplements” claimed to control weight through advertisement, promotion and direct sales. The spa and exercise businesses are booming. Sufficiency Economy does not mean total denial, but making appropriate choices to suit one’s own situation. One’s choice is based on one’s means. The question is how to get the individual to resist “me too” temptation and how to convince the society of a bunch of virtues of saving and to be careful on the pursuit of luxury.

Sufficiency Economy should be the country’s social values in coping with the social ill. Motivation of the people and public measures have been introduced such as public exercise programs which cost less, and in some schools they have announced a prohibition on sales of junk food in the schools.

In 2003, there was a report on the results of a survey on 296 enterprises about the application of Sufficiency Economy to small and medium-sized industries. Seven indicators for sufficiency economy were tested in six groups of industries. The results showed that 90% felt that Sufficiency Economy could be applied to their enterprises: production plan in line with their ability to manage, honesty to customers, and social responsibility were among the positive responses. However, outside financing is difficult to avoid for medium-sized enterprises.

In summary, Sufficiency Economy fits well and nicely with the current trend of sustainability. The broad-based consideration to include natural resources, environment and social consequences make the basis for rationality. Morality with moderation and middle way serve as governing values. The emphasis on self-determination and self-constraint is also important for sustainability, applicable for consumers, service providers and producers alike. Sufficiency Economy is a composition of interrelated elements aiming at coping with the present challenges as an alternative development model.

**2.4 DISCUSSION**

**Question 1:** We talk a lot about carrying capacity of forests, of rivers and many others, and there is a hidden quote, meaning that water is not product, it underlies everything that we do. With the point of carrying capacity of ecosystems, has there been a successful case where ‘payment for ecosystem services’ (PES) has been successfully applied, and if so, can it be scaled up?

**Answer (Stefanos Fotiou):** There are many success stories of PES being applied to increase income generation for the poor and rural people, and to improve their livelihoods at the same time, while ensuring a good environment. What we need is policy that can allow this type of approach (i.e. PES) to be mainstreamed and become an important ‘buzz’ of the macro economic policy arena.

**Answer (Aneta Nikolova):** We have a couple of good PES project examples in Vietnam, Cambodia and Indonesia. Vietnam has established a National Policy that makes this approach more successful. Essentially, this helps communities to preserve their forests and encourages them to sustainably harvest different forest products without degrading the ecosystem itself. The downstream users of the rivers pay ‘ecosystem service fees’ into a central fund and the fund is then distributed to communities that live within the forest catchment that is contributing to the watershed. A similar approach is used in Indonesia, in Aceh province, which was hit by the Tsunami back in 2004.

**Answer (Zinaida Fadeeva):** One of the basic problems with PES is that the cost is not universal, so whatever water cost in one region would be quite different in another one. However, they are quite sophisticated instruments for development, and what is really required is a policy that would enable the pilot testing of those. However, the layouts of those policies have never existed before. You would need to generate and validate a valuation scheme at each point in time among different agencies, which is complex.

**Question 2:** With regards to the new theory for agriculture you refer to as ‘Sufficiency Economy’, what are the indicators of a successful sufficiency economy model in practice for Thailand, or for that matter, wherever it is being used?

**Answer (Charas Suwanwela):** The basis of Sufficiency Economy Theory/Philosophy comes from HM the King’s experience over 60 years on the ground working with the people. For examples of success stories, there are many cases and also a lot of publications from the King’s initiated projects, which are proven to be better than the mainstream economy system.

**Question 3:** Given that advertisements and capitalism promote greed and desire, and that is the main way we follow now, the Sufficiency Economy is moving against the stream so to speak but is seeing some success here in Thailand. Do you see any prospect or opportunity to share or spread this concept and approach to other parts of the world? How do you see it being scale up?

**Answer (Charas Suwanwela):** Logically the Sufficiency Economy philosophy is based on problems we see in Thailand, and what we see is only the ethics or basic principles behind all the problems. It has been proven several times that it can be applied well in Thailand, and if you look at global problems at the moment, it is more or less the same. I would invite everyone to try to see how this can be applied to the world as a whole. I think Sufficiency Economy complements green growth/green economy, environmental sustainability, etc., but another element is the ‘constraints’ by everybody, including the producers, traders and consumers to contain excesses in use of everything. This philosophy is applicable in Thailand as we see and whether it is applicable elsewhere remains to be seen. Of course, we must take into account the cultural differences, but the basic human happiness is challenging GDP and shows that there are many ways to look at economic development.

**Answer (Stefanos Fotiou):** The biggest problem of today is commercially induced desire. This has happened because the corporate world runs without any regulations, rules and controls, but there is a kind of collective social decision that gives an inordinate amount of power to the corporations, and is uncontrolled, unregulated and this is the result. I think the biggest counterpart of this corundum is to make capitalism work because what we have today is not capitalism; it is a protective economic system that gives protection to a few handful corporations. So if real capitalism works, regulation, equity and fairness for all businesses then may be we can start having a solution.

**Answer (Zinaida Fadeeva):** There is a hope and this hopeful feeling in my view would come from the area of social media. Have a look how the young people nowadays are using ICT media, mobile phones, etc. Have a look what has happen during the “Arab Spring”, a lot of cultivations have been done through mobile phone, tweeting, etc. The second point is the whole paradigm of education, but in order for it to become the place for experimentation and social activism and innovations it needs to be articulately reformed as well. But after one’s formal schooling is finished, in my personal view, it is pretty difficult to change a person’s mindset. However there are certain things that are happening to support these ideas.

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**SESSION III**

**3. ALTERNATIVE MODELS OF DEVELOPMENT - PART II**

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* + - **Chair** **of the Presentations and Discussion**:

*Mario T. Tabucanon, United Nations University Institute of Advanced Studies*

* + - **Poverty Reduction**

*Muanpong Juntopas, Stockholm Environment Institute*

* + - **Social Business**

*Zinaida Fadeeva, United Nations University Institute of Advanced Studies*

* + - **Business and Biodiversity**

*Sonjai Havanond, The Sirindhorn International Environmental Park*

* + - **Discussion**

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**3.1 POVERTY REDUCTION**

***Muanpong Juntopas***

***Stockholm Environment Institute***

The biggest challenge in this new century is the idea of sustainable development, which seems very abstract to take and turn it into a daily reality for all the people in the world. The concept of sustainable development needs to be asked, how sustainable is it? When one talks about consumption and production, one talks about how to manage to live on this planet together.

Many people might have seen the movie “An Inconvenient Truth”; it shows what people have done and continue to do many things to the this planet that renders it impossible to support human lives any longer, and people must learn from experience and do things differently into the future. Another movie that was produced by the Swedish Government, called “The Planet”, is now part of curriculum in high school in Sweden. It has similar messages found in the “An Inconvenient Truth” film, but they communicate these messages in a fun way. The Swedish film not only talks about “Dooms Day”, but it also talks about “what you can do to make change”. Its main message is ‘global change’ instead of ‘climate change’. It talks about “planetary boundaries”, which means there are certain boundaries that should not be crossed otherwise it would be impossible to restore it back, and climate change is one of those boundaries. Another boundary is biodiversity, among others. This movie is recommended to use in school class or in workshop settings.

The rate and amount of resources that are used and consumed today are way beyond what the planet can give. With the earth’s surface shared among the world’s 7 billion people, there is approximately 1.8 global hectares per person to produce what are needed for use - food, clothes, shoes, etc. However, today more than 2.2 global hectares per person are used which is beyond the planet’s threshold. At a water conference a few years back, it was said that 100 years ago there were 161 international rivers that covers more than half of the world population. Now with population increase having tripled, the need for water is 7 times greater than the past. It means that it is not only the population that is increasing but in the way water is used as well.

What is sustainable consumption and production? For production, it is how things are made, how to produce in the way that it lasts; and for consumption, it is to consume in the way that it will not destroy everything. Also it is about how things can be distributed among many people in the present generation to reduce poverty. Can resources be preserved so that stakeholders who are not yet born, who cannot participate in decision-making today, will have sufficient resources for their needs in the future?

With regards to sustainable production and consumption, what can be done? How can it be done better? Are the ways things are now done sustainable? Can it continue into the future? Private enterprises play a big role in this regard. They produce things; they do advertising and sell things. But how could things be better? Is production energy efficient? Does it use less resource? Who is using what? How are the benefits distributed? How does production and consumption effect environment? These are key questions.

There is need for trade-offs both in the long and short-term. The world is faced with a “Butterfly Effect”, meaning that the world is so connected today. An example is the boom of travelling in the Mediterranean region and its impact to the collapse of Mangrove forests in Asia because of the need for large volumes of exported seafood such as prawns, across the sea. Many countries in Asia that are resource-rich are at the same time institutionally poor, with weak regulations and enforcement, so investors like to use them for their business. For the long-term trade-off, is there a need to eat a lot now, use a lot now, then suffer in the future, or should all of this consumption be moderated so as to be fair to others, fair to the workers, to the people who are poor and keep some for the future? These are all very important questions.

The point is that no one can do this alone. It requires a lot of understanding from governments and the private sector, which has money to invest. Only using laws and regulations to hit when things go wrong will not work. However, if the private sector understands, this concept then go appreciated to go in the direction of being socially responsible to the people, the workforce and to the environment.

So, what is the problem? Unsustainable pattern of consumption and production now need to focus on resource-use and waste. In particular, in the industrialized countries this is a big concern and it pushes the poverty problem to get worse and increasingly imbalanced. When talking about industrial countries, one usually refers to many countries in the west, many countries in the north. However, one must be careful as countries like Germany, Italy, France, etc., consume a lot and have large resource flows. There is a lot of blaming, and it is stressed by these countries that ‘globalization’ is creating a growing global middle class in countries such as India and Thailand. However, this middle class shows little difference in the way they consume compared to countries in the west.

The paradox is that currently efficient technologies are affordable for the producers, but the number of consumers is also much, much larger than in the past. A key question is: How to talk to someone who is wealthy to not buy a new car or other luxury stuffs? This is a big challenge. As long as there are demands there are supplies.

Every country focuses their development on GDP; every country wants to grow, but how far can they go on like this? No country wants to go backwards. Countries take and extract natural resources, consume natural capital, and then produce. Only 10% of resources end up to be part and parcel of the product. There are wastes and only a small percent of wastes are recycled. The most important thing is not to make waste, but also to ask how much of what is bought is wasted even before using it. This is related directly to the issue of poverty. Materials are moved from somewhere, and those materials may be taken from the poor and say not to care so much because it is being paid. Capitalism as it is currently practised is certainly not so much about the combination of social equity, economic prosperity, social justice and environmentally soundness, which are the pillars of sustainable development.

Societies consume and produce globally. For example, in Thailand a very large percent of GDP comes from exports. Look at a typical hotel breakfast table and see where all the things are from. If the food is not delicious and not all is consumed, then it is thrown away. But there is a lot of energy spent for that food before it reaches the customer’s hand.

Consumption creates demand. Demand shapes trade, investment, and products globally, but demand in the global north requires resources from the global south. Meanwhile in Asia, during the past 50 years of development, the overall situation is better than in the 1960s. Economic growth is 5 times greater since 1960 and the human development index (HDI) has gotten better in general. But in many developing countries, there is still about 50% of the population that lacks adequate sanitation. Education and healthcare are still not accessible by many because what they earn is very little. Millions of children have no education and still work full-time, and hundreds of thousands of them will remain poor regardless of whether the Millennium Development Goals (MDGs) are achieved or not.

How many people argue that economic growth will provide the means to cope with climate change, meaning if one has money one copes better and believes in trickledown effect; but is that dependable? In linking climate change and poverty, one should focus on poverty reduction as a main goal of sustainable development; in other words, equitable distribution, distribution of wellbeing so there is not so much gap. Resources from the rural area should not be taken only to feed to the big city. Questions should be asked about how to produce, how to make things to benefit the people who are poor. One needs to understand ecosystem services and environment, one ecosystem can be of benefit for many things and usually these benefits are not accounted for. There is a need to mainstream sustainable development into development planning, inter-provincial planning to see where the river flows, which area to put housing, which areas should be zoned for factories so that kind of sustainability planning needs to be mainstreamed.

Sustainable consumption and production ask business to consider opportunities for sustainable production. Many people believe that ‘businesses are bad guys’, but recently many companies are moving to corporate social responsibility (CSR) and there is a need to have more of those that take care of the environment, use resources efficiently, and give people green jobs (environmental friendly job, decent job). Quite often one talks about human resource development and human development (they are not the same). Human resource development thinks of people as an input like fertilizer (but people are not fertilizer). People are producing something at the end of the day. The people are living good, healthy and happy life, not only go to the factory to put some screw on the machine but that human resource at the end of the pipe, people need to have decent living. The idea is to share prosperity, share the future for the generations and be kind to the environment based on carrying capacity for people and children who are not yet born, for the stakeholders, that is conservation - biodiversity, river, forest, etc. that for future generations and for current generations is to have a decent living, a decent job.

When one talks about sustainable livelihoods, about the poor, often times the government looks to the rural area farmers. Things have moved and livelihoods have changed. For many people who call themselves farmers these days, their income is not only from farming. They say that to see if the farmer’s family is good or not, the determining factor is not the size of land anymore but how they use laborers. Some children and grandparents are taking care of the farm; some kids go to foreign lands; some kids work at factory in the city, it is a 2-leg economy, farming and wage labor. So there is a lot of space to do poverty reduction; e.g. how to manage labor, how to deal with wages, how to create benefits to the workers in the company, in employment sector. Urbanization is a big rising trend, so for poverty reduction one must look both at the rural context as well as in the towns. In addition, regional migration is a big issue, with a lot of neighboring country migrants working in Thailand, and a lot of Thais working in other countries. Poverty reduction policies need to come for these two frames.

Recognizing poverty reduction and climate change is not an easy task, but it is possible. Green economy, green consumption is possible, starting from the individuals and as company investors. Development in itself is the hope for addressing environmental decline and recognizing opportunity for sustainable development. The goal is to make development sustainable and good for everyone. Thus, it is everyone’s business - companies and individuals alike - but the government is the key actor. They must start this process through formulation of responsible laws, regulations and policies as well as their enforcements.

**3.2 SOCIAL BUSINESS**

***Zinaida Fadeeva***

***United Nations University Institute of Advanced Studies***

‘Social Enterprise’ concept is not really entirely a new one, but goes back hundreds of years. Businesses working with issues of social output and governments stimulating consumption go back decades if not centuries, particularly in the United Kingdom. Going back to the 1850s, if one looks at credit unions, and in the U.S. we can see ‘self help’ groups, one can see that this is not a new idea. With regards to other countries, there are other forms of socially focused business occurring. A lot of our learning comes from this time. From the 1940s, and blooming in the 50, 60s and 70s, we see the rise of *‘Fair Trade’* providing the initial impetus to the concepts of social enterprise and ‘pro-poor development’. In the past three decades, people like M. Yunnus and Grameen Bank have become well known for their focus on marginalized and social disadvantaged peoples who are seen as labour and investment assets (i.e. collateral) for providing loans to develop small businesses that are extremely profitable.

*Bottom of the Pyramid* and *Base of the Pyramid* protocol and movements are now known and funding by international banks, but not enough to up-scale to an effective level. Quite recently in last decade is collaboration between development organisations and private entrepreneurs, such as the Gates foundation. There are plenty of examples both societal view (poverty eradication) and environmental viewpoint.

Social enterprise has many definitions, but is essentially about business venture created for social purposes (mitigating / reducing a social problem or market failure). The goal is two-fold - social and economic value creation stemming from different degrees of mixing of social activities/programmes and business activities; i.e. business and social activities can be part of the same unit. Or they would be several departments where one of them focuses on economic priorities, and another focus on the social aspect of business maximization.

Here are several examples and modalities of the concept of social enterprise coming out of the work of the Inter-American Bank.

