

WORK-IN- PROGRESS

DRAFT ANNOTATED FRAMEWORK TO BE UPDATED

GREEN INVESTMENTS AND DEVELOPMENT – NOW
*Holistic, Integrated Sustainable, Resilient, Inclusive, Equitable,
Smart Growth
To Spur Innovations and Inventions*

Provisionally 4 & 5 February 2020

Nay Pyi Taw, MICC 2,

6 February 2020

Yangon at UMFCCI, Co-organized with UMFCCI

Celebrating Tenth Anniversary of GEGG

And

Fifth Anniversary of AIGE Endorsement

At 25th ASEAN Summit November 2014, Nay Pyi Taw.

(TBA Government Ministries, International Organizations, Universities, Research Institutions, Private Sector)

THE VISION: URGENT BOLD GREEN GROWTH TOWARDS GREEN PARADIGM.

The GEGG Sixth Forum, continues to support the objective of the Green Economy Green Growth, GEGG Myanmar (not for profit) and non-political Association “*To expeditiously promote green economy green growth in Myanmar and foster national and international cooperation*” www.geggmyanmar.org

The Sixth Forum will celebrate the Tenth Anniversary of the inception of GEGG and the Fifth Anniversary of the Endorsement of AIGE ASEAN Institute for Green Economy, by ASEAN Heads of State/ Governments at the 25th.ASEAN Summit in November 2014, Nay Pyi Taw. AIGE, an ASEAN Charter Entity is located at and supported by GEGG.

During the past decade and accelerating recently, is the unprecedented convergence of major inter-connected global changes, many are increasingly known and are irreversible.

An increasing number of scientific reports and expanding global empirical evidence point to major systems and systemic changes, with dire consequences for the inextricably linked social, human health and wellbeing, economic, financial, and ecological sustainability, with overarching impacts on human, national and global security, in particular with food security and safety. The Reports include the October 2018 IPCC Special Report on Global Warming of 1.5C above pre-industrial levels; June 2019 U.S. Global Change Research Program Climate Science Special Report (CSSR); Jan 2019 Worldwide Threat Assessment. US Senate Select Committee on Intelligence. Key excerpts are highlighted in the End Notes. With improved knowledge and awareness, there is intensifying and growing global public actions, in particular by students, stressing the existential risks and threats and the urgent need for actions. There is growing international consensus on the imperative need now for expeditious actions and transitions toward a Green Paradigm. Business as usual, procrastinations and silo approaches are woefully inadequate to meet the scope, scale and speed of the mega transformations and threats. And importantly, do not adequately identify multiple benefits of expanding green opportunities, and opening of new windows and doors.

The Sixth GEGG Forum emphasize the imperative urgency and need for bold, visionary, holistic, policies, strategies and solutions that are integrated and aligned. The integration requires not only of disciplines, but also of sectors and stakeholders, with alignment of institutions. Furthermore, development needs to be considered in conjunction with investments. The GEGG 6 theme is Green Investments and Development--- Now. The two –day Nay Pyi Taw segment address Policy and Strategy and is aligned with the one-day Yangon segment at UMFCCI, that will focus on moving forward Policy and Strategy from WHAT to HOW solutions and actions.

The work-in-progress Draft Annotated Provisional Framework consist of elements clustered into transformative building blocks that are driving green transitions. These building blocks include Increasing Natural Resource Use Efficiency; Next Generation Energy; Preparing and Unleashing 5G; Promoting Smart Materials; Innovative Financing and Economic Instruments; Transformation and translational Vocational Capacity Building. The Yangon segment discuss initiatives to implement the building blocks. Two mutually supportive mechanisms are proposed to accelerate and support transition to a transforming Green Paradigm: an Enabling Collaborative Platform to motivate, promote, support and fast-track innovation, inventions and competitiveness, and the Myanmar Green Horticulture Institute, to support and promote horticulture of the future, to drive and revolutionize agriculture. Building upon the Myanmar Community Agroforestry strategy, the concept of ‘agrohortiforestry’ is introduced.