*Model 1: Entrepreneur Support Model*

* Usually embedded – the social programme is a business
* Facilitating financial security for clients
* Examples: financial services, management consultants, technology
  + Providing access to funding (ex: Grameen Bank)
  + Pacific Pilot-faith based green growth business model on renewable energy (biogas)

*Model 2: Market Intermediary Model*

* Usually embedded – the social programme is a business
* Helps clients to access markets by adding value to client’s products
* Example: product development, marketing, credit;
* Fair Trade coffee, chocolate, diamond, crafts

*Model 3: Employment Model*

* Usually embedded – the social programme is a business
* Building capacity for people to gain new skills to develop new businesses or to take skilled jobs; providing employment opportunities training for clients
* Example: skills training, counseling, transitional housing
* Digital Divide data (Cambodia)
* Giving employment opportunities to poor youth…. Go to household to collect waste from household and produce methane energy (biogas)

*Model 4: Fee-for-Service Model*

* Usually embedded – the social programme is a business
* Provides services to clients
* Example: health services like check-ups, dental, etc.; education opportunities

*Model 5: Low-income client as Market Model*

* Usually embedded – the social programme is a business
* Facilitating financial security of the low-income clients
* Example: health (eyesight) and providing access to very cheap/affordable eye glasses, education, technology solutions
* Scojo Foundation: relieving consumer barriers (India)

*Model 6: Cooperative Model*

* Is embedded – the social programme is a business;
* Providing member services;
* Fair trade coffee – equal exchange
* Marginalized communities can take part in business by investing and taking part in decision making

*Model 7: Market Linkage Model*

* Is embedded – the social programme is a business;
* Providing member services;
* Connects clients but doesn’t participant in the service provision

*Model 8: Service Subsidization Model*

* Usually integrated – the social programme and business overlap;
* Business mandate is separate from its social mission;
* Support through tangible and intangible assets;
* Example: produce a product that provides services to the poor, by scaling down normal products that bring high profit

*Model 9: Organisation Support Model*

* Usually external – the social programme and business activities are separate;
* Model common for non-profit oganisations;
* Example: PDA (Thailand)

Government support has not been very forthcoming for social enterprise development in this region. Social enterprise should be guided by the *Bottom of the Pyramid* concept, where there are 4 billion people not fully part of local or global market. However, when we expand our markets, the potential for this segment is huge, even though they cannot pay as much as middle-income consumers. But the scale makes in profitable. There are multiple ways to see the poor, not only as consumer but also as innovators and as producers. She said that there should to be a shift from a charity to the market angle. Some ways to do this include:

* Provision of products and services
* Sourcing locally
* Getting local communities involved

Take the example of Procter & Gamble (P&G), a company providing water purification products to people suffering from disasters and catastrophic problems. It was mentioned the need to find out from the target population about the community’s needs and you then you need education about the product and then delivery. This is done effectively by using social marketing. P&G demonstrated the usefulness of its product, and engaged with the emergency relief agencies already working in the country.

Using the supply chain, we should focus on distribution and marketing (social marketing). Another good example of some of the pitfalls of social contributions is found when not enough understanding of the culture and situational context has been done. For example, Holcim Cement Company in Bangladesh partnered with Grameen bank to provide affordable housing. They set up a revolving fund whereby 90% of customers are women who were previous borrowers and proved themselves reliable (low risk). Of significant importance was the design of house. Unfortunately they did not do this well because they did not engage and consult the community enough on the design phase. Thus, people did not want to live in the houses.

The lesson learned and the challenge for large companies that want to work in a poor community is how to select the right product? We should use non-traditional channels of communication and consultation/engagement. Other problems can often include issues of cash flow and how to include poor in the supply chain. In summary, there are lots of innovations available, however investment is needed – coming from both the public and private sectors.

**3.3 BUSINESS AND BIODIVERSITY**

***Sonjai Havanond***

***The Sirindhorn International Environmental Park***

There is an agreed perceived problem of the global change that is happening now. Global transportation is increasing every year and is emitting an increasing amount of greenhouse gases to the atmosphere, so the world health is declining because of an increase in pollution. The world has seen a significant upturn in flood events, not only in Thailand, but also in many other countries in Asia. Some countries in Europe have also experienced severe flooding unlike in previous years.

The world is facing the problem of carbon build up and its effect on biodiversity; 20-30% of biodiversity are affected globally. The carbon cycle is increased due to the conversion of forest to agriculture, and the carbon balance of inputs and outputs (source and sinks) are now operating in an overcapacity situation, and traditional sinks, like the oceans and forests, cannot absorb the increasing supply of carbon generated from human activities.

There are systemic effects from the loss of biodiversity, starting at the core problem and going over the intermediate threats, underlying threats and interventions. There is still need for public awareness, as even though people do understand the problem, they still use natural resources in the same way because people need some form of income. As with the case of mangroves, there are difficulties because of the fact that most of the land may be privately owned and is used for agricultural purposes.

If the business sector understands the reason for green business then it will work; and particularly the role of manager is very important for this to happen. Research and development (R & D) leads to increase in rescue and recovery of waste products. This needs to be combined with land use zoning, but should be based on ecosystem management concepts.

Eco-tourism is now based mostly on enjoyment, not learning. This needs to change. In building capacity, there should be focus on competency building so that people can apply the principles of green economy for real. It will also allow people to understand the concept of limits. However, it is essential to have good data and information for rational decision-making.

Regarding the concept of‘Sufficiency Economy’, or ‘New Theory’ as it is called, involves land-use zoning on a ratio of 30-30-30-10 (pond-paddy field/mixed crop/animal husbandry). The Huai Sai Development Center under Royal patronage provides a good example of this theory, as does the Sirindhorn International Environmental Park (SIEP), which is involved in mangrove recovery. The crocodile population in mangroves, for example, has been greatly reduced due to its skin value. Now it is a value for tourism so the private sector stepped in to assist with biodiversity increase and recovery of the crocodile population. Biodiversity can increase if business also increases with the green area.

**3.4 DISCUSSION**

**Question 1:** Is there any role that government can play to support and strengthen social enterprise? And what is that role?

**Answer (Zinaida Fadeeva):** This is a complex question and is answered differently in different countries. One way the public sector could assist up-scaling of growth of social enterprise type companies is to make sure their capacity to make business strategies exist. Governments can establish schemes to help social and community enterprises to help stimulate the economy; communities often know the value of a particular innovative product or service for the community or tourists sector, but do not have the business skills needed. So business skill development could be provided as well as knowledge to access funding schemes.

**Question 2:** How do you see financing social enterprises that are ethical?

**Answer (Muanpong Juntopas):** Poverty is relative to the place; it is different in different countries. There is not always a good level of awareness due to the income/economic situation and infrastructure and efficiency of the city. We need to share understanding between the central and local governments. We also need to provide management and also consume less, and also need administration (what is in the waste need to be managed as there is more hazardous waste involved) along with the need to have more knowledge of what is in the garbage, for instance.

**Question 3:** I am interested in the “New Theory’ 30-30-30-10 zoning design. Has it been successful and productive in the long term?

**Answer (Sonjai Havanond):** With respect to the King’s initiative stemming from Sufficiency Economy; the 30-30-30-10 scheme depends on the area, so there is not an absolute rule to follow; but it provides guidance. The New Theory considers a natural resource management model to be self-reliant, and to cut the debt cycle, have more food security, and to take into consideration the appropriateness of the land area and social context in order for it to be applied. If you can reduce cost, you can have more self-reliance and can sell the surplus.

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**SESSION IV**

1. **Group Discussions I: *World Café* Conversations**

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**Moderator**: *Stefanos Fotiou, United Nations Environment Programme*

The final session of the day was a World Café exercise that allowed participant to share and discuss their own ideas regarding green economy via several guiding questions that were posed for discussion. Participants moved around the discussion topics sharing their opinions and experiences as well as their aspirations. The questions discussed included:

* Are there fundamental similarities and differences among the various concepts and initiatives discussed in the forum so far as alternative models of development? Can you identify common elements and differences of these concepts?
* What are the challenges and barriers to implementation of green economy in this region?
* What human resource skills are needed and what is the role of the education sector in green economy transformation;
* What should be the role of governments from the perspective of the business sector; And what importance do private-public partnerships and multi-stakeholder engagements take in this scheme?

At the end of the café conversations, each conversation group presented a summary of all the previous conversations around each of the four questions.

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**Day 2 – 7 October 2011**

**SESSION V**

1. **CONSUMPTION PATTERNS AND RESOURCE EFFICIENCY**

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* ***Chair of Presentations and Discussion:***

*Robert Steele, Systainability Asia*

* **Changing Consumption Patterns in Green Economy**

*Peter King, Institute for Global Environmental Strategies*

* **Green Growth, Resources and Resilience**

*Daniele Ponzi, Asian Development Bank*

* **Eco-Design and Sustainable Manufacturing**

*Anthony S.F. Chiu, De La Salle University; Asia Pacific Roundtable for Sustainable Consumption and Production*

* **Discussion**

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**5.1 CHANGING CONSUMPTION PATTERNS IN GREEN ECONOMY**

***Peter King***

***Institute for Global Environmental Strategies***

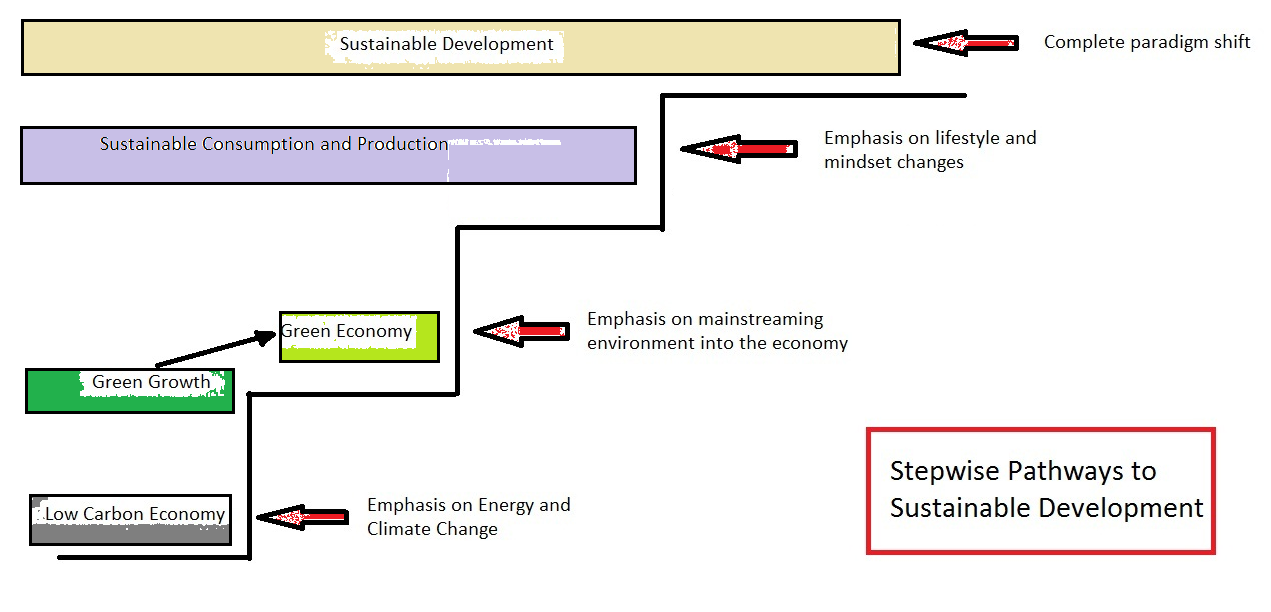
Sustainable consumption is “the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life-cycle so as not to jeopardize the needs of future generations.” Green Economy as defined by UNEP is “one that results in improved human well-being and social equity, while significantly reducing environmental and ecological scarcities. The Johannesburg Plan of Implementation (2002), and before that, Agenda 21, recognized that fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development.

UNEP’s stand is that green economy and sustainable consumption and production represent two sides of the same coin. They both share the same objective of fostering sustainable development. However, this is where further elaboration is needed. What is the difference between low carbon economy, circular economy, green economy, and many others? This can be thought about as a stepwise pattern of change because change is not easy. For a developing country it might be easier for them to think about changing toward low carbon resilience economy with an emphasis on energy and climate change first because it is aimed to the triple bottom line that companies buy into and it is worth doing anyway whether you believe in the green economy concept or not.

The difference between ‘green growth’ and ‘green economy’ is that green growth is the process that leads towards a green economy. Green economy is the goal perhaps of green growth and the emphasis here is on how to mainstream environment into the economy. Sustainable consumption and production is another step above that, perhaps this is the step that developed countries can immediately start thinking about moving forward, putting emphasis on changes in lifestyle and mindsets, thinking about why consume, what to consume and how to change behavior in relation to consumption because whatever one consumes, there will be somebody out there who will produce it. Ultimately all of these lead toward the ultimate goal, which is sustainable development, and that is the complete paradigm shift where people can then incorporate all of the lower steps toward changing the way societies produce and consume energy and other resources, and our impact on our climate.

The way economy, environment and quality of life are mainstreamed into development processes will show the way to change lifestyle and mindset/paradigm overtime. Of course one cannot wait for each of these steps to take place one at a time, rather one actually needs to start them all at the same time, some countries would be able to leapfrog some of these steps and hopefully achieve something closest to sustainable development within a reasonable time frame. Figure 7 depicts this sequence of steps.

**Figure 7: Steps to Sustainable Development through Green Economy**

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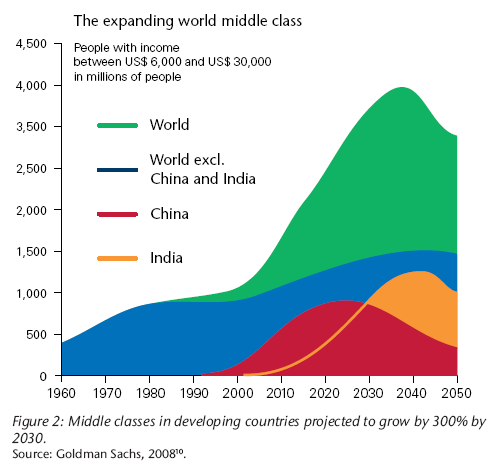
There are no universal criteria of “quality of life”, since it changes from culture to culture, from society to society, and sometimes individual to individual. One of the things to challenge environmental colleagues on is to ask whether they have been able to change the way people they are close to (e.g. family members, close friends, work colleagues) consume things, and in most cases, somebody so close to you is the one who is the most difficult to change behavior, and if one cannot change the behavior of their children, partner, what right does one have to imagine to be able to change the world.

Changing the way to satisfy the basic human needs (food, shelter, clothes, etc.), have companionship arrangements; going out drinking with friends, forms of companionship through the church and other places of worship, cultural, through community life and religious practices, and participation, health, rest and relaxation, recreation, personal development, reduced levels of stress, and high levels of job satisfaction, etc., All these are elements of quality of life, but it will be different for each culture and each individual. Individuals may argue for additional items, such as beauty, but these vary from society to society. A universal truth is consumption of material goods and services are never sufficient for human wellbeing.

From a book entitled “Theory of the Leisure Class” by Thorstein Veblen (1902), consumption is for both utilitarian and status purposes because one consumes to impress others, win a mate, or demonstrate position in the social pecking order. One also consumes for comfort, to relieve boredom, and to be entertained”, but increased consumption does not necessarily increase happiness or wellbeing, but certain level of money coupled with unhappiness may drive someone to consume more. Increased consumption can have major negative health impacts (e.g. obesity), which in turn may have negative environmental and social impacts.

The middle class is projected to grow by 300% by 2030 and most of that is going to take place in fast-developing parts of Asia in places like India and China in particular. China now is the world largest market for many things, including Rolls-Royce cars, and consumption behavior of the middle class in India and China is no different from the middle class in the US. They are consuming in exactly the same way and will continue to consume. Of course if they continue to consume like that there will be a need for another 3-5 planets just to provide the resources to allow that consumption to take place. With the business-as-usual scenario with the Asia population continuing to grow, the Ecological Footprint indicates that the world is now over consuming the planet’s biological capacity by August of each year and that timeframe is getting closer to the middle of the year, every year as time goes by. Possibly by 2015 a breakpoint sometime in July, the world will be using almost twice as much as the planet is actually able to provide.

It is important to understand the six Re-Philosophies, which are Rethink, Repair, Replace, Reuse, Reduce and Recycle. These are elements of the Green Economy. There is a need to think about the products being consumed in terms of a life cycle approach. Starting from natural resources, where do they come from, how are they extracted, what are the impacts of extraction, the mining and processing of raw materials, the design of production of goods, the packaging, distribution systems, getting it out to the retail shops, then to the final consumers, the use and maintenance of the goods and then final disposal to incineration or land-filling and some reuse, some recovery of raw materials but not much.



**Figure 8: The Expanding Middle Class**

The core of the change is the product re-design, designing the products in such a way that will have much lower impacts to the environmental profile. Think about the product chain and all of the people who are involve in getting those products to retail shops, consumers are simply part of the product chain. The question is, “can consumers actually be in the driver seat, can consumers drive the shift that is necessary in product chain?” And how it can be done?” Looking at the waste minimization pyramid where avoiding waste in the first place is the highest priority, reducing waste is the second highest priority, reusing the products is the third and recycle is the fourth. Consumers actually are in the driving seat in relation to waste minimization. When thinking about the law of consumers in changing consumption and production, consumers are in the key position, that is known, but how can they effectively make change?” One possible answer is that governments can actually shift the policy framework toward sustainable consumption. There are a wide variety of possible such policies, including some of the following:

Policy Shifts for Sustainable Consumption (breakdown by policy categories):

* Market-based – taxation, cap and trade, subsidies, incentives;
* Direct government intervention – green public procurement, stimulus packages, investment;
* Regulatory – standards, mandates, legislation;
* Information-based – certification, eco-labelling, product information, independent testing, education, social marketing;
* Voluntary – lifestyle changes, offsets, consumer boycotts, advocacy campaigns, socially responsible investment.