The Sixth GEGG Forum provides a provisional Framework of Vision; Integrated and Holistic Concept, Policy and Strategy Determinants; Building blocks for Actions; and two supporting Platforms to pilot test and demonstrate the efficacy of the integrated and holistic Framework.

GEGG Forums do not have any Entrance or Conference fees and are free by invitation.

Please contact <info@GEGGmyanmar.org>

END NOTES

*[IPCC Special Report Summary for Policy Makers on the impacts of global warming of 1.5 °C](https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf) above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

* [U.S. Global Change Research Program Climate Science Special Report \(CSSR\)](https://science2017.globalchange.gov/) Final Clearance

28 June 2017 USGCRP was prepared by 13 US Federal Departments and Agencies that carry out research and support the Nation’s response to global change The Report summarized the linked and integrated aspects. “Temperature affects agricultural productivity, energy use, human health, water resources, infrastructures, natural ecosystem, and many other essential aspects of society and natural environment. Recent data adds weight of evidence for global-scale warming, the dominance of human causes, and the expected continuation of increasing temperatures, including more record-setting extremes.” <https://science2017.globalchange.gov/>

*[Worldwide Threat Assessment. US Senate Select Committee on Intelligence](https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR--SSCI.pdf): Statement for the Record 29 Jan 2019 .Highlights included the linked effects and impacts on the many aspects of human and national security: “Global environmental and ecological degradation, as well as climate change, are likely to fuel competition for resources, economic distress, and social discontent through 2019 and beyond. Climate hazards such as extreme weather, higher temperatures, droughts, floods, wildfires, storms, sea level rise, soil degradation, and acidifying oceans are intensifying, threatening infrastructure, health, and water and food security. Irreversible damage to ecosystems and habitats will undermine the economic benefits they provide, worsened by air, soil, water, and marine pollution. “

<https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR--SSCI.pdf>

NAY PYI TAW SEGMENT AT MICC 2
Transformational Policies and Strategies Provisional Framework
Accelerating Green Transition

4 FEBRUARY 2020, DAY 1

8 to 8.45 Registration at MICC 2

SESSION 1

9.00 to 10.00 OPENING

(Speakers to be announced)

10.00 to 10.15 BREAK

SESSION 2

10.15 to 11.30 EMINENT PERSONS ROUNDTABLE DIALOGUE ACCELERATING TRANSFORMATIVE GREEN PARADIGM --- Challenges and Opportunities

(Speakers to be announced)

Decarbonizing global economy trends, climate change, ecosystem destructions, and pollution, in particular plastics and hazardous wastes, Increasing and expanding global green investment and development trends.

In 2018, in the broadest possible terms for green tech activities, products and services of all types, global green tech is estimated to be at approximately US \$4.67 trillion.

According to IRENA, International Renewable Agency, driven by investments, renewable energy in 2017 provided a significant - and growing - number of 10.3 million jobs worldwide.

The energy sector, in all of its many facets, is unquestionably a major part of the green tech field. There is compelling need for bold, visionary, holistic and integrated vision, concepts, policies, strategies, actions that are aligned with institutions.

According to the UNISDR "between 1998 and 2017 climate-related and geophysical disasters killed 1.3 million people and left a further 4.4 billion injured, homeless, displaced or in need of emergency assistance. While the majority of fatalities were due to geophysical events, mostly earthquakes and tsunamis, 91% of all disasters were caused by floods, storms, droughts, heatwaves and other extreme weather events.--- during this period direct economic losses were valued at US\$ 2,908 billion , of which climate-related disasters caused US\$ 2,245 billion or 77% of the total. This is up from 68% (US\$ 895 billion) of losses (US\$ 1,313 billion)" **The World Bank recently calculated that the real cost to the global economy is a staggering US\$ 520 billion per annum, with disasters driving 26 million people into poverty every year.**

Business as usual and silo approaches will not be adequate to respond to the mega, systems and systemic changes, or open up new and expanding opportunities. Bold vision, integrated and holistic policy and strategy, aligned with and supported by actions are needed. Collaboration of the private sector is imperative

Myanmar has the opportunity to be at the forefront of the growing worldwide trend towards a green paradigm and a safer future

SESSION 3

11.30 to 12.45 INCREASING NATURAL RESOURCE USE EFFICIENCY: INTEGRATING ENERGY, WATER, SOIL, MATERIALS. (*Speakers to be announced*), (*Cross reference with Sessions 14, 15, 16*)

Energy, water, soil and materials are major inputs for green growth. Integrating the four components considerably increases efficiencies and benefits.

Enabling R & D Policy and Strategy are necessary to promote breakthroughs in new generations of clean and renewable energy; water quality and quantity availability and affordability; increasing knowledge on soil microbiology for food; smart materials that mimics the conversion efficiency of nature . Food security and safety are critically important. The value chain, from growing, pre and postharvest loss reduction, nutrition, transportation, storage, packaging, and consumption, and the overarching impacts of climate change. From recent published research reports, an emerging concern is with the correlation of reduction of nutritional value with increase in atmospheric CO2 content, highlights the interconnectedness of the whole value chain.

Plant-associated microbiomes have tremendous potential to improve plant resilience and yields in farming systems. There are many reports and empirical evidence that biological technologies using microbes or their metabolites can enhance nutrient uptake and yield, control pests and mitigate plant stress responses. To fully realize the potential of microbial technology, their efficacy and consistency under the broad range of conditions need to be improved. While the optimization of microbial bio fertilizers and bio pesticides is advancing rapidly to enable use in various soils, crop varieties and environments, crop breeding programmes have yet to incorporate the selection of beneficial plant–microbe interactions to breed ‘microbe-optimized plants’. Emerging efforts exploring microbiome engineering could lead to microbial consortia that are better suited to support plants. A combination of approaches need to be integrated to achieve maximum benefits and significantly improved crop yields to address food security and safety.

Increasing Water Use efficiency, WUE, in agriculture and horticulture, E.g. better harmonization with irrigation system, improving design for more efficient measurement and recording of water services. Improving design and management of irrigation systems.

In May 2019 WHO World Health Assembly Member States agreed on a “new global strategy on health, environment and climate change: the transformation needed to improve lives and well-being sustainably through healthy environments. The strategy provides a vision and way forward on how the world and its health community need to respond to environmental health risks and challenges until 2030. Risks include environmental physical, chemical, biological and work-related factors. “

The critically important roles of renewable energy in food are discussed in subsequent Sessions

12.45 to 13.45 LUNCH

SESSION 4

13.45 to 15.00 NEXT GENERATION NEW, CLEAN RENEWABLE ENERGY (*Speakers to be announced*). (*Cross reference with Sessions 14, 15, 16*)

Renewable energy plays a critically important role in decarbonizing the economy and towards a green paradigm, a growing global trend

To be in line with the Paris Agreement, there is a need to increase investment in renewable energy in the global energy mix to 36% by 2030, and up to 65% by 2050.

Wind and Photovoltaic capacity investment are expected to account for US\$9.5 trillion in new investment between now and 2050.

Increasing energy mix and diversification enhance security, reduce reliance on one source and vulnerability to power shortages and blackouts during climate cycles, unpredictable and extreme meteorological events, and unforeseen global events.

Demand Side Management (DSM), modifies consumer demand for energy through e.g. financial incentives, behavioral change, awareness and education to encourage less energy use, in particular during peak hours, or off-peak times.

DSM technologies are become increasingly feasible with integration of information and communications technology and the power system and smart grid.

Increasing Energy Efficiency, Conservation and Harvesting. These systems are cost effective, using less energy to perform the same task, eliminating energy waste, good housekeeping and engineering practices are fundamental steps that need to be implemented.

There are enormous opportunities for efficiency improvements in every sector of the economy, buildings, transportation, industry, agriculture and energy generation.

The transition to next generation of clean and renewable energy will provide opportunities and catalyze research, innovations and wider applications that will drive down costs.