In developing countries, there is a need for smarter consumption and leapfrogging that is of most priority. On the other hand, in developed countries the need is to reduce over-consumption and try for lifestyle changes, like switching to the consumption of services rather than purchasing goods; e.g. like having a car-sharing system for electric cars in urban spaces (use public car-sharing service instead of owning a car).

A ‘green economy’ emphasis needs to shift to sustainable consumption and provision of information because more aware consumers are already changing production behavior and more can be expected in future. Also the policy challenge is to create the enabling conditions for more sustainable consumption (e.g. through green procurement) and monitor how production changes in response.

**5.2 GREEN GROWTH, RESOURCES AND RESILIENCE**

***Daniele Ponzi***

***Asian Development Bank***

**The Asian Century**[[1]](#footnote-1)

In recent decades, Asia has made remarkable progress. The region as a whole achieved a growth rate of 7% in the 1990s and around 8.5% in the 2000s, and recovered swiftly from the 2008–2009 global economic recession. This sustained and rapid growth has transformed Asia into a global hub of economic dynamism. Asia has also made significant strides in poverty reduction, halving the incidence of poverty from 1990. By the middle of this century, it is plausible that Asia could account for half of global output, trade, and investment, while also enjoying widespread affluence.

However, the promising prospect of an “Asia Century” is by no means pre-ordained. The region faces a number of converging challenges – including volatile food and fuel prices, persistent inequalities and economic uncertainty – that will cloud the regional outlook and complicate poverty reduction efforts. Meanwhile, there is great concern that the world is approaching dangerous “tipping points” or “thresholds” in natural systems, especially in regards to climate change and biodiversity loss. As we are all aware, many of Asia’s ecosystems are in decline due to poor natural resource management decisions and growing human populations.

**A Changing Regional Outlook**[[2]](#footnote-2)

Policymakers are operating in a rapidly changing economic reality – one in which economic strategies that rely on an unlimited supply of free or cheap resources will no longer be possible. Intensive resource use, rising energy costs, limited resource endowments, climate change and declines in the ability of ecosystems to provide critical ecosystem services, are all working together to expand environmental, economic, and social vulnerabilities and uncertainties.

However, these converging challenges have also given the region’s policymakers new opportunities to rethink development strategies. Conventional economic growth strategies are being replaced by new green growth initiatives, green technologies and new markets which are beginning to show that sustainable approaches to production and consumption are necessary and economically and politically feasible.

**Reversing the Resource-Intensive Pattern of Economic Growth**

Resource use has grown much faster than economic activity – there has been massive infrastructure development, rapid industrialization and urbanization, increased transport capacity, along with increasing per capita consumption. Asia has been the world’s largest resource user since the mid 90s. Starting from the year 2000, materials[[3]](#footnote-3) consumption in the region accelerated. In 2005, the region consumed 58% of the global resource use (or 35 billion tons) of about 60 billion tons. As the world faces increased resource constraints (i.e., peak oil, water limitations) and sink constraints (i.e., climate disruption, pollution), it is imperative that Asia economies continue to reduce resource-intensive patterns of economic growth.

**The Green Growth Imperative**

The choices that Asia and the Pacific make in relation to economic strategies over the next few decades are critically important for the future of the planet. Under a business-as-usual scenario, the region’s economies would continue to use relatively less materials, energy, water and land per unit of GDP – or achieve relative decoupling – but these efficiency gains will be unable to keep pace with growing populations and per capita consumption. As a result, the region would continue to witness a rapid growth (in absolute numbers) in material and energy use, along with carbon dioxide emissions. Such a path could lead the region, and the world, into deeper economic and environmental challenges.

Environmentally and economically sustainable growth can only happen through a second industrial revolution characterized by systems innovation, high resource use efficiency, and a greatly reduced reliance on hydrocarbons. Such absolute decoupling of economic development and resource use would involve large structural changes in patterns of consumption and production, affecting everything from how people are housed and get around to how water, energy and food are produced. This will require substantial changes in policies, economic behavior and societal aspirations to develop in a way that requires less materials and energy. Such a path should allow for higher flexibility and lower risks in the face of global environmental change and resource scarcity.

**Towards a Green Economy[[4]](#footnote-4)**

Green growth can be viewed as an economic imperative, as well as a significant opportunity for those countries that choose to pursue technology and policy innovations.

It is clear that similar or even higher levels of development can be achieved with reduced and more efficient use of natural resources. This may be particularly true for developing Asian countries. In 2005, China and India had material intensities, measured in kg per US$, of 9.42 and 6.84 respectively, while Japan’s was under 0.3. This huge “efficiency gap” represents a great deal of potential for these and other developing countries.

Countries can take advantage of the vast and growing global market for green goods and services. Environmental technologies, products and services have, in 20 years, grown to match the aerospace and pharmaceutical industries in size. Global estimated revenues were US$653 billion in 2006 and are likely over $1 trillion today. Developing Asian markets are accounting for a growing share of this total, with significant opportunities in emerging low carbon and alternative energy sectors. China, in particular, views clean tech as a growth sector and is aggressively moving forward to develop the market.

Second, the need for new infrastructure (transport, water, energy and other services) in the region opens up tremendous opportunities to design, build, and operate infrastructure on principles of sustainability, including accessibility, eco-efficiency, and social inclusiveness. ADB has estimated that, between 2010 and 2020, Asia needs to invest approximately US$8 trillion in overall national infrastructure. Given the lifespan of new infrastructure and the pace of development in the region, immediate action in this area is crucial so that countries can avoid becoming locked into new infrastructure with outdated technologies.

Third, policies and actions that promote green growth can also lead to more resilient economies and societies. A shift to greener growth can help mitigate the impacts of adverse shocks by reducing the intensity of resource consumption and alleviating pressure on commodity prices.

Finally, green growth has great potential to provide a clear and focused agenda of actions and policies, including those that are more “economically literate,” or that also promote economic benefits than has been the case in the past. Positive transitions can happen through a combination of fiscal reforms, more efficient pricing, removal of perverse subsidies, and better valuation of critical ecosystem services.

**Priority Steps and Key Investments[[5]](#footnote-5)**

On the policy side, green tax and budget reform is needed to change the enabling environment for governments, businesses, and consumers. This effort must include removing distorting subsidies. Pursuing green growth will also require political will and leadership, strong and predictable public sector management systems, appropriate levels of funding and a governance environment that fosters transparency, accountability and stakeholder consultation.

To promote technological innovation and green investments, collaborative action between governments and the private sector should focus on overcoming barriers and risks that restrict capital flows into the sectors that support green growth. Governments play an important role in providing incentives through clear regulatory and institutional frameworks for increased finance and for various partnership arrangements with clearly defined roles for all parties.

Regional approaches are also needed to govern the region’s rich and diverse natural resources and address shared challenges. This should include regional efforts to address environmental problems that cross national borders: dealing with serious transboundary air pollution and global climate change; managing cross-border rivers and protected areas; and controlling the transboundary movement of hazardous materials.

The scale of the challenges faced will mean gradual but inevitable changes in lifestyles. Political leadership and strengthened efforts to create awareness of the issues and solutions will be needed because the green economy will ultimately need to be built on reoriented values.

**Strategy 2020 – Increased Operational Emphasis on Environment**

Consistent with this “green growth” agenda, ADB will continue to strive to achieve poverty reduction in the region by promoting environmentally sustainable growth, including efforts to meet the climate change challenge. Under our Strategy 2020 vision, ADB will strive to protect fragile renewable resources, and fight a decline in environmental quality and a diminishing base of non-renewable resources. More specifically, we will focus on delivering results through three mutually supportive strategic directions: 1) promoting transitions to sustainable infrastructure; 2) improving natural resource management and maintaining ecosystem integrity; and 3) building environmental governance capacity.

**Investing in Resilience[[6]](#footnote-6)**

The Asian and Pacific region has made encouraging first steps towards green growth as a path to sustainable development. Securing such a future also depends on achieving greater resilience — the capacities to survive, adapt, and grow in the face of unforeseen, often sudden, changes.

A shift to greener growth can mitigate the impacts of adverse shocks by reducing the intensity of resource consumption, alleviating pressure on commodity prices and simultaneously fostering economic, social, and environmental resilience. Green growth in the context of resilience comprises various options such as economic diversification, energy security, ecosystem preservation, sustainable production and consumption; and investment in social capital. Such measures should be accompanied by efforts to deal with incomplete information and uncertainty.

Robustness (the ability of a system to withstand a perturbation without significant loss of performance), redundancy (developing a diversity of pathways for achieving the same goal), and resourcefulness (the ability to diagnose, prioritize, and initiate solutions to problems) are key principles in enhancing resilience to environmental, social and economic disturbances.

To become more resourceful, countries can explore “inclusive and adaptive” governance approaches that allow knowledge and flexibility to be integrated into the institutions that sustain societies in the face of complexity and change and promote resilience and transformation.

To enhance redundancy and ensure greater resilience, domestic policies should also encourage diversification in key sectors, such as industry, agriculture, and energy. To boost robustness, countries should consider taking a “no regrets” approach to climate change adaptation, among others. Such an approach involves taking measures that represent sound development practice as part of a broader effort to achieve inclusive and environmentally sustainable growth, rather than to wait for a perfect system of forecasting extreme events, such as climate change projections, before taking action.

**Final Thoughts[[7]](#footnote-7)**

Given the diversity of the Asia-Pacific region, there is no common blueprint that can be applied to all countries equally. Green growth strategies must be carefully adapted to national situations, and investments prioritized depending on specific environmental, social and economic contexts.

Governments will require vision and political courage to take on long-term issues with benefits that will not be realized until well beyond the next election cycle. However, they also have a responsibility to ensure that conventional growth strategies and patterns of resource use are not promoted in the guise of green growth or a green economy. While there is little disagreement that a change is needed, there is still significant uncertainty that implementing green growth strategies will ensure a brighter outlook for all. Thus, a greater commitment to accountability is needed that puts people at the centre of development. International financial institutions, development banks and local financing institutions will also need to take important steps to change investment paradigms to support government actions.

In any economic transformation, there will be short-term costs and winners and losers. Environmental and equity objectives can only be achieved simultaneously when reforms to achieve environmental goals are carefully designed. To develop the skills needed to succeed in a ‘green’ market place, retraining and various forms of support and benefits should be provided to workers affected by job losses. These efforts should take into account the present gender gap in economic activity, with women predominating in vulnerable and, especially, informal jobs. Ensuring a just transition should also include social assistance and welfare programs to help the most vulnerable groups.

Strengthened regional cooperation will also be essential. It is clear that developing countries need support and that any global discussion on green growth must not disadvantage developing countries. The potential for a global compact to support the most vulnerable must be explored. A package of innovative financing and measures to establish partnerships between developed and developing countries to close development gaps, deal with interlinked challenges, such as the food, energy, water nexus, and secure greater investment in human capital, based on a more realistic economic approach is needed.

**6.3 ECO-DESIGN AND SUSTAINABLE MANUFACTURING: LIFE CYCLE THINKING AS A GREEN COMPETITIVE STRATEGY**

***Anthony S.F. Chiu***

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***Asia Pacific Roundtable for Sustainable Consumption and Production***

**SCP and Life Cycle Thinking**

As the world recognized the growing crisis of unsustainable pattern of consumption and production, UN agencies have initiated various programs over the last 2 decades to respond to these two issues separately and as integral issue recently. Agenda 21 (Chapter 4.3), which is an outcome of the United Nations Conference on Environment and Development (UNCED 1992) further recognized such unsustainable pattern, particularly in industrialized countries, which is a matter of grave concern, aggravating poverty and imbalances.

One key initiative to address the issue of sustainable consumption and production (SCP) was the formation of the Marrakech Process, and it formulated the 10-year framework of program (10YFP). Sustainable consumption and production (SCP), among existing definitions, can be understood as “the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life-cycle so as not to jeopardize the needs of future generations.” This definition is somewhat widely accepted, as it was adopted at the CSD international work program in 1995 and borrowed from the Sustainable Consumption Conference in Oslo, Norway; 19-20 January 1994.



**Figure 9: 10-year SCP framework from Marrakech Process**

In the adopted 10YFP, the life cycle thinking consists of the core principle for SCP, as shown in the Figure 9.

The framework operates under enabling environment wherein policies and market are in favor for the SCP, as steered by the various stakeholders (e.g. national government, local government, consumers, industry and business, research institution, NGO, and others). It also takes two major factors; namely: technological innovation (e.g. factor 4, factor 10, factor X) and human values with sustainable lifestyle.

**Eco-design**

In the inner core, product design stands out as a primary beginning step for the entire life cycle. As the years go along in the implementation of cleaner production (CP), greening the supply chain (GSC), and SCP; project managers learned about the significance of the product / service design in the entire life cycle. Design can typically “lock in” way of consumption pattern of the product / service. For example, a building that is designed without window would require air-conditioning and lighting facilities throughout its entire consumptive life. Design also provides innovative values to the utility function as well as reduced environmental impacts throughout the entire life cycle stages.

A global picture of design-for-sustainability (DfS) is to close the loop of resource flow within the system, which can be interpreted as our eco-system. The hierarchical value of the resource can be translated to the market value or the willingness of market to pay. In the past 200 years of industrialization, resource flow has been focused from source extraction to production (of raw materials and finished products or commodities) and delivery to the consumer. After consumption, it is believed that the eco-system could naturally ‘digest’ our post-consumed resources – or simply called wastes. Over the years, the accelerated production and consumption pattern releases accelerated flow rate of post-consumed resources, way beyond the natural digestive system of the eco-system – or simply called carrying capacity. This scenario is now shifted from a linear resource flow to a closed-loop ‘roundput’ (term introduced by Korhonen[[8]](#footnote-8)). Ways to pursue this direction are 3Rs (reduce, reuse, recycle), more R’s (e.g. remanufacture, repair, re-value), extended producer responsibility (EPR), cascading hierarchical value re-use or recycle, etc. Several scholars and I have noted the technological constraint – and not mention socio-cultural constraint – to close the loop as we wish it should be. Resource properties such as fiber length limit the prolonged reuse of paper product as its higher value, for example. The role of design can be multi-directional, such as design for recyclability (DfR), design for environment (DfE), design for disassembly (DfD), etc.

**Life Cycle Assessment**

The one and only common tool used nowadays to evaluate the impact on environment of a product, service, or technology is life cycle assessment (LCA). LCA covers a range of environmental impact categories ranging from climate change, eco-toxicity, to acidification. The key tracer element here is the chemical releases in each stage of the life cycle of the product, service, or technology from source extraction, to production of raw materials, to manufacture of commodity goods, to logistics and delivery to consumer, to consumption, to waste management (e.g. collection, recovery, final disposal). LCA basically has many subsets of indicators; if one looks at the green house gas (GHG) tracer path, it will lead to the carbon footprint, for example. Other popular footprint indicators are ecological footprint and water footprint, of course, carbon footprint being the most popular one nowadays. LCA can also produce comparative values among different products of similar functions, and this is done based on singular functional unit of the compared products. LCA is widely accepted though researchers and users find it quite limitative. One scenario is that the other two pillars of sustainability; namely: social and economic, are not integrated. Researchers attempt to introduce social LCA (sLCA) but there is not general acceptance, such as the generic LCA (which is included in the ISO14000 series). Other limitations are the accuracy of data, which is geographically dependent or practice-dependent. Many LCA results use database built in commercial or popular software to overcome data insufficiency, yet the results may also yield confidence insufficiency. LCA is applied by industry for product superiority promotion, by government for sustainable procurement program, or by other stakeholders for various purposes. These different agenda also demand for different boundaries (of stages) in the LCA computation.

**Holistic System and System Thinking**

Eco-design and green manufacturing can truly be a successful sustainability tool when it influences vertical and horizontal integrations. Industrial Ecology - Science of Sustainability – applies eco-industrial development strategies to industrial clusters, parks, or cities and even larger systems such as a province. When resource flow is a ‘roundput’, and when only influx is renewable energy; sustainability can be achieved.