Photovoltaics primarily crystalline silicon (c-Si), thin-film PV, and concentrating PV are widely used in many applications. With rapidly falling prices, demand and applications are increasing

There is a need to ensure quality, performance, reliability and price are carefully weighed.

Building-integrated photovoltaics systems to provide savings in materials and electricity costs, would also increase the architectural appeal of a building.

Artificial photosynthesis, that bio-mimic and replicates the natural process of [photosynthesis](#)

Research and development that integrate materials sciences and biology include

Photocatalytic water splitting that converts water into [hydrogen](#) and oxygen; [Light-driven carbon dioxide reduction](#) that replicates natural carbon fixation; photo electrochemistry in fuel cells; engineering of enzymes; photoautotrophic microorganisms for microbial fuel cells; and bio hydrogen production from sunlight.

Hydrogen, high in energy, and when burned produces almost no pollution. NASA, since the 1970s, has used liquid hydrogen to propel the space shuttle and other rockets into space. Hydrogen fuel cells power the shuttle's electrical systems, producing a clean byproduct - pure water, which the crew drinks.

Hydroelectric is globally the largest source of renewable electricity. As reported by the US Union of Concerned Scientists, "although the generation of hydropower does not emit air pollution or greenhouse gas emissions, it can have negative environmental and major social consequences. Blocking rivers with dams can degrade water quality, damage aquatic and riparian habitat, block migratory fish passage, and displace local communities. The benefits and drawbacks of any proposed hydropower development must be weighed before moving forward with any project. If it's done right, hydropower can be a sustainable and nonpolluting source of electricity that can help decrease dependence on fossil fuels and reduce the threat of global warming."

Geothermal Direct use, include heating buildings, raising plants in greenhouses, drying crops, heating water at fish farms, and industrial processes. Heat pumps, use shallow ground to heat and cool buildings. As heat is drawn from the ground, much less energy is needed than conventional heating and cooling systems. Generating electricity Small-scale geothermal power plants (under 5 megawatts) have the potential for widespread application in rural areas, possibly even as distributed energy resources to improve the operation of the electricity delivery system.

Biomass renewable energy resource from non-food crops, e.g. Plant and algae-based materials that include: crop wastes, forest residues, urban and food wastes. Algae needs to be promoted and supported to increase energy options and mix.

SESSION 5

15.00 to 16.15 PROMOTING SMART, COMPOSITE, NATURAL MATERIALS (*Speakers to be announced*). (Cross reference with Session 14)

The Green Paradigm transition will need innovative materials with increased functionality to improve energy and resource productivity and savings in processes and applications. Advanced composites, hybrid materials, engineered polymers and low-density/high-strength metals or alloys are some examples.

Biomimetic, bio responsive and bioactive materials, "smart materials" assisting the mobility of the elderly and those with disability are increasingly used in medical applications and in aging societies.

Smart Glass to enhance energy conservation and efficiency as well as self-cleaning, are increasingly used in buildings, automobiles and airplanes.

These filter out infra-red spectrum of sunlight but allows light spectrum wave lengths to pass through. Recent innovations and development include incorporating resilient properties that will enable the glass to withstand hurricanes and typhoons.

As Myanmar will fast become more urbanized, smart glass applications in malls, offices, hospitals, and in homes need to be promoted and supported. The savings in energy costs need to be made aware and demonstrated.

Natural materials

Traditional and indigenous knowledge need to be revived to improve and expand the use and application of natural materials. They are renewable, sustainable, much less impacts on the environment, readily recycled and reused, locally available and can increase employment opportunities. There should also be increased and expanded use of natural fibers, promoted by FAO in 2009 in Celebration of the International Year of Natural Fiber. These include cotton; flax. Jute, hemp; sisal; and husk fibers, such as coconut as well as animal fibers e.g. wool, hair and secretions, such as silk.

Bamboos are of notable economic and cultural significance in large parts of Asia. The plant is used for **building materials**, as a food source, and as a versatile raw product. Bamboo has a higher **specific compressive strength** than **wood, brick or concrete**, and a specific **tensile strength** that rivals **steel**.

Bamboo is often described as the perfect natural building material. It is abundant in Myanmar and the plant can grow more than a meter per day. It is renewable, when harvested, it regrows without having to be replanted. The building industry and architects need to harness the plant's significant properties and potentials.

With its inherent sustainability and ecological benefits, bamboo needs to be supported with R &D and promoted in many applications such as paper, furniture, utensils, ornamental pieces, and to augment and supplement nonrenewable synthetic materials

Mud, combination of different kinds of **soil**, cob, adobe, and clay, are historically used synonymously to mean a mixture of subsoil and water possibly with the addition of stones, gravel, straw, lime, and/or bitumen for construction.

Cob a **natural building** material made from **subsoil**, water, fibrous **organic material** (typically **straw**), and sometimes **lime**. Cob is fireproof, resistant to seismic activity, and uses low-cost materials. It is labor intensive and hence provides local employment opportunities.

SESSION 6

16.15 TO 17.30 ACCELERATING DEVELOPMENT AND PROMOTION 5G INFRASTRUCTURES

(Speakers to be announced). (Cross reference with Session 17)

Myanmar's interconnectivity vaulted from around 5 % a decade ago to almost 90% by early 2019. This is a record achievement for mobile connectivity supported by increasing number of towers rising from 3,000 in 2013 to 11,700 today, while the national fiber backbone has grown from 7,600 kilometers in 2013 to 31,000kilometers. This record achievement demonstrates and underscores Myanmar's ability to fast track connectivity development.

5G, the fifth generation of wireless technology, touted as "game changing" significantly advances mobile technology in speed, number of permissible connections, latency, capacity, and reliability. It has the ability to improve communication between people, as well as to enable people to interact with the growing ecosystem of connected machines around them. 5G will be the catalyst for significant long term changes in the way people communicate, and what gets communicated. Digitization will contribute significantly in all sectors including production, transportation, agriculture, energy, urban and rural development, healthcare and education

Rules and Regulations are needed for 5G infrastructures development, subsidizing costs, attracting investments, license fees and payment terms. Some of the specific policy and strategy issues that will affect 5 G development include: spectrum availability, regulatory policy, financial burden to operators, and Protection of Personal Data, taking into consideration for example, the EU General Data Protection Regulation (GDPR) that went into effect in May last year.

The testing of 5 G network in some locations, as being undertaken in ASEAN neighboring countries should be conducted to evaluate 5G technology on coverage areas, capacity, maximum speed and compatibility with current infrastructure.

SESSION 7

17.30 To 20.00 NETWORKING WELCOME RECEPTION

5 FEBRUARY, DAY 2

SESSION 8

8.30 To 9.45.FINANCING AND ECONOMIC INSTRUMENTS FOR ACCELERATING POLICIES AND ACTIONS. *(Speakers to be announced)*

The ADB estimated that Developing Asia infrastructure (transport, power, telecommunications, water supply, and sanitation) to be US\$26 trillion from 2016 to 2030, or US\$1.7 trillion per year, if the region is to maintain its growth momentum, eradicate poverty, and respond to climate change.

With such large investment needed, it is very important to ensure the investments do not become “stranded assets”.

UNCTAD estimated that “achieving the Sustainable Development Goals (SDGs) by 2030 will require US\$3.9 trillion to be invested in developing countries each year. It also notes that with annual investment of only US\$1.4 trillion, the annual investment gap is US\$2.5 trillion.”