In late 90s, many UN projects discovered that improving sustainable production performances also led to rebound effects – which can an increased consumption. From then on, consumption and production were treated as two sides of the same coin. However, sustainable consumption has been approached from consumption of resources by the “producer”. The end-users, or consumers-at-large, consist also of the significant population among all consumers (of production resources). Further studies in consumption patterns from social science, behavioral science, and biological science would be necessary. I found Mesolimbic Dopaminergic Reward System[[9]](#footnote-9) in human the greatest barrier towards sustainable consumption. Probably, we can solve the problem more efficiently if we use system thinking.

**6.4 DISCUSSION**

**Question 1:** Is there anything in the ADB program/resources) that would enable people back home to understand how ADB assesses environmental investment, using typical terms like “return on investment”, “payback period”, “net present value”? I ask this because many of my colleagues are not that familiar with this new way of material flow, cost accounting, etc. In their mind (mindset) they do not associate the handling of waste with a product, and we put account for it as overhead cost or as a hidden cost. So I am wondering if there are any institutions that could provide some assistance or knowledge training on how we can change the mindset of conventional economic realizations to take into account this new way of looking at environmental investment.

**Answer (Daniele Ponzi):** We do have a financial economic analysis for all the projects that ADB has developed for our Board to approve loan or grants. We actually support a number of investments. We have a compulsory process to look at the environmental impacts through what is called ‘environmental safeguard’, which is essentially an environmental impacts analysis and environmental assessment. We have been doing this for decades in Europe and US, and it is increasing throughout the rest of the world in the past 20-30 years. International development institutions like ADB, the World Bank and others, have been increasingly introducing this assessment model to address environmental impacts in order to assess, prevent, mitigate and compensate affected people as much as possible. We are trying to actually minimize negative impacts.

We have come to use more industrial ecology engineering, environmental engineering or life cycle analysis methods and models in specific cases or specific types of cleaner production systems. At the project level this is not done so systematically, but we do have programs where we are supporting eco-industrial parks in various countries in North Asia and Southeast Asia. We also have been participating in some knowledge hubs like the 3Rs knowledge hub. In activities where we are actually supporting these programs, we are engaging with various partners (academic, research centers, AIT, etc.) towards this type of approach. With that said, it is likely that ADB is not really the best placed institution to do LCA, but we are doing part of this work and supporting progress of this type in relation to industrial ecological parks, or in term of programs, approaches, knowledge management and dissemination of research findings. ADB does also have capacity building type of approaches where we actually support various countries in this regards, even though industrial investment is not our forte, as we are much more involved in the infrastructure investment development side.

**Answer (Anthony S.F. Chiu):** In cleaner production there are 5 steps and usually the last step is to quantify everything into financial figures because that is still what business people are interested in looking at, and what they can understand. The method for accounting is more at the macro level and is important because it accounts for how much materials we consume in order to generate income in an economy. However, sometimes it is quite unfair to just use the material intensity factor because it does not really reflect the capacity of a system; i.e. meaning that China might have a low Direct Material Input (DMI) per capita GDP, probably number in using low (backwards) technology for the production process; that is one reason. Another reason is that there are at least 13 export industries from the west to the Asia-Pacific region, and they are not just producing for their own domestic use, but are producing to export back to Europe and USA. So MFA or LCA are good tools to provide a baseline reference for the bankers so that they can encourage the company to produce products more environmentally friendly. So also it encourages banks to provide low interest loans to businesses if they are able to comply with and work towards low energy and low material intensity methods.

**Answer (Peter King):** Japan is the most efficient manufacturing country; however last year they had a record for CO2 emissions. This indicates that even the most efficient country in the region, like Japan, is having negative impacts on the environment. So efficiency is only part of the story and we need to make sure that we are not getting carried away trying so hard to drive down efficiency but at the same time not addressing a general and overall reduction in consumption and the absolute decoupling.

**Question 2:** In talking about the financial situation – assuming that the notion and importance of ecosystem services increases more strongly – how do you recommend changing the consumption patterns that green growth and sustainable manufacturing, and particularly eco-design, seek to change?

**Answer (Anthony S.F. Chiu):** Right now, I am running a project in Vietnam with the tourism industry and I use the ecosystem services as support system as one answer to this question. If they do not have beautiful natural resources, clean river, then people will not come. For example, in Hoi-an city, which is a UNESCO World Heritage Site, they are now receiving 1 million tourists every year in comparison to 100,000 permanent residents. In this project, we stressed to the project partners the need to make sure that Hoi-an, as a site receiving World Heritage status, will preserve into the future, or else the entire tourist industry will collapse. It is difficult to quantify ecosystem services in that project, but people catch the concept easily and they feel ownership of their natural resources. The people within the local industry, meaning the hotel and restaurant industries are working closely with the local residents. It is a holistic effort partnering the community (the people’s will) with the local government (political will) working all together. It is not difficult to do in an industry that is relying on this type of asset. However, if we are talking about a more complex issue such as in a larger urban city, it is much more difficult. In China many environmental economists are working hard and successfully in proposing taxes based on the scarcity of the resources. They are using economic instruments (incentives and dis-incentives) to regulate the consumption of these natural resources so that it will remain within the carrying capacity.

**Answer (Peter King):** If we were properly recognizing the value of ecosystem services then we would have a completely different economic system in place than we do now. In regards to small PES projects, Vietnam is actually a country where we have done the most work. China is also doing quite a lot in this regards. They are coming close to fundamental realization that when we look at sustainable development, instead of thinking about the three pillars (Environment, Social and Economic), we should be thinking about environment as a foundation on which the other two pillars stand, and we need to change our mindset, our society and our economic systems, as all depend on the continual functioning and viability of the environment. Therefore, a company that is able to profit in the past by discharging waste and taking no account of their externalities are actually destroying part of the foundation on which their business depends. There is a change of mindset that is required, but environmental, social and economic are not equal pillars. Environment is actually the foundation for all.

**Answer (Daniele Ponzi):** The economic analysis guidelines/approach that ADB produced more than a decade ago included some of the environmental quality and quantity type of aspects in the economic analysis. For example, when there are number of infrastructure investments such as with the sustainable transport sector, you can then consider the improvement in air quality, which then also has a positive impact on health, and can be directly or indirectly calculated in terms of lost work time, productivity losses, sickness and absence from work days. Therefore, you not only reduce the health impacts, you reduce the congestion, reduce energy consumption and earn direct and indirect economic, social and environmental benefits.

**Question 3:** From a presentation called “Cradle to Cradle” by William McDonough & Michael Braungart, they stressed that this is the time to move away from eco-efficiency to eco-effectiveness. I would like to ask about this eco-effectiveness idea (i.e. ecosystem restoration and improvement), and how do you factor this in, and how do you go from eco-efficiency to eco-effectiveness?

**Answer (Anthony S.F. Chiu):** Ten years ago, we were talking about these three issues; eco-effectiveness, eco-efficiency and eco-sufficiency. From the industry-engineering point of view, effectiveness means moving in the right direction, efficiency means how fast you are moving to that direction. You may be moving very fast but to the wrong direction and maybe that is still called eco-efficiency. The most important factor in eco-effectiveness is that you need to find out what is your real goal, what is the right place that we have to go, and after we have identified the right path, that is the time we work on eco-efficiency.

In the past 15-20 years we have been working very hard on production, then in the early 2000s we found out, because of the rebound effect, that consumption is the by-product of eco-efficient production. So, now we are redirecting and integrating consumption and production as two sides of the same coin. We need more follow-up thinking (life cycle thinking is good but it is not enough but nothing better exist as yet). Eco-effectiveness is a very good philosophy but we do not know what the right place to apply to is. We also use a back casting approach because we need to stage first what we want to be the future state, and then figure out how we can go there. We need to involve many more professionals, because in the last 20 years we have pretty much only involved engineers. But as we are now talking about consumption, then we need to involve more people even the ones who are not directly in the picture like psychologist, behavior sciences, biologist, etc. After a real good discussion, then we need to identify where we want to go.

**Answer (Peter King):** In an industrial system the long-term goal has to be, ‘how do we mimic nature?’ in addition to ‘how do we end up in a situation where we have industrial ecology systems that can replicate the same processes as in a forest; i.e. where waste equals food. However, that is really what we do not know; how to get there. But we can set that as a goal, i.e. to get the right brains working in that direction. Then I think we have some prospect to make it happen. A good book recommended to everyone to read is entitled “Natural Capitalism”. It provides a lot of thinking behind the approach that treating nature as the model to mimic and replicate.

**Answer (Daniele Ponzi):** We do not really need to own everything that we use. We just need services, because we can also share ownership for things like cars. As an economist, the major challenge I see is how to actually shift some of the values (value added) that effectively corresponds to the income we generate. I think more in terms of the need to de-materialize: i.e. make things smaller and smaller, and maximize the services. Once the basic needs are satisfied and then we can certainly go to the direction where we still consider our shift to being wealthy and rich in a different way of lifestyle.

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**SESSION VII**

**BUSINESS, COMMUNITY AND SUPPLY CHAIN**

* **Chair of Presentations and Discussion:**

*Anthony S.F. Chiu,**Asia Pacific Roundtable on SCP*

* **Sustainable Production: Business Case I**

*Ekachai Ratanachaiwong,* *Toyota Motor Thailand*

* **Sustainable Production: Business Case II**

*Rob Coombs, President Asia Pacific, InterfaceFLOR*

* **Sustainable Supply Chain and Logistics**

*Mario T. Tabucanon, United Nations University Institute of Advanced Studies*

* + - **Discussion**

**7.1 SUSTAINABLE PRODUCTION: BUSINESS CASE I**

***Ekachai Ratanachaiwong***

***Toyota Motor Thailand***

Toyota Motor Thailand (TMT) was established in 1962. It currently has three plants in Thailand. The first is Samrong plant located in Samut Prakarn province, which mainly produces export vehicle of 1-ton pickup. The second is a ‘gateway plant’ located in Chachoengsao province and which mainly produces passenger cars. The third is the Banpho plant located in Chachoengsao province as well, which mainly produces 1-ton pickup and PPV Fortuner. In total, TMT’s capacity is 680,000 units/year, and the overall manpower at the end of August 2011 was 15,400 persons.

In terms of energy efficiency and environmental impact reduction, TMT has implemented energy saving and environmental protection activities for several years. In 2006, TMT launched “Toyota Global Vision 2020” which aimed to balance cycles of industry and cycles of nature in response to global warming and in line with the United Nation’s climate change policy. Implementation of the ‘Toyota Global Vision 2020’ is through its entire network, which covers suppliers and dealers, known as the Toyota Eco-Network.

The first activity was the “Toyota Earth Charter” which was implemented in 1992. At that time, “Zero emission” was the long-term goal. So, the company needed to find and develop its production technology to reduce environmental impact. This means that TMT will not only follow the local regulation of the government, but also try to do better than the requirements (i.e. beyond compliance). In addition, TMT cooperates with every organization or even individual to create better environment than today according to its business operation. This policy was also put into practice on hazardous waste and general waste, respectively.

TMT has achieved “Zero landfill for hazardous waste” since 2003 and achieved “Zero landfill for general waste” since 2005, and achieved quality management system certification ISO 9000 since 1997. TMT was the first company in the automotive industry that acquired this certification in Thailand. Furthermore, TMT was also the first company in automotive industry that acquired ISO 14001 certification in Thailand since 1997 and has expanded the certification to the entire Toyota Network.

In 2001, TMT was the first automotive manufacturer in Thailand that acquired the certification on occupational health and safety management system. In the launching of “Toyota Global Vision”, there is “Toyota Environmental Management System” or Toyota EMS, which was launched since 2002. In Toyota EMS, there are three key pillars that are of concern to the environment.

The first pillar is “Compliance and No complaint”. This pillar concerns pollution from industry that can affect air, noise, water, odor and vibration. As mentioned before, TMT has a beyond compliance policy, so all the government standards are controlled at 20% stricter than the requirement. An example is about how air emissions are controlled at TMT’s welding shop. They installed wet scrubbers into the venting system which can reduce 80% of welding fume, all particulate and toxic gas. Furthermore, the fumes trapped are collected and treated in the waste water treatment plant.

The second Pillar is “Minimization of Environmental Risk”.TMT utilizes four main types of equipment to minimize environmental risks with respect to soil and groundwater contamination prevention, mostly by use of different treated double-wall tanks, sump pumps, underground press pits and other equipment.

The third pillar is “Number One in Environmental Performance in Automotive Industry”. This pillar is focused on the energy and natural resources which generate CO2, Volatile Organic Compound or VOCs, waste and water consumption. There are three main activities to improve TMT’s key performance indicators (KPIs). These are: first is through efficiency improvement in equipment, second is loss prevention in process, and third is build up environmental consciousness among our employees.

TMT is reducing its CO2 emissionsthrough the use of a co-generator for electricity generation which utilizes natural gas whose unit price is cheaper than other fuels and also can reduce CO2 emissions by 8,500 tons/year. In addition, the exhausted gas can be used for steam power and as a heat exchanger for the cooling system.

Another example is regarding environmental management with TMT’s paint shop. Previously, they had to open all units of the compressed air at the same time. This was improved by installing an individual switch to each air compressor, thus the plant can operate the air compressor unit as required during holiday.

With regards to human behaviour, TMT has conducted CO2 reduction training to motivate an energy reduction mindset amongst employees. They have also conducted energy reduction contests among the Samrong, Gateway and Banpho plants to motivate employees to participate in energy control. Since 2003, TMT has reduced CO2 emission by 270,000 tons. The energy management inside success of TMT’s plants have been recognized by the Thai government through national awards as well as an award from ASEAN.

For VOC reduction, TMT focuses on equipment, process and material. Originally, the plants had to flush every time when changing the color. So they reduced flushing of thinner by color grouping which results in an estimated reduction of 66% of flushing thinner. With regards to material use, they have changed from solvent to waterborne paint, which has reduced VOCs by 40%. Toyota Banpho is the first automotive manufacturer in Southeast Asia that has used this environmental friendly technology. Since 2001, the plant has reduced VOC emission by 36 gm/m2 of painting surface.

With regards to waste reduction, TMT focuses on the 3Rs (reduce, reuse and recycle). TMT utilises big metal scrap pieces left over from the production process to produce smaller parts. This can reduce scrap by about 25 kg/unit. They modify their sludge farm to reduce the water content by drying sludge an additional 5 – 7 days at 37 – 50 oC. This can reduce water content of sludge, which reflected in sludge’s weight reduction by 50%. Since Y2001, TMT has reduced waste by 9,000 tons.

For water consumption reduction, TMT also focuses on the 3Rs. Firstly, reduction is carried out at the paint process, as TMT has changed from wet sanding to dry sanding process. In addition, they have changed from air sander to manual sanding which also saves energy. For reuse and recycle of treated water, about 40 to 60% of treated waste water is recycled and reused such as RO water and another 10 % is reused for gardening and toilet flushing. Since 2001, TMT has reduced water consumption by 2 million m3. The Toyota Global Vision in TMT is strongly supported by every successive president since 2002. Thus, leadership makes a strong and visible commitment that permeates the whole company..

The final key part of TMT’s sustainability program is the Eco Network in Logistics. There are three main activities under this program to reduce CO2 emission.

* First is milk run - The part logistic from supplier is changed from individual supply by each maker to milk run system in which a truck provides part pick-up from several suppliers and deliver to our plant. By applying milk run, the energy consumption on part moving can be reduced and also reduce the stock area in the plant.
* Second is reduce distance - The new car delivery to dealer is done by zoning and grouping dealer in same area same as milk run. By implementing this project in all regions, there is reduction in total running distance of 126,000 km./month and reflected to CO2 reduction about 90 tons/month nationwide.
* Last example is increasing loading efficiency by implementation of Toyata Poly box for new Corolla model at G/W. From this activity, there can be reduction in truck frequency around 386 trips/month and reduced CO2 emission around 47 tons/month.

TMT implemented waste reduction activity in logistics by re-using returnable module which can save 2.5 MB/month and reduced steel waste about 1,800 tons/month.

For Sustainable production activities with suppliers:TMT has two main activities.

* First is ISO 14001 expansion to all suppliers, which has been already achieved since Y2009.
* The second activity is CO2 reduction activity. The entire supplier network are asked to implement 5 kaizen / supplier / year. Therefore, there will be annually 1,000 kaizen activities in our supplier network.

Sustainable production activities in dealer:TMT has 2 main activities.

* First is ISO 14001 expansion to dealers. Currently, 90% of TMT’s dealers are already certified.
* The second activity is CO2 reduction activity. Currently, TMT has shared the best practice from TMT and previous successful dealers to the other dealers in order to encourage the implementation of the CO2 reduction activity.

Environmental social contribution: TMT has three main activities.