Green buildings represent a major global investment opportunity, with buildings making up the largest segment of the US\$231 billion energy efficiency market. The European Bank for Reconstruction and Development, EBRD, reported that “In EBRD countries of operations, however, they also represent a challenge. Currently, green-building renovation rates and practices in these countries are far below Paris Agreement targets. Furthermore, most of these efforts are not cost-optimal due to capacity and supply-chain limitations, as well as regulatory and policy constraints. The EBRD Green Economy Transition GET approach enables both direct and indirect green-building investments through a range of innovative channels and financial instruments, such as:

- direct finance, including debt, equity or quasi equity financing with a focus on green investments and use of advanced resource-efficiency techniques
- intermediated finance through local financial institutions or through nonfinancial intermediators, such as utilities and energy service companies
- large-scale public-private partnership (PPP) framework programs (greenfield and brownfield public buildings)
- sustainable property funds (commercial and private residential buildings)
- performance-based finance and other market based climate finance products that provide additional revenues for EBRD clients
- green-labelled property bonds (commercial/ public buildings)
- structured financing and If market barriers are very high, donor-funded”

The ADB in April 2019, Chiang Rai, Thailand, launched the “ASEAN Catalytic Green Finance Facility”, a new initiative to spur more than \$1 billion in green infrastructure investments across Southeast Asia. “The new facility provides loans and necessary technical assistance for sovereign green infrastructure projects such as sustainable transport, clean energy, and resilient water systems. It aims to catalyze private capital by mitigating risks through innovative finance structures”.

The UNEP 2016 Inquiry into the Design of a Sustainable Financial System publication “Green Financing for Developing Countries: Needs, Concerns and Innovations” identified the Key Concerns: (1) Integrated Approach—strongly emphasized that environmental considerations in financing be addressed in conjunction with economic and social issues and priorities, in particular access to finance for SMEs. (2). Dilemmas, Gaps and Tradeoffs— International measures to promote appropriate green financing of the transition to a green economy should not come at the cost of developing countries’ competitiveness, equity, development and financial inclusion. (3). Impacts of International Developments – Developments in the international financial system, including those in major national financial centers, impact on developing countries positively and negatively, a key matter for all developing countries seeking to achieve sustainable development.

SESSION 9

9.45 to 11.00 INNOVATIVE FUNDING AND RESOURCE FACILITY. *(Speakers to be announced)*

To provide support with financial, human and in-kind resources from bi-lateral, multi-lateral, national, international public, private sector sources and academia.

The Facility could have components of: Strategic framework; Capitalization; Administration; Operation and Implementation, with goals and outputs.

The Facility will be crafted to spur and support innovations, inventions, synergy and coherence of a Green Paradigm that will be visionary, holistic, and integrated and promote sustainable, resilient, smart, inclusive and equitable investments and development.

SESSION 10

11.00 TO 12.15 HUMAN RESOURCE MOST IMPORTANT RESOURCE, VOCATIONAL CAPACITY BUILDING FOR TRANSFORMATIONAL GREEN PARADIGM.*(Speakers to be announced)*

Human resource, the most important resource of a country, is a paramount determinant for an accelerated and sustained transition towards a Green Paradigm. With its long history, possession of traditional and indigenous knowledge, skills and wisdom on the use of its rich and diverse natural resources, the country has a rich reservoir of human resource that can be readily trained for the transition.

The global transition is moving fast. To fast track the transition, there is an urgent need to upgrade and train skills, with the knowledge and know how to address problems with alacrity and identify opportunities.

The private sector plays a very important role. They are a primary source for and beneficiary of a skilled and forward looking work force that will spur innovations, inventions, improve productivity, and competitiveness in the global market place.

Collaborative vocational training programme with transforming curricular content that imparts holistic and integrated thinking, knowledge and skills are needed. Training the trainers schemes are also critically needed to ensure the trainers have the necessary knowledge, capability and capacity.

SESSION 11

12.15 12.45 BRIEF SUMMARY HIGHLIGHTS *(By GEGG)*

SESSION 12

12.45 CLOSING *(Speaker to be announced)*

13.00 LUNCH

15.00 LEAVE FOR YANGON.

YANGON SEGMENT AT UMFCCI (COSPONSORED BY UMFCCI)

Accelerating WHAT to HOW SOLUTIONS

For Green Implementation

State of the Art Technologies and Management, Traditional & indigenous Knowledge

6 FEBRUARY DAY 3

SESSION 13

9.00 to 09.45 OPENING

(Speakers to be announced)

09.45 to 10.00 BREAK

SESSION 14

10.00 TO 11.15 GREEN BUILDINGS AND INFRASTRUCTURES. *(Speakers to be announced)*

(Cross-reference with Sessions 3, 4, 5)

Buildings and infrastructures such as roads, bridges, electricity and water supply, waste disposal and management are interconnected. Greening, resiliency, sustainability and “smart” attributes need to be integrated in designs and operations.

Infrastructures play a critically important role in social economic development.

As very large long term investments are needed, it is very important the infrastructures do not become obsolete and become “stranded assets”.

Investment needs for Developing Asia infrastructure, defined by ADB as transport, power, telecommunications, water supply, and sanitation are estimated by ADB to be US\$26 trillion from 2016 to 2030, or \$1.7 trillion per year, if the region is to maintain its growth momentum, eradicate poverty, and respond to climate change (climate-adjusted estimate). Without climate change mitigation and adaptation costs, US\$22.6 trillion will be needed, or US\$1.5 trillion per year (baseline estimate). Of the total climate-adjusted investment needs, US\$14.7 trillion will be for power and US\$8.4 trillion for transport. Investments in telecommunications are expected to reach US\$2.3 trillion, with water and sanitation costs at US\$800 billion over the period.

Green Buildings, as mentioned in Session 8, represent a major global investment opportunity, with buildings making up the largest segment of the US\$231 billion energy efficiency market

Green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution and environmental degradation

Maximizing use of new and renewable energy, harvesting rain water, reusing gray water; utilizing smart and natural materials, and designing Net-zero structures are some of the ways towards green structures.

The US Green Building Council Leadership in Energy and Environmental Design (LEED) standards provide measurable criteria for the design and construction of environmentally responsible buildings. Key criteria are:

Sustainable site development; whenever possible, the reuse of existing buildings and the preservation of the surrounding environment, incorporation of roof gardens, and planting throughout and around buildings. Conservation of water and energy, e.g. cleaning and recycling of gray water, installation of building-by-building catchments for rainwater. Monitoring of water use and supplies. Increasing and improving energy efficiency, e.g.

Orienting buildings to take full advantage of seasonal changes in the sun’s position, use of diversified and regionally appropriate energy sources such solar, wind, geothermal, biomass, hydro. Materials that are recycled or renewable, free of toxic and hazardous chemicals, require the least energy to manufacture, ideally made of nonpolluting raw ingredients and are durable and recyclable. Indoor environment that improves health and wellbeing, including the use of materials that do not emit toxic gases. LEED requires Diversion of construction and demolition debris from disposal in landfills and incineration facilities. Redirect recyclable recovered resources back to the manufacturing process and reusable materials to appropriate sites. And requires developing and implementing a construction waste management

plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or comingled.

There is an increasing global trend towards designing and constructing net zero / zero-energy building. The goal is becoming more feasible as the costs of alternative energy technologies decrease, and the growing need to address climate change. Augmenting advances in renewable energy technologies, building industry innovations include high efficient spray-foam insulation, solar panels, **heat pumps**, smart and self-cleaning glass, smart metering to measure and control energy use. Smart glass filter out infra-red spectrum of sunlight but allows light spectrum wave lengths to pass through. Recent innovations and development include imparting resilient properties that will enable the glass to withstand hurricanes and typhoons. Smart glass ore increasingly used in buildings, automobiles and airplanes.

Green infrastructures are resilient. It enhance water management, protects, restores and mimics the natural water cycle. Investments create employment, are cost effective, enhance community safety and improve quality of life.

Storm / Rain water runoff is a major cause of water pollution in urban areas.

Higher flows resulting from heavy rains also can cause erosion and flooding in urban streams, damaging habitat, property, and infrastructure.

Practices include: planting trees, restoring wetlands and floodplains, use of vegetation, soils, and other elements to restore some of the natural processes that absorb and store water.

At the local level, green infrastructure practices include rain gardens, permeable pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting systems.