* The first activity is Stop Global Warming Project. TMT has cooperated with Thailand Environment Institute to encourage schools, communities and local governments to initiate concrete actions to reduce the effect of global warming. There are 4 main themes of these activities. They include energy saving, waste reduction, sustainable transportation and increasing green area. By implementing these in the project in the past 6 years, TMT has encouraged 135 municipals and 170 schools to participate, with 684 projects implemented resulting in an overall reduction of 7,500 Tons CO2.
* The second activity is establishing environmental education learning center for integrated learning of young generation. There are two main types of learning centers. The first one is an ‘ecological learning center’ which there are three, and they are located respectively in Samutprakarn, Petchaburi and Toyota Banpho Plant. The second one is the ‘global warming learning center’ which located at Nakorn Sri Thammarat and Lampoon.
* The last main activity is eco-forest plantation. TMT has implemented the first eco-forest plantation since 2008 by applying Prof. Dr.Miyawaki’s method in which native forest are created in shorter time. There were 13,000 volunteers from Toyota network including Toyota family, dealer, supplier, NGO, government sector and local communities that collaborated in planting 100,000 trees within a day.

TMT has expanded the eco-forest plantation and supported seedling to their network such as dealers, suppliers and communities by aiming to achieve 1 million trees plantation within five years or within 2012.

**7.2 SUSTAINABLE PRODUCTION: BUSINESS CASE II**

***Rob Coombs***

***InterfaceFLOR Asia-Pacific***

There is concern about the negative image that “sustainability” has in certain business quarters.” If one thinks of the word “sustainability”, what most people think of is ‘sacrifice’, which does not attract many people, even if it is about doing the right thing, which is good. But what if it does not need to be that way? What if sustainability - i.e. more sustainable business solutions - were exciting, interesting and sexy even? That would make a difference.

For the past decades, Interface has been trying to reinvent the company by creating a sustainable business model – a better way to a bigger profit – in what Interface refers to as their “Mission Zero”.

Interface is a global, American-owned, public company. Its business is based on design excellence and focused on the commercial interiors market. Interface’s core business is the manufacture of modular carpet sold commercially for offices, schools, hotels, hospitals and so on. Interface’s annual revenue is over $1 billion and the company is 40 years old, manufacturing in four continents including Asia-Pacific, with plants in Thailand, China and Australia. The company is particularly design-focused, but does have a large environmental footprint due to the fact that Interface is petrochemical and material intensive and is part of an old, traditional industry – textiles.

For the first 25 years, the company and its management thought very little about its environmental impact other than about the need to comply with local laws. Interface’s journey started with a realization that one day, people will go to jail for environmental impacts. This essentially was the awakening of Ray Anderson, Interface’s Founder & Chairman in 1994. He came to this realization while reading a book by Paul Hawken entitled the ‘Ecology of Commerce’. Hawken’s book highlighted the degree to which natural systems were in a state of decline and showed the degree to which business and industry were at the heart of the problem. It branded Interface as one of the earth’s plunderers and showed how its business model was completely out of step with nature. The Interface founder had his spear in the chest moment. He had his ‘mid-life correction’ at the age of 62 and from that point onwards, he led a root and branch change in the way Interface thought and operated.

The transformation of the company has been based on three fundamental beliefs, namely: 1) that the carrying capacity of the earth is insufficient to support the way the world produce and consume; 2) that the industrial revolution of the 1700s spawned a business model totally out of step with nature and therefore working against it; 3) that business has created many of the environmental problems faced today and therefore, business is the only institution capable of fixing it. And it is accountable.

Interface created a vision of a sustainable company in all its dimensions. They talked about showing leadership by example – by doing. This is like a journey to climbing a mountain, with the peak of the mountain denoting zero environmental footprint. This is what Interface refers to as their ‘Mission Zero’ journey, meaning zero waste and zero harmful emissions. The journey is based on three areas of focus that have remained intact since 1996: reducing the company’s overall ecological footprint; closing the loop on product; and creating a culture for that to take place

A range of initiatives has been implemented over this time including those focused on eliminating waste, working with suppliers to secure the ‘upstream multiplier effect’ creating carbon neutral product and adopting ‘biomimicry’ as a key part of the business model.

In terms of performance and reaching their ‘desired state’ as emphasized in an earlier session, Interface was about half way there across a range of environmental measures and at the same time revenues and profits are up significantly. How did they do it? Through leadership right throughout the business at multiple levels, and by engaging outside experts and by starting with one focused issue – waste - and by measuring it and holding people accountable for improvement and gearing reward systems to the outcome. It has also been important to realize that one person, or one company cannot do it alone. Partnerships are crucial to be successful. Just as important was the discovery that the business case for sustainability is very strong, in that the company’s costs are lower, their products are better, they have many more customers, and Interface is able to attract and retain great people.

Interface’s fourth belief is that they have come to over time, and that is the real kicker; i.e. when a business focuses on its environmental and social impact as well as its financial results it will do better in all three dimensions. The ‘triple-bottom-line’ is not a compromise; it is mutually supportive. Interface is a business half way to Mission Zero – the last half of its journey is still in front. It plans to be there in nine years and that will not be easy. But the Power of Zero is known. What is more, it is real and it is achievable.

**7.3 SUSTAINABLE SUPPLY CHAIN AND LOGISTICS**

***Mario T. Tabucanon***

***United Nations University Institute of Advanced Studies***

**Sustainable Production and Consumption and Supply Chain**

Sustainable development entails societal changes - in peoples’ living and working styles; in enterprises doing business; and in sustainable production and consumption. When it comes to corporate sustainability strategy, the supply chain is usually the ‘weak link’ due to uncertainties in many partners and much information about them may not be clearly known. Supply chain refers to the entire connection from the customer to the source of primary input materials covering all the intermediate connections including vendors and suppliers. The whole chain is thus viewed ideally as a system with all the interrelated parts forming a network of entities through which material flows, which may include vendors, carriers, manufacturers, distributors, retailers, and customers.

Supply chain success ought to be measured in terms of supply chain “sustainability” and not in terms of the traditional measure of profitability. “Sustainability” takes into account the Economic, Environmental and Social considerations of the business and its impact. Sustainable supply chain entails sustainable production on the part of all enterprises involved in the chain. Ideally, sustainability of the chain is the ultimate objective of the supply chain system not necessarily only that of the individual businesses. Enterprises should report their environmental and social footprints (e.g. “carbon footprints”, etc.) and ask their suppliers to check their supply chain to do the same. Enterprises should publish ‘Sustainability Reports’.

**Vendor Selection Problem**

There is a compelling need to evolve strategic alliances with the vendors. Vendor selection deals with the selection of right vendors according to the sustainability criteria - Economic considerations, Environmental sustainability practices, and Social responsibility practices. Vendor-based evaluation is needed to identify better performing vendors in a supply chain. An efficient vendor selection methodology selects the best vendors. Executives related to the vendor selection decision cannot be dishonest or biased in dealing with the vendors. The primary use of the vendor selection problem (VSP) methodology is to objectively compare the performance of the different vendors and allocate the quota according to their performance.

The VSP can be used as a feedback to the vendors for improving quality of their product or service. It can generate competitive environment within vendors. It not only enables the organizations to know the performance of their vendors, but also gives and idea as to how much they outperform their competitors.

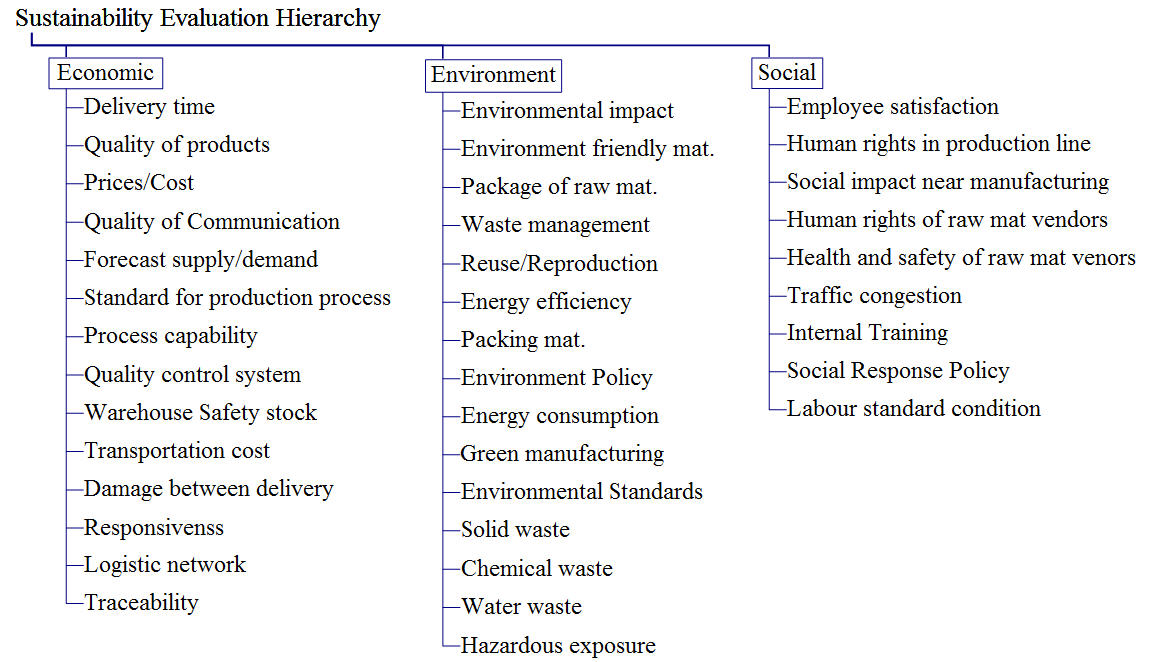
Acquisition of goods or services should take environmental elements into account: e.g. product criteria (such as recycled content, energy and/or water efficiency, organic or fair trade origin, etc.); facility criteria (such as energy efficient buildings and construction, waste recycling facilities, etc.); and supplier criteria (such as certified environmental management system, local “content”, etc.).

***Development of an Evaluation System***

Every part of a supply chain system, from upstream to downstream, ought to embrace the pillars of sustainable development (SD) - Economic, Environment and Social. Every part of the supply chain activity must capture this triple-bottom-line of sustainability. The methodology described below can be applied to various kinds of business decision-making problems including vendor evaluation system, business unit and self-performance evaluation.

**Developing Criteria Hierarchy**

The company chooses key criteria as sustainability indicators. Stakeholders are expected to brainstorm on the SD concept and put things into proper sustainability perspective. A sample hierarchy is developed in a framework shown in Figure 11. The company may choose to have a more elaborated version.



**Figure 11- Sample of New Sustainability Evaluation Hierarchy**

**Finding the Champion**

This step uses the Analytic Hierarchy Process (AHP) methodology to determine the ranking of criteria and to find each ‘champion’ in SD context.Of the entities or decision-making units (DMUs) being evaluated, the best for each criterion (Economic or Environmental or Social) is known as the ‘champion’ for that particular criterion. The champion may be different for each criterion. A questionnaire is used to determine the intensities of the importance of criteria by using pairwise comparison among the three main criteria. Expert Choice (EC) Software version 11.0 is suggested as a tool.

From the AHP results, the company can determine the preference of all criteria in each context – Economic, Environmental and Social. The company can choose the key criteria to be used in the next step. After choosing the key criteria, the next step is to use AHP to find the new ranking again that the company can use in this model for evaluating the entities or DMUs. From the datasheet taken from inside information, and datasheet taken from the supplier side, AHP is then used to determine the champion for each issue (economic, environment and social). The final AHP ranking of all citeria and for all suppliers is created. The champion of each SD context is also determined.

**Creating the Ideal Sustainability DMU**

This is development of Ideal Sustainability DMU (ISDMU). In this step the company creates a new ideal DMU, which is the best in any field of all criteria. ISDMU is an imaginary entity or DMU with attributes corresponding to the attributes of the champion for each criterion (economic, environmental or social). The step to develop the Ideal Sustainability DMU should have key stakeholders in the company involved in the process including top management, line managers and purchasing manager. The indicators of all criteria can be both qualitative and quantitative, some numerical some are not. For the qualitative data the model uses pairwise comparison in AHP technique. After pairwise comparison, the indicators of ideal sustainability supplier with current real suppliers are determined.

**Finding the new ranking including ISDMU**

After using pairwise comparison, AHP results are obtained including Supplier X (the Ideal DMU). The new Ideal Unit has both qualitative and quanitative features.

**Finding the relative efficiency of all DMU compare with ISDMU**

The company needs to know the efficiency of all suppliers with respect to the ideal one. It is useful to know the status of suppliers or any partner entity and how they can strategically improve or develop in the long-term. But the limitation of the AHP technique is that it is unable to compute the efficiencies of these entities being evaluated; the AHP result can only reveal the ranking score. An important tool to measure the efficiency for multiple data is Data Envelopment Analysis (DEA).

The principle of the DEA technique is to find the relative efficiency by using the linear programming technique with multi-input and multi-output data and information. After determining the ideal sustainability entity or DMU, the result is used as multi-output for the DEA technique. In addition to the multi-input data used from the step to find the champion, a questionnaire is used to pairwise compare the champion with all criteria and with the ideal entity or unit for finding the multi-input data. This step will enable one to know the policy of top management in respect of its sustainable development vision. The DEA results can show the efficiency of all entities compared with the ideal sustainability entity or DMU.

**Applications**

The model developed was applied to three evaluation problems in the context of sustainability. These are evaluating suppliers in a motorcycle assembly plant, evaluating the different business groups of a large company, and evaluating the temporal patterns of growth in a particular multinational computer business.

Vendor Evaluation Case: The case was a motorcycle assembly plant in Thailand having many parts from hundreds of suppliers, and the company works closely with their suppliers. This is in a way a model company as far as good relations with suppliers is concerned.

Business Units Evaluation: In large companies they normally divide operations in their group into smaller business units or business lines. This kind of set up helps them to manage and control the business more effectively and efficiently. This case applied the model in evaluation of business units within the same group of companies.

Evaluating Sustainability in an Enterprise: A company concerned about sustainable development concept will have to do some monitoring on business sustainability. Some companies have a sustainable development report and a systematic way of recording data which they produce and publish every year. The case study used the model for evaluating sustainability business and to determine progress annually over a period of time.

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* 1. **DISCUSSION**

**Question 1:** In Japan, we know thatlegislation and policy has driven a lot of improvements in the industrial sector: the extended producer responsibility system, the end of life vehicle act, etc. Does Toyota in Thailand adopt the same practices as companies in Japan, and what is the motivation to do so, knowing that other companies have lower standards when they are operating in developing countries than they do in their home country? I’m wondering if Toyota operates with the same standards even if policies and legislation do not require.

**Answer (Ekachai Ratanachaiwong):** If you look back to 30 years agowhen Toyota entered to this region, at that time the sales volume was quite low and not profitable if compared to USA and Europe. Even though the European division did not get much profit, the situation was better than here in Asia. In the current economic situation around the world, Toyota has problems in several regions, for example, economic downturn in USA and economic crisis in Europe. So, now everyone is looking at Asia-Pacific. In the last 4 years, Toyota has established their regional headquarters for engineering and manufacturing support area in Thailand. Toyota aims to strengthen all the regional countries to be the future production based for the global market because of the competitiveness in labor and resources as well. However, there are many regulations about the automobile industry and the environment. For example, the EU is soon to launch the list and implement it to the whole entire business. Toyota is watching this problem carefully and is now making a plan how to develop this region to be in the required regulations to survive in the global market. Now we are developing our resources, especially about the production efficiency. Each country will produce what is required locally for manufacturing. We are trying to test the human resources’ ability to be competitive to Japan Manufacturer. However, I think we are still far away from that target.

**Question 2:** Does Toyota Thailand have any management or follow up systems to control the emission from the Toyota cars after using for many years because I think some Toyota car after use for several years the burning system or some emission from the car might be changed. So, do you have any policy or management to control this?

**Answer (Ekachai Ratanachaiwong):** About how do we handle our products after sale and life-end, the Thailand government has regulations on this, but of course, compared to Japan it is still very far off. Of course, all regulations are about how to control which recently most concern in the emission of the product before sale. In this regard, we are able to keep improving our products, which allows us to penetrate to the USA and European markets. However, for end-of-life vehicle, they still have resale value but I do not know exactly where those vehicles that cannot run anymore go. Recently, there are two companies in Thailand that take the expired car and make to scrap cube by using a pressing machine.

The most important is the regulation of government because we have to be competitive with our competitors. So, what kind of expense that might cost us to lose competitiveness we have to consideration very carefully.

**Question 3:** For Interface -Are there any difficulties to make your organization achieve the “Emission Zero”?

**Answer (Rob Coombs):** The main challenges to get the Mission Zero are: Firstly, we must continually try to find better ways to do things when we are up against the current way of doing things, the cost which are artificially low. For example, in trying to find solutions to petro-based materials, when cost of oil is artificially low due to subsidies, there are an entire range of economic challenges that exists because the externalities are not factored in. The second challenge is technology when it comes to purchasing, recycling, and finding new material sources. There will continue to be new challenges but over time they are addressed one by one. The third area of challenge is around people. When a journey takes 25 years, it is not easy to keep people on track, to not give up, and to understand why we stay the course and are still committed.

The second and third challenges are internal. I think the only two ways of economic challenges to be addressed are; either when we start to run out of the bad materials and the bad way of doing things, and that will accelerate the change process, or some kind of government action to redress the cost of externalities.

**Question 4:** What are any other applications for the supply chain methodology; any examples available?

**Answer (Mario Tabucanon):** Firstly,The main application of this methodology is vendor selection. Secondly, it can also be used to monitor different business lines of a company. The Siam Cement Group has published their sustainability report. We took whatever data in their sustainability report and used in the model to evaluate several business lines (paper, cement, construction materials and so on). So, we used the business lines as the decision-making units instead of vendors. The different lines were the focus of the evaluation, so we were able to determine which business unit is better in which aspect of sustainability. So, we could share information and they will be learning from each other. Thirdly, the application was to monitor the progress of one company over time as far as sustainability is concerned. We took data from sustainability report information and data of HP. Instead of vendors, one year is used as decision-making unit. So if you look at the record in last 10 years then you have 10 decision-making units. Over the years you are able to monitor the progress of a particular year or a particular sub-criterion within the framework of sustainability. In this case, the model can also be used for planning purposes.

**Question 5:** Business is considered to be a very strong player in transition to Green Economy. From the perspective of your company and sector what is the biggest leverage potential to move towards green technology? What are you missing still to go towards this pathway? And how public sector could help you to address it?

**Answer (Rob Coombs):** The biggest thing and the most important thing that individual businesses can contribute is to demonstrate that you can run a business differently, in a much more sensible way, much more sensitive way. In so doing, you can still meet the more traditional measures that are only in place. You can be more successful operating in a more sustainable fashion and when you get beyond the talk, the most important thing a company can do is to demonstrate that there is a much better way to make more money - demonstrating by doing. What is business missing, the only thing out of our control, is those external factors that lead to a situation where the market is not correctly pricing bad behavior. Good businesses need authority to help to solve that problem. Bad behavior needs to be priced effectively.

**Question 6:** Considering your being operating internationally and the externalities are not priced in the same leverage in different countries of your operations, would your company be crafting different strategies to meet those challenges and competition?

**Answer (Rob Coombs):** We are going to get on with it anyway. I do not think we have been or will be affected but the companies that are less advanced in this regard. Anyway, I think it would help considerably to come to the party if I would deal with the reality of the competitive cost scenario. As one of the earlier movers in this area, I do not think we wait for the government to think. I think business gets up there first and respond to the market and customers and that is what we have done. So, it is not change our behavior but it will certainly encourage other to be involved.

**Answer (Mario Tabucanon):** The customers of universities are the business people. So, we have to deal with the issue of curriculum development. Eventually these people will be leaders in the businesses. If we reform curriculum of business schools, for example, curriculum of engineering school, so that we embed sustainability into those people, then it will help when they come to the business, it will be easier for them to implement or apply the knowledge they learnt. The United Nation University (UNU-IAS) has a network of higher education institutions in Asia-Pacific with the main purpose to integrate the sustainability into curricula and research, we called “ProSPER.Net” (The Promotion of Sustainability in Postgraduate Education and Research Network). The purpose is to change the way higher education institutions teach and do research. By doing so, we are actually preparing these graduates on sustainability paradigm before they go to the real world. We need to have partners in designing the curriculum and we need input from businesses.

**Comment (Justin C. Alick, UNESCO Bangkok):** How and what role public sectors have in greening supply and demand chains across the Asia region? I think the private sector is important but also the government as an entity and what is the role of government as an entity, being a massive of carbon emission, being a big consumer from the private sector. There is a study about the United Nations itself emitted to same amount of carbon as the country of Laos where there are 6 million people. There is room for governments to put themselves in the role of proving the concept on how to green supply and demand chains. It is something that is not just for the business that can pave the way for this but also the government as well. It does not involve more regulations or environmental trading systems or whatever.

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**SESSION VIII**

**PANEL DISCUSSION ON ‘GREEN INVESTMENT’**

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* **Chair**: *Stefanos Fotiou, United Nations Environment Programme*
* **Panelists’ Presentations**
* *Daniele Ponzi, Asian Development Bank* *(presentation made in Session VI; joined the discussion)*
* *Songpol Chevapanyaroj*, *Kasikornbank, Thailand*
* *Irdika Mansur, SEAMEO Regional Centre for Tropical Biology (BIOTROP)*
* *Sirithan Pairoj-Boriboon, Thailand Greenhouse Gas Management Organization*
* *Martin Krause, United Nations Development Programme (UNDP Bangkok)*
* **Panel Discussion**

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**Chair’s Introduction**

Key questions: Why green investment and financing? Due to the need to upscale green economy projects, where / what are possible opportunities, frameworks and challenges for up-scaling and mainstreaming green investment?

The first panelist, Daniele Ponzi, having spoken in an earlier session did not make another presentation but directly joined the panel discussion.

***8.1 Panelist: Songpol Chevapanyaroj***

***Kasikornbank, Thailand***

Green investment is part of the Kasikorn Bank’s business strategy to support Thailand’s sustainable development. Its Green Strategy is based on the three pillars of sustainability as shown in Figure 12.

**Figure 12: Pillars of Sustainability**

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The bank’s Green Investment strategy translates to mean Environment plus Business. There are four focus areas of investment:

1. Renewable energy market size is approximately 319 billion baht. Energy investment from the renewable resources such as solar energy power plant, biomass power plant, biogas power plant, wind and water power plant.
2. Energy efficiency market size would be about 25-30 billion baht, would be the modification and replacement of inefficient energy consumption
3. Cleaner Production
4. Carbon Credit

Figure 13 shows Kasikorn Bank’s green road map, which they started with their own principles to give the organization the road map to look at the environmental and social responsibilities until being able to fully endorse the equator principles. Kasikorn had not yet implemented the equator principles but that they are in the process of applying it and to see how they can use the equator principles for their business operation. The goal would be to become as green as possible and the bank’s mission is to be the first mover in “providing green investments to ourselves, our customers and our society.”



**Figure 13: Kasikorn Bank’s Roadmap**

The bank’s third headquarters building was recently renovated from a building that was designed to be a factory, but has never been used for that purpose. The bank purchased it and turned it into their head office. This building was recently awarded a LEED Gold certification for energy savings. The building can save electricity consumption by 30% and can save water consumption by 50%. Kasikorn joined with EGAT (Electricity Generating Authority of Thailand) to change all the light bulbs in all branches and buildings that they owned and have saved almost 30 million baht/year on their electricity charges. The bank also joined the renewable energy expansion in Thailand with investment and development of the largest solar farm project financed in Thailand.

The bank joined with AFD and applied the ATM on the Carbon Footprint. As the solar farm would be one of the area of focus on and also AFD on the K-Green hotel loan, which provides lower interest loans to the customers with an aim to help them achieve better saving for their operations. The bank had joined with two ESCO companies (Johnson Control and Schneider Electric) in providing energy saving improvement like Johnson Control and Schneider in order to help the customers to provide the guarantee savings to the company. The bank also gives loan to the customers. The loan would also be interest-free for 6 months, after which the prime rate decreases to encourage companies to join.

Thailand’s energy intensity is still very high and the forecasted energy demand in the future is also very high. Kasikorn Bank strongly believes that it can be an important player to help entrepreneurs, the business community and individual companies to achieve a better overall business based on a green approach. The bank leads by example in going green by looking closely at their own energy and carbon footprints and how they did business on every day-to-day basis, because “if we can prove that we can do it, we can relay this message more easily to our clients.”

***8*.2 *Panelist: Irdika Mansur***

***SEAMEO Regional Centre for Tropical Biology (BIOTROP)***

Mining is a very important industry in Indonesia, nationally and locally, especially for income it provides to the country (via taxes and royalties) and to remote areas by way of community economic development. Currently, there are more than 3,000 mining operations that produce more than 300 million tons/year of ore. However, almost all mining industries have been regarded as environmentally destructive because the process that they currently use requires that they have to remove all the biodiversity, remove vegetation and potentially causing pollution (water, soil air and noise) and changing landscape and leaving unfertile soil for cultivation. So, to avoid the bad effect of mining there are some regulations that have been made by the government on mine reclamation and mine closure in order to ensure economic and environmental sustainability even after the mining contract has terminated.

The transformation of mining industry to become a green industrydoes not mean asking the mining industry to stop operating, but reclamation has to be carried out much more systematically and thoroughly. After one mining block is completed then that block should be converted into green area immediately. This involves a well-planned reclamation program. Some of the activities that SEAMEO BIOTROP has carried out include the following:

1. Gradually converting final ex-mining area to become productive agriculture industry

* For the bare land – to eliminate/ control the soil erosion we have to plant the cover crops (legume and grasses) at the same time it can also be combined with livestock production because cover crop is very good for livestock;
* Bare land can be invested on plantation of commercial forest tree species;
* Bare land can be invested on rubber plant and oil palm plantation and;
* Bare land can be invested on biofuel crop plantation.

1. For the pond, it can be converted into ponds for productive purposes

* Processed into drinking water
* Investment on fish and shrimp farming.

The next steps in the greening of the mining industry in Indonesia include the following.

* Set up enabling regulation by government of Indonesia.
* Socialization to mining companies about the concepts and good practice.
* Capacity building for mining staffs.
* Conduct research on soil and water quality improvement for health safety and productivity.
* Conduct research on food safety for products from ex-mining sites.
* Funding should not be problems because the reclamation is the must for mining company. Also the CSR fund should be used structurally to improve/ greening the mining industry.

Mining industry is important for Indonesia, but also, it is potentially destructive to the environment. However, well-planned mining and reclamation operations could transform mining industry into a green industry. Lastly, learning from some Indonesian mining companies, transformation of mining industry into green industry is possible.

***8.3 Panelist: Sirithan Pairoj-Boriboon***

***Thailand Greenhouse Gas Management Organization (TGO)***

Green investment is a win-win strategy for the developer and the client. In Thailand, the talk is about green investment, as Thailand is taking steps to move to ‘cleaner production’, ‘eco-efficiency’, implementing ISO 14000s, energy conservation (this is an element under cleaner production and eco-efficiency), renewable energy, CDM-GHG reduction, and green procurement.

The concept of UNEP on cleaner production (CP) covers various aspect of CP, including reducing raw materials, reducing pollution and increasing recycle. The OECD and the World Business Council on Sustainable Development (WBCSD) have also developed detailed guidelines for industries to increase the eco-efficiency. The word “Eco” comes from ecology and economy, so when one implements it, one essentially saves both the ecosystem and money. The concept of ‘eco-efficiency’ is essentially the same as the concept of ‘cleaner production’ as they both are focusing on materials, reducing energy use, reducing pollution, increasing integration and use of renewable resources, increasing recyclable materials in product design, increasing recycling and increasing the level of services.

It is recommended to adopt the ISO 14000 series in CP, describing how partial or full implementation helps with systematic thinking and planning in identifying sources of pollution and energy losses. Investment in ISO 14000, CP, and eco-efficiency can ensure much better economic return and social response in both the intermediate and long-terms. The situation in Thailand at the moment is very difficult for the investors or industrial developers if there is social opposition from the community who now are more aware of the harm that is possible with proximity to industrial estates and activities, which is currently being referred to as the “Map Ta Put Syndrome”, which sums up how conflict with community over pollution issues can have quite detrimental effects on production and investment activities. This has had a lot of impact to Thailand’s economy.

Green investment does not always have to be a financial investment. It may just involve some form of management effort. For example, TGO had brought the manager to the production line and have direct contact with the workers, building personal relationships. The result was a reduction in waste and water use by 10% automatically.

Thailand has currently anEnergy Conservation Plan 2012-2030, with targets that include:

* Reducing energy intensity 25%;
* Reducing final end consumption 20%.

The plan includes low-costs measures with ROIs attractive to investors and developers. Some of the key aspects include:

* Electrical motors and lighting system,
* New/ Improved Technology; motor, lighting, boiler, furnace, and incubator.
* Fuel Switching
* Self-sustained investment on energy efficiency:
* Chemical industry,
* Food and Beverage Industry,
* Pulp and Paper Industry,
* Metal and metal product Industry.

The Thailand Strategic Plan on Alternative Energy 2008–2022 focuses on renewable energy. This plan has already been implemented for a few years. Renewable energy is still quite difficult to attract investment due to having a pretty slow and not very tangible return on investment. So, the Thai government has come up with a number of incentives. The main incentive from the government is to give the adder cost to the producers/project developers depending on which energy source type and type of resources used (solid waste, wind energy, solar energy, etc). Many of these energy producers have also implemented Cleaner ***Development Mechanism (CDM) projects so the get more return and quicker. Regarding the CDM status in Thailand,*** the following is the situation***:***

* There are currently 146 Letters of Approval (LoA) that have been issued with expected CERs equaling 8.8 MtCO2e/y. Among these projects, 64 projects have been registered at the UN and 6 projects are certified and have financial returns. The carbon credit price at the moment is getting lower due to the world’s current economic situation. It is about 7-8 Euro/ton. In 2008 the price was at 22 Euro/ton.
* Around 63% of these projects are energy projects from Biogas (pig farms, tapioca plants, ethanol plants, landfills).
* Around 19% of these projects are energy projects from biomass (bagasse, rice husk, chip-wood, etc.)
* Around 18% of these projects are other kinds of projects such as solar power, wind power, mini-hydro, transportation, and energy efficiency.
* There are around 50 solar projects submitted and quite a number of wind power projects have also been submitted.

Regarding green procurement, currently Thailand has five types of label related to GHG reduction, and includes the following: Label number 5, Green Label, Carbon Footprint, Carbon reduction label and Cool Mode for the textile standard. Thailand still does not have enough variety of GHG and energy products and thus there is a need to promote these much more.

***8.4 Panelist: Martin Krause***

***United Nations Development Programme (UNDP Bangkok)***

UNDP has been working for the past 18 years on the issue of green investment. Globally, UNDP has approximately 200 projects and programs on renewable energy, energy efficiency and sustainable transport and these are clean and green technologies that are being promoted with UNEP support with net value of over 600 million US dollars. Currently there are approximately 55 projects and programs in Asia, and their net worth is around 200 million US dollars.

There are some lessons learned on green investment, as follows.

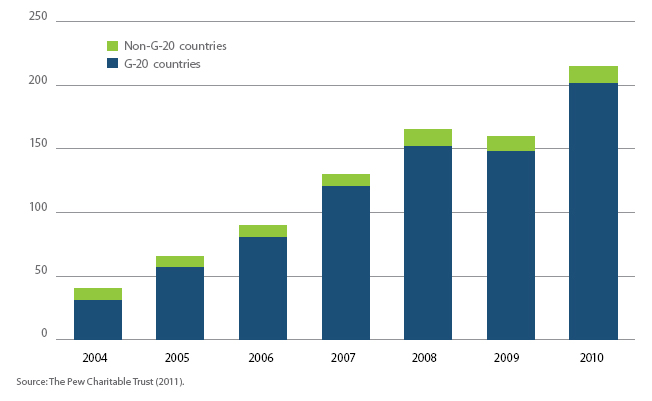
* Policies – Green investment will not happen if there is not conducive policy environment. This is the government’s responsibility, obviously, to set the policies so the private sectors and the banks will invest. There are very good examples of such including ‘feed in tariffs’ that guarantee a premium price for the investors who would like to set up wind farm or solar power plant and feed electricity back into the grid. There are a number of policies and regulations that could be put in place or have been put in place in some countries that enable green investment.
* Capacity and skills building - One example is in Southeast Asia where the government, with good intention, bought 200,000 PV panels to place in rural poor areas. However, they just dropped them there and then boost that they have brought electricity to off the grid areas and we have done something good for the global climate as well. Unfortunately, the reality is that this PV panels last for between 4-8 months and then they are broken because the program does not provide skills training for local technicians on how to repair and maintain the panels and electrical system;
* The technologies themselves are very important;
* The financing is obviously a key part of a successful project;
* There is a big advantage in having information, since we need to educate ourselves so that the demand is being created from green investment in the first place.
* The institutional frameworks to take care of the project like CDM are also very important.

Abatement cost curbs certain technologies. Even today, certain technologies make business sense such as switching light bulbs. Some technologies are at the R&D stage and they are not attractive to any bank at this point (such as carbon capture and storage). Thus, there is a need to look specifically at what the technology is what one talks about when one wants to make a case for attracting money into green investment.

There are five categories of barriers to green investment according. These include the following:

* Financial Barriers – constraints in financing, lack of information on the cost effectiveness of green products and services, financial sector reluctant to finance usually perceived “risky” projects
* Technical Barriers – (a) insufficient capacity for design and production; (b) inability to deploy technologies
* Institutional Barriers – governments often have limited capacity in designing and implementing policies and programs.
* Market Barriers – dispersed markets, small end users, individual difference between end-users and dispersed locations
* Awareness & Information Barriers – information gaps are present in all aspects of the markets

When one looks at the financing side, where money is essentially coming from international organizations, there is a need to be more innovative so that one can leverage money coming from capital markets. The key question is: “can we use concessional funding, how can we use the innovative sources of public finance or financing instruments such as CDM?”There is a need to combine and sequence in order to leverage private sector investment. Then, one can use this small money to work with the government to create the policies that will trigger further investment that may come from larger banks and/or the private sector. It is very crucial to get the policy environment right, and it can be done with public grant money.



**Figure 14: Growth of Private Investment in Clean Energy**

Figure 14 indicates the growth of private investment in clean energy globally showing a hopeful trend, but considering the problems that the world is facing, especially when talking about Climate Change in the context of green investment, it is small.

In creating attractive risk/reward profile for green investment, there is a need to do two key things:

* Make a business case to attract green investment. There is a need to try to reduce the risks for the investment (e.g. grid access GEF financing)
* Guarantee a premium price to increase the financial return.

The steps needed for selecting the appropriate combination of policy and financial instruments to trigger Green Investments are as follows:

Step 1 - Identify Priority Mitigation and adaptation technology options. There is a need to be precise, what technologies one talks about?

Step 2 - Assess key barriers to technologies diffusion.

Step 3 - Determine appropriate policy mix and how can we create a policy environment that will encourage banks and private sector to invest.

Step 4 - Select financing options to create and enabling policy environment. There is a need to have to look how one combines and sequence them in the case of a particular investment.

**8.5 DISCUSSION**

Issues that were discussed includedmicrofinance, sourcing, green growth, green energy, paying for services, etc., as well as on some assumptions that should be addressed, including:

* Green investments depend on very broad spectrum of technologies; some have tendency to use label of green investment that is not really green;
* Funds are sometimes not the crucial factor; but culture and capacity are more important for making best use of funds;
* Basic conditions exist for use of different green technologies; need to continue with these efforts.

**Discussion Point 1:** Do you see any role of micro-finance in Green Investment?

**Daniele Ponzi:** One of the areas that micro-finance is particularly useful is in terms of small businesses in the formal sector. With respect to activities at the community level,where we have small holders/ farmers and PES potential, we actually need an injection of small liquidity to get things started. In addition to micro-finance, there is micro-insurance which is also very important with respect to climate resilience, other resilience, climate adaptation, climate risk management or other types of vulnerability reduction, type of interventions would also benefit from micro-insurance. Micro-insurance is a specific area where there have been a number of programs done by certain international organization like the World Bank, ADB, the African Development Bank. These programs are providing for special instruments to cover the farmers from the type of reduction in crop yields or productivity due to climate change. Overall, we need micro-finance together with the big finance and other instruments to actually make green choice investments so that is more attractive. The experience is growing in terms of types of instruments that we can use on micro-financing.

**Discussion Point 2:** Regarding renewable energy and energy efficiency projects, Kasikorn Bank is financing projects of approximately 350 billion baht. How much of these funds are going to micro-financing or to small and medium enterprises?

**Songpol Chevapanyaroj:** If we look at just the portfolio side, for sure, loans to the bigger companies would account for about 60%, with 30% going to the smaller SMEs. I would say that medium-size companies receive more financing from the bank right now than smaller companies. However when we look at the definition of micro-finance, it needs to be clarified a bit. I have some concerns, for example, if we have some farmers or pig farms or a community who want to start their own green business venture that needs investment capital (i.e. biomass, biogas). Many times these communities do not have the skills and also sometimes they do not have a reliable supply of raw materials that add more risk to their project as well. For example, when they started it, it was all right because the price of palm oil, rice husk or wood was cheap for them to start using that as raw materials. But later on, because they do not own those raw materials, they have to buy some from others at market prices that can increase, and then often times the project is no longer feasible. However, on the energy efficiency side, if the community already runs the project and they want to have some savings based on technology changes that have more chance to succeed than the normal investment in terms of the projects.

**Discussion Point 3:** How can micro-financing help the Indonesian mining sector to be more sustainable?

**Irdika Mansur:** In the Indonesian mining sector, funding is not a problem. The key factor is the commitment of the company. We can estimate the price of coal between 50-100 USD per ton. In one company they spare 1 USD, 50 % for rehabilitation and 50% for CSR, then there will be something like 50 million USD per year; of course, for smaller company, their saving is also smaller than the big company. If we calculate the saving, there will be about 20,000-25,000 USD per hectare and it is a big money.

**Discussion Point 4:** In the GHGs financing business, do you see any place for micro-finance or for smaller companies to be part of the effort?

**Sirithan Pairoj-Boriboon:** I think there is a problem in this regard.In Thailand, CDM or carbon credit banks are still considered as a high risk so if you negotiate with a bank right now the bank will not consider carbon credit as income. Even the BoI (Board of Investments) will say “Do not talk about Carbon Credit”, but surprisingly, the government now gives tax incentive for the income for carbon credit for three years.

**Discussion Point 5:** With regards to pollution and GHG abatement technologies, is there is a differentiation in investment on the three main technologies? – hybrid car for instance, or carbon capture and storage with a high capital and no role for micro finance; but if we look at solar PV in past 10 years, markets have been created in remote areas; small companies provide maintenance and service, which can use micro-finance to start up; micro credits can also apply big market.

**Martin Krause:** If you look at the technologies that I have mentioned here, hybrid cars for instance, or carbon capture and storage technologies, these are high capital, very, very expensive and there is no role for micro-financing in those very capital intensive technologies. But if one looks at solar PV in the past 10 years, markets have been created in remote areas where small PV companies and more entrepreneurs can offer their services and maintenance. These are often very small companies that can use micro-finance to start up; micro-credits can also apply to big markets.

**Open Forum**

**Question 1:** In relation to investment in solar technologies,does the bank look at the decommissioning cost? How does the bank address the decommissioning cost of solar technology?

**Answer:** Often life cycle costs are not taken into account when choosing a particular technology over another. We need to correct it because we need to look at the entire value chain. The life cycle costs including decommissioning cost and the cost of pollution or destruction of natural resource due to the production of certain technologies are not currently included. This point is very important and we do not systematically do that yet.

**Question 2:** Though money could be available, it could also be politically quite sensitive to keep a large sum of money for long period of time (30-50 years) because the life span of the mine could be quite large. In the context of Indonesia, are there any guarantees that the monies which are decades ahead would be used at the appropriate time to fund the cost of habilitation?

**Answer:** Money is safe in the bank. The mining company will submit the plan for habilitation to the government. The government will approve the amount of money then the company must deposit this amount into the bank. The following year the government will assess the reclamation work and if the company meets the standard, then the money will be returned to the company directly.

**Question 3:** If we look in the context of Asia-Pacific,what capacity and what technology is most priority to develop in order to get intermediate green investment?

**Answer:** We need to look at the capacity of finance and planning ministries to make successfully our case for phasing out subsidies for fossil fuels, we are facing the situation where we are trying to promote solar PV pumps for agriculture use, but baseline scenario is currently that the pump is operated with a diesel generator and the diesel is very cheap. It is cheap because of subsidies in many countries and it is subsidized out of social (and political) concerns obviously. There is some legitimacy for the subsidy.

It is very difficult for us to argue with decision-makers in the finance and planning ministries to make a convincing case for phasing out fossil fuel subsidies. It is very difficult because we are environmentalists, we are climate experts and to make a case to them, we must talk in their language and make an economic case to see how it would benefit the country ultimately. To make an economic case to these two ministries is very difficult, so to turn it around, we need to start by working with decision-makers and experts sitting in non-environmental, non-climate institutions to build the capacities and create skills to make our case successfully. This has to go right across the Asia-Pacific. Maybe there is exception to some of the middle-income countries or very big countries like China where there is a lot understanding of the issues. But for most of the countries in the region the understanding is very limited.

**Question 4:** What is the best support that government can give to the private sector to change their management practices?

**Answer:** If there is a win-win then it is workable. Right now every party tries to create win-win strategies. The government can provide tax incentives, financial assistance, technical assistance and general assistance. In addition, for the government to facilitate and promote green investment, green growth, green economy transition is actually to get the prices right, remove subsidies and try to internalized negative externalities as much as possible which are pollution and natural resources degradation type of processes and destructive industry type of negative impacts. At the same time, allow more investments by private sector or those entities who can invest in green businesses, therefore the economy of scale takes place. Depending also on particular sector/ industry, in what stage of maturity of that particular product is. In some cases it is in the demonstration level and some cases the stage of the product is already matured. A number of instruments exist already, but have to be chosen well.

**Question 5:** What do you think about the future of green investment? Will it be expanded? If we want them to expand, what incentive or additional policies are needed from the public sector?

**Answer:** A lot of green investments are not cheap so financing support from government needs to be there. For example, the adder to be added to wind and solar farms probably has to be thought through more deeply regarding decommissioning and what would it cost. However, the cooperation between organizations like government agencies and the business side has to increase as well. For Kasikorn bank, I believe that it will be expanding in terms of energy efficiency projects in Thailand. But as you can see, the number of persons who apply to these projects is still very small. However, we do not support only big ESCOs companies but also look at small ESCOs companies as long as they are capable. With or without doing anything, these green investments have been taken into account in terms of trade barriers between companies who import/export products across the border. If the company wants to sell their products to some countries that will have a larger trade barrier to each other and which would automatically impose the community who operate in the other countries to be more focus on what they are doing with their manufacturing processes.

**Question 6:** How do environmental criteria affect the traditional financing in other sectors? Is there any change in the mentality of the banks to using environmental criteria in addition to the financial criteria for evaluation of investments? What are some environmental criteria?

**Answer:** All ADB projects have to go though environmental and social safeguards, so that this type of impact is assessed before the projects are approved, then prevention, mitigation, compensation can take place. So, the negative impacts, worse impacts can actually be minimized, mitigated. In addition to that, more generally, economic financial projects in the World Bank or other international development banks, for a number of years now have been taking into account non-economic and non-financial dimensions like health and environmental impacts which can be quantified and even those ones that can not be quantified in economic monitoring but there are some qualitative type of judgment. We have been seeing a shifting away for certain types of projects that in the past were no-brain kind of decision. Now there is much more causational thinking to the bank’s investment decision-making. For a number of years hydro-power, big dam, mega-project or even nuclear power, for example, have not been funded. All social considerations and political sensitivities are there.

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**SESSION IX**

**GROUP DISCUSSIONS II: *WORLD CAFÉ* CONVERSATION**

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**Moderator**: *Zinaida Fadeeva, United Nations University Institute of Advanced Studies*

The final session of the day was a World Café exercise that allowed participant to share and discuss their own ideas regarding green economy via several guiding questions that were posed for discussion. The questions discussed included:

* What are the roles of businesses and communities in promoting and implementing sustainable consumption, sustainable production, resource efficiency, and green investment?
* What are the policy implications,challenges and barriers of implementations in resource-efficient practices, business and community engagement, sustainable supply chain; etc.

Again, participants had an opportunity to rotate and mix with each other around the discussion questions posed above. Each café conversation group summarized their final conversation for the entire group and a final discussion was facilitated.

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**SESSION X**

**CLOSING**

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* **Co-Chairs**:

*Zinaida Fadeeva & Mario T. Tabucanon, United Nations University Institute of Advanced Studies*

* **Closing Statements of Participants**

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The program ended with a broad consensus communicated by the participants that the program was extremely valuable and inspiring at the same time. The final activity of the indoor program was a sharing of reflections and insights, with emphasis placed on what participants would do to ‘add value’ to this great learning and sharing experience when they returned to their respective countries and organizations. Some of the important reflections and points of action that this Leadership Programme inspired the participants to commit to are recorded below:

* From the business sector, to push more strongly for green manufacturing projects within their company in addition to creating a green network within supply chain business partners (Private sector plant manager – Thailand);
* Conduct research on patterns of consumer behavior and what are the key roles and who are the stakeholders involved in the implementation of sustainable production and consumption (Packing and Recycling NGO Director – Thailand)
* Disseminate the knowledge, the message and the inspiration received from this Leadership Programme to my university students and others through quality research and teaching (Lecturer Faculty of Economics / Chulalongkorn University - Thailand);
* Disseminate, through activities and lessons, the green economy concepts to elementary and high schools and other community stakeholders (Program Manager / International NGO (ERECON) – Cambodia and Head of EE & Community / Ministry of Environment - Indonesia);
* Maximize resources in our research centre (BIOTROP) and RCE to support the understanding and implementation of Green Economy through research, training and information dissemination (Deputy Director / SEAMEO BIOTROP– Indonesia);
* Dissemination of knowledge through media and stakeholder engagement and conduct discussions on Green Economy concept with our “Knowledge Management Community” (Executive Director / Pertamina Foundation– Indonesia);
* Will develop a new course on sustainable development, that will address Green Economy / Sufficiency Economy at my university (Lecturer/Prince of Songkhla University– Thailand);
* Integrate ideas and smart and good practices of green consumption through Eco-school project, especially using a systems thinking approach (EE Section Head / DEQP– Thailand);
* Write articles on Green Economy and Sustainable Production and Consumption to send to Vietnam Economic Review publication and also spread the message within our own organization’s consumption behavior ; provide economic assistance for private sector for environmental projects (Credit & Investment Dept. Vietnam Environment Protection Fund Senior Officer – Vietnam)
* Approach and engage with policy makers on Green Economy and Sustainable Development (Health and Office Safety Manager / National Petroleum Company – Brunei Darussalam);
* Involve relevant policy makers and influence policy makers to participate in this program and similar ones on sustainable development and green economy (Environment Officer / Dept. of Environment, Parks and Recreation, Ministry of Development – Brunei Darussalam);
* Identify and disseminate successful case studies on subsidy removal and how it can be done (Lead Environment Specialist – Asian Development Bank);
* Rethink the impact of policy in a more systemic way; i.e. in relation to the impacts on all beneficiaries and stakeholders, not just one sector (Climate Change Official / Ministry of Environment – Japan);
* Proposing a Asia – Pacific regional project to EU on Climate Compatible Policy Framework for Development of Green Zones (Senior Program Specialist / AIT-UNEP Regional Resource Center for Asia Pacific)

**Day 3 - Field Session: Visit to The Sirindhorn International Environmental Park (SIEP) and neighboring Royal projects and sites in the coastal areas of Cha-am, Petchaburi Province, Thailand**

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* SIEP
* Visit Energy for Environment Center Exhibition
* Visit Mangrove Forest & Mangrove Planting
* Mrigadayawan Palace
* Huay Sai Royal Development Study Center - to observe Vetiver

grass plantation to improve compacted hardpan soil)

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**Presenters’ Bio Sketch**

**Mario T. Tabucanon**

Mario T. Tabucanon is currently a Visiting Professor at the United Nations University Institute of Advanced Studies. He is Emeritus Professor at the Asian Institute of Technology (AIT), an international institution based in Thailand, where he had served in the faculty for more than three decades and held key leadership positions at the Institute including among others as Provost from 1999 to 2005 and President in 2005. As AIT faculty member since 1978, he has taught and supervised numerous master and doctoral students in industrial systems engineering and management, and authored more than two hundred academic and research publications in the form of books, book chapters, peer-reviewed journal articles, and articles in conference proceedings.

Professor Tabucanon is internationally recognized in the industrial engineering and management science fields having served, past and present, in editorial boards of reputed international refereed journals. He is internationally renowned for his contributions in multiple criteria decision making (MCDM) especially in the theory and application of the approach to solve industrial problems. His teaching and research interests include theories and applications of MCDM, systems modeling, operations research, project management, and in issues on sustainable development and education for sustainable development.

During the recent years, Professor Tabucanon engaged in issues related to sustainable development (SD) and education for sustainable development (ESD) having been a visiting professor affiliated with the ESD Programme of the United Nations University Institute of Advanced Studies (UNU-IAS) since 2005. He has assisted UNEP Regional Office for Asia and the Pacific as senior adviser to principally provide guidance to the UNEP-Tongji Institute of Environment for Sustainable Development at Tongji University in Shanghai, China. He currently holds guest professorship at Tongji University in Shanghai, and serves as international adviser to the Executive Board of the Sirindhorn International Environmental Park Foundation under the Patronage of HRH Princess Maha Chakri Sirindhorn.

**Zinaida Fadeeva**

****Zinaida Fadeeva is a Research Fellow at the United Nations University Institute of Advanced Studies (UNU-IAS). Her main responsibilities include undertaking research projects and organizing activities within the framework of the Education for Sustainable Development Programme. Her research interests relate to the topics of interorganizational learning and partnerships development, assessment of higher education, and sustainable production and consumption systems, among others. She also coordinates and teaches sustainability-related courses at several universities at the Asia-Pacific region and leadership programmes for the private and public sectors. Before joining UNU-IAS, she worked with research and non-governmental organizations in Europe and former Soviet Union countries, dealing with questions of industry and the environment, nature protection, ecosystem management, human rights and governance.

**Stefanos Fotiou**

Stefanos Fotiou is the regional coordinator of the UNEP’s “Resource Efficiency and Sustainable Consumption and Production” programme for the Asia and the Pacific Region. Before joining UNEP, he was working as General Director in a consultancy company for governments and the industry on issues related to sustainable regional development. He has also worked as a monitoring and evaluation expert for the Environment General Directorate of the European Commission, as head of the Sustainable Development unit of the Greek Biotope Wetland Centre as well as a research associate in the Aristotle University.

During his career Stefanos has conceptualised, initiated, managed or monitored a number international projects and programmes dealing with sustainable development with a total budget of more than US$ 100 million. He has been involved as a leading expert in the development of national, regional and sectoral strategies related to sustainable development and he has published scientific papers, monographs and a number of articles on economics of the environment, sustainable development, information economics and natural resource management.

He has also an extensive experience as an educator; he has taught as a visiting lecture for 6 years in the Department of Planning and Management of Natural Resources of the Aristotle University and in the Department of Business Administration of the University of Macedonia. Stefanos has been participated in several international conferences as invited speaker and has been involved as a co-organiser in a number of global events related to sustainable development, management of natural resources and environmental economics.

He holds a BSc in Forestry and Natural Resources Management, a PhD in Environmental Resource Economics and a Master in Information Systems.

**Robert Steele**

****Robert Steele is Founder and Director of Systainability Asia, a Thailand based regional consultancy that works closely with national and local governments, NGOs, international agencies and private sector corporations and SMEs the Asia-Pacific region on sustainable development and corporate social responsibility since 2005. He has been a Senior Associate with AtKisson Group (www.atkisson.com) since 2002 and is currently Principle for AtKisson’s Compass Education Initiative as well as on the faculty of AtKisson’s ISIS Academy. Robert has a BSc. in Geology with a minor in ecology, and a MSc. in Natural Resource Management from University of Wisconsin-Stevens Point. His expertise lies in the fields of Education for Sustainable Development (ESD), Corporate Social Responsibility (CSR), sustainability indicator development, systems thinking, a innovation diffusion and organisational change managment, organizational sustainability assessment, and strategic planning and communication. Robert has authored and contributed to several key regional and international publications and papers.

**Aneta Slaveykova Nikolova**

****Ms. Aneta Slaveykova Nikolova is currently the Environmental Affairs Officer at the Environment and Development Policy Section, Environment and Development Division, UNESCAP. She has a broad educational background with degrees in Scientific Information Management, Hydrogeology and Engineering Geology (Engineer) and European Politics and Administration.

Ms. Nikolova has been managing EU, UN and bilateral donors projects and programmes addressing the needs of developing countries and countries with economies in transition in Europe, Africa and Asia for more than 20 years. Ms. Nikolova has a rich professional experience in development, analysis and advocacy of sustainable development policies, as well as providing, institutional strengthening and technical advice, and most recently leading a regional green growth capacity development programme.

**Charas Suwanwela**

Charas Suwanwela is Professor Emeritus and Chairperson of Chulalongkorn Univesity Council, Bangkok; Chairperson of Policy Committee of Thailand Reserach Fund; Former President of  Chulalongkorn University and of the Asian Institute of Technology, Bangkok; Former Chairperson of National Higher Education Committee, Thailand; Former member of the UNESCO Advisory Committee on Higher Education; Chairperson of the Asia and the Pacific Follow-Up Committee for the World Conference on Higher Education. He is a member of the UNESCO Scientific Committee for Asia and the Pacific.

**Muanpong Juntopas**

Ms Juntopas background is in public policy (Seattle, Washington). She has about 20 years experiences in development work in 5 Mekong countries both at policy, planning and implementation levels specifically poverty reduction scheme. She is specialized in local planning, decentralized /rural, natural resource management, and river basin management. Prior to joining SEI in 2006, Juntopas worked with Mekong River Commission, an Intergovernmental organization in implementing Mekong Agreement. Muanpong worked with UNDP, FAO, Save the Children, and IUCN on several development /conservation programmes in the region including the management of Tonle Sap lake in Cambodia, and Wetland management in Laos, and Vietnam and Thailand .

Currently, she is a senior researcher at Stockholm environment Institute, Asia Centre in Bangkok. Muanpong is responsible for, and coordinates a research network called “Sumernet (Sustainable Mekong research Network) comprising of 24 universities in the region, who conduct research on sustainable development issues for policy support. She also works for the Asia Climate Change Adaptation Knowledge Platform.

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:Deputy Managing Director of The Sirindhorn International Environmental Park, Cha-am, Phetchaburi Province

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1976 M.P.A (Public Administration), National Institute Development Administration (NIDA), Bangkok, Thailand

2000 Ph.D (Bioregulation) Tokyo University of Agriculture, Japan

3. Experience

1973 – 2002 Forest Technical Officer, Royal Forest Department

2003 – 2009 Expert, Mangrove and Coastal Resources Management, Department of Marine and Coastal Resources

4. Past important project responsibility

1. Team leader (Forestry Team) in Training and Research project of The Integrated Multidisciplinary Survey and Research Programme of the Ranong Mangrove Ecosystem (UNDP/ UNESCO Regional Mangrove Project RAS/86/120, 1986-1989)
2. Consultant, Sungei Mangrove Arboretum and Birds Sanctuary, Singapore (1991 – 1992)
3. Expert, Case Study of Mangrove Plantation in Vietnam and Bangladesh and field team leader of development and dissemination of Re-afforestation Technique of Mangrove Forests by the promotion of International Tropical Timber Organization (ITTO), Japan, Association for Mangroves, National Committee of Thailand and National Research Council of Thailand (1994 – 1996)
4. Working with International Coordination Council MAB Bureau, UNESCO Paris for considering the declaration of 55 Biosphere Reserves and formulate guide line to develop B.R. areas and cooperating with some project of RAMSAR SITE, BIODIVERSITY, WORLD HERITAGE (1998 – 2001)
5. Mangrove Focal Paint of Thailand and Chairman of Regional Mangrove Working Group of the project of “Reversing environmental degradation trends in the South China Sea and Gulf of Thailand”, (2002 - 2008)
6. Secretary of Mangrove for the future (MFF), Thailand and Steering Committee of MFF (2006 - 2009)

**Daniele Ponzi**

****Daniele Ponzi has about three decades of experience in the field of environment policy and management as staff and consultant for various international organizations, Italian companies and academes, and NGOs.

He joined the Asian Development Bank (ADB) in 1995, and since 2009 is the Lead Environment Specialist with the Environment and Safeguards Division. In his more than 12 years with ADB, Ponzi has worked in several departments including (i) Programs West Department with responsibilities for country strategy and programming on environment; (ii) Pacific Department in charge of developing and managing environmental loans, grants and technical assistance; and (iii) Regional and Sustainable Development Department, with responsibilities focusing on ADB strategic environment agenda as well as operations support, and knowledge management for green growth.

From November 2005 to November 2008 he was with the African Development Bank (AfDB) where he managed the Sustainable Development Division. In this capacity he led the GEF coordination program, started the AfDB safeguards review process, and co-led the development of the AfDB climate change program. Ponzi holds a university degree in Economics from Bocconi University, Milan and a 2-year postgraduate master degree in Environmental Management. He is a member of the Italian Journalists Professional Association.

**Anthony Shun Fung Chiu**

****Dr. Chiu works in the fields of Sustainable Consumption and Production (SCP), Operations Strategy, Circular Economy, and Eco-Industrial Development (EID). He is an “international expert” at UNIDO, and consultant to UNEP, UN ESCAP, and UNCRD. From 2001 to 2011, Chiu authored and delivered key inputs to Asia Pacific Industry Paper and SCP Papers for the Johannesburg WSSD Summit and UN CSD18/19.

Aside from being a full professor at De La Salle University; he also serves the Philippine government as a Board Member in the Pollution Adjudication Board as well as technical panel to the Presidential Commission for Climate Change. Outside the country, he advises in national and local government and universities in Switzerland, Australia, France, China, Hong Kong, Thailand, Singapore, Japan, Taiwan, Vietnam, and Indonesia.

For the promotion of various emerging disciplines in Asia Pacific, Chiu is the Chair of the Asia Pacific Roundtable for Sustainable Consumption and Production (APRSCP) on policy issues, President of the Asia Pacific Industrial Engineering and Management Society (APIEMS) on technology issues, and the President of the Asia Pacific Business Innovation and Technology Management Society (APBITM) on business model issues. He was recently elected to the Secretary-General of the International Society for Industrial Ecology (ISIE) and Board Member of the International Foundation for Production Research and Economics (IFPR). Professor Chiu is an editor in more than 10 international journals including the J of Cleaner Production and Progress in Industrial Ecology.

**Peter King**

Peter King has been an avid environmentalist since his undergraduate days and it has remained an abiding passion for more than 30 years. On graduating from Melbourne University (B. Ag. Sc.) in 1970, he was fortunate to find a position in the Soil Conservation Authority of Victoria, where he worked on soil erosion control, watershed management, and land capability assessment. To continue his education, he joined one of the first multi-disciplinary post-graduate courses in Environmental Science at Monash University, where he graduated with a M. Env. Sc. in 1977. On completion of his Masters degree, he returned to the Victorian Government’s new Conservation Ministry, reaching the position of Land Studies Coordinator for Victoria. Based on work that he was involved in regarding watershed management, he was invited to take up a Research Fellowship in the Environment and Policy Institute, East West Center, Hawaii from 1981-82, where he wrote several books and research papers on watershed management.

In 1982, he established his own company, Terra Firma Environmental Consultants, specializing in environmental impact assessment. This company was subsequently merged with ACIL Australia, probably Australia’s largest agriculture and natural resources management consultancy, where in short time, he was appointed Director, Overseas Development. As one of six owners of the firm, he was responsible for strategic planning, marketing, and project design and supervision for environmental, natural resources, and agricultural development projects throughout Asia and the Pacific. At various times, he also acted as a Project Leader in country, or an environment specialist for short-term inputs.

Following some successful work for the Asian Development Bank (ADB) as a consultant in the period 1984-88, he started work with the ADB in March 1991 as an Environment Specialist in the Office of Environment. In 1996, he transferred to the Agriculture and Social Sectors Department (East), Forestry and Natural Resources Division to gain additional experience in loan processing and administration. In the ADB and throughout Asia, Dr. King established a sound reputation as ADB’s leading natural resources management (“green”) expert. Dr. King had personal responsibility for over 50 loan and TA projects in ADB. Based on his experience in integrating economic and environmental dimensions of development, he transformed this knowledge into a Doctor of Philosophy (Environmental Science) degree in 1998 from Murdoch University in Perth, with a thesis entitled “Integrated Economic and Environmental Planning at the Sub-national Level in Asia”. In 2001, he was appointed Manager, and subsequently Director, Pacific Operations, ADB. In 2005, Dr. King took early retirement from ADB and is currently a Senior Policy Advisor for the Institute of Global Environmental Strategies in Japan, heads the Asian Environmental Compliance and Enforcement Network secretariat, and works as an independent environmental consultant for international organizations.

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2009 – Present Environment Management Promotion Office

Senior Vice President

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Senior Vice President

2009 Senior Vice President, Manufacturing Division/ Samrong Plant

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2006 Senior Vice President, Manufacturing Division/ Samrong Plant

2001 Vice President, Manufacturing Division/ Gateway Plant

1999 Director, Administration Division/Human Resources Department

1996 ISO 9000 QMR (Quality Management Representative), Manufacturing Division

1995 General Manager, Manufacturing Division/Production 3

1991 General Manager, Manufacturing Division/ Production Engineering

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**Robert Alan Coombs**



Robert Coombs is President and Chief Executive Officer of the Asia Pacific division of Interface Inc, a manufacturer of commercial carpets.

With a background in marketing and product management, Robert first joined Interface in the UK in 1988 and later became Chief Executive of the Company's European business, returning to Australia in 2002 to his current position. Interface Inc. is a long-term proponent of sustainable business development and has a vision of becoming fully sustainable and restorative by 2020.

**Irdika Mansur**

Irdika Mansur is currently the Deputy Director for Resource Management and Communication SEAMEO BIOTROP, a Southeast Asian Regional Centre for Tropical Biology under the Southeast Asian Minister of Education Organization (SEAMEO). He is also a lecturer at the Department of Silviculture Faculty of Forestry, Bogor Agricultural University (IPB), Indonesia since 1989. He received his degree in forestry from IPB in 1988, his Master’s degree from the University of Canterbury in 1994, and he has been awarded PhD from the University of Kent at Canterbury, England. As an IPB faculty member, he has taught and supervised numerous undergraduate, master, and doctoral students in the field of silviculture, agroforestry, and restoration ecology. Despite his busy time holding structural positions at the Faculty of Forestry IPB, i.e. as Head of the Department of Forest Management (2003-2005), Head of the Posgraduate Study (2004), and Head of the Department of Silviculture (2005-2009), and now the Deputy Director of SEAMEO BIOTROP (2009-recently), he actively engaged in various projects and consultation related to agriculture based CSR programmes targeted community welfare and environmental improvement with various multinational companies. For the last ten years he leads various researches, consultations, paper presentations in national and international meetings, and training courses related to sustainable mining, especially for the improvement of mine reclamation programmes involving multinational and national mining companies operating in Indonesia. Most recently, he introduces green investment to the community through the promotion of investment on small scale fast growing commercial forest tree species, such as Albizia and Kadam trees in Indonesia.

**Songpol Chevapanyaroj**

Songpol Chevapanyaroj has extensive experie nce in banking, including 12 years in the capital markets and treasury business. He integrated Kbank’s corporate product suite, leading to an increased overall market share of over 20% in 2008. Earlier in his career, as the head of Kbank’s capital market business division, he achieved a revenue increase of more than 40% per year and tripled volume within four years. Songpol was named one of The 50 Most Promising Young Bankers in the Asia Pacific and Middle East regions by The Asian Banker in 2008.

**Sirithan Pairoj-Boriboon**

Sirithan Pairoj-Boriboon is Executive Director of the Thailand Greenhouse Gas Management Organization. He had a long career in the Ministry of Science & Technology, as well as the Ministry of Natural Resources and the Environment (MNRE) of Thailand. He held senior positions including Director General of the Pollution Control Department of MNRE.

**Martin Krause**

Martin Krause leads and manages the Environment and Sustainable Development team at the UNDP Regional Centre in Bangkok. He liaises and works closely with both external and internal partners and also provides policy advice and project related services on climate mitigation and carbon finance.

He has over 14 years experience working for UNDP and is a specialist in climate change, energy and project planning and management. Prior to joining the Centre, Martin coordinated the GEF Climate Change portfolio in Eastern and Southern Africa out of UNDP Pretoria (2002-2006). He has also managed UNDP-GEF’s Monitoring and Evaluation work at UNDP HQ in New York (1997-2002). Martin Krause started his career with UNDP in 1994 at UNDP Argentina.

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2. Forthcoming. *Green Growth, Resources and Resilience: Environmental Sustainability in Asia and the Pacific*. Asian Development Bank / United Nations Economic and Social Commission for Asia and the Pacific / United Nations Environment Programme. A copy of the report will be available at the following websites: [www.unescap.org/esd/environment/flagpubs/GGRAP](http://www.unescap.org/esd/environment/flagpubs/GGRAP),

   [www.adb.org/Environment/default.asp](http://www.adb.org/Environment/default.asp) [↑](#footnote-ref-2)
3. Materials include metal ores, industrial minerals, fossil fuels, construction minerals and biomass. [↑](#footnote-ref-3)
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5. *Ibid.* [↑](#footnote-ref-5)
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8. Jouni Korhonen, editor-in-chief, Progress in Industrial Ecology – An International Journal (InderScience) [↑](#footnote-ref-8)
9. panel facilitator keynote delivered in IGES, Yokohama 2010 at the launching of the White Paper on SCP. [↑](#footnote-ref-9)