For transportation infrastructures, there is increasing inclusion of wildlife crossings such as: **tunnels**, culverts, **viaducts**, **fish ladders**, **canopy bridge**. These also support **habitat conservation**, connections or reconnections between **habitats**, and combating **habitat fragmentation**.

Similar structures are also used for domesticated animals.

SESSION 15

11.15 TO 12.30 BEYOND ORGANIC HOTRICULTURE, WITH EMPHASIS ON

“AGROHORTIFORESTRY” (Speakers to be announced). (Cross reference with Session 17.2)

This Session builds upon the 22 to 26 March 2017 Green Fruits Dedicated Workshop in Yangon and the 17 to 21 March 2014 17th ASEAN Conference on Civil Service Matters (ACCSM) Seminar on Improving Green Productivity Improvement and Developing Green Economy, Organized by Myanmar Civil Service Board, at Central Institute of Civil Service , Pyin Oo Lwin www.geggmyanmar.oorg

There is an opportunity to position Myanamr at the forefront of green horticulture, above and beyond Organic.

An Innovative Experimental and Demonstration Horticulture Farm incorporating a leapfrog Transformation and Translation Laboratory, with aspirations to be a "blank canvas for green horticulture" The MGHI would incorporate state of the art designs, materials in harmony with natural materials, climate and traditional knowledge, and with smart features. The activities would include:

Leapfrog to a low-carbon, low-input, sustainable green horticulture, and breeding for the future;

Digital, Thermal, and Hyperspectral imaging, remote sensing; benchmark canopy development; Genetics, genomics & breeding for resistance, quality and dwarfing root stocks; Bacterial diseases and biological controls, Stress signals measurements for ripeness, improved flavour, firmness, phytonutrient content, and shelf-life; Inter-cropping Science. Technology, Management; Measurement Services for hydro meteorology, water, soil, biodiversity; New and Renewable Energy In-situ for Agrohortiforestry, State of the art bioenergy , wastes to energy, solar, wind, geothermal.

Pre harvest Loss Prevention Precision farming; Micro-dosing, Inter cropping and crop rotation,

Breeding with crop specific genetic and molecular resources, homogeneity of the pest and conservation of wild rootstocks with genetic diversity; selecting crops and varieties which are resistant to pest; timing planting and harvest dates to minimize pest damage. Postharvest Loss Reduction and Prevention : Controlled atmosphere Thermal immersion; Cold Storage, Traditional Practices, Good engineering and house-keeping applications, Marketing & Promotion for green produce and value addition , Value chain analysis, Vertical and horizontal integration, Public Awareness and Education on health and nutrition, economic and social benefits, Geographical indexing, Certification, quality assurance.

Establishing a Horticulture Seed Bank to preserve and conserve genetic diversity and resources as well as historical and cultural value, available for research that benefits the public.

12.30 TO 13.30 LUNCH

SESSION 16

13.30 to 14.45 SOME MARKET POTENTIALS FOR GREEN, SAFE AND HEALTHY LIVING & WELLBEING. (*Speakers to be announced*). (*Cross reference with Sessions 4 and 14*)

There is increasing global awareness of and the correlated demand for socially responsible, sustainable, safe and nutritional food, less harmful products and greater use of natural materials in clothing. There is a growing trend to phase out plastics, in particular for single-use. Currently, environmentally sound disposal is a major challenge and opportunity. In homes, dwellings, buildings, and transportation there is also a growing demand for more efficient use of energy, water and increase in safety. With leap frog 5G network and expanding use of social media, the market demand for “green” products, processes and services are increasing significantly. As mentioned in Sessions 8 and 14 Green Buildings make up the largest segment of the US\$231 billion energy efficiency market. Add on to this is the enormous market potential for green and safe food and clothing.

The potential for green, safe, healthy living, welfare and wellbeing is as extensive as the horizon of a bold vision.

Reiterating the proposition made in earlier Sessions, Myanmar with its abundant and still pristine natural resources, in particular biological, soils, water and air, coupled with long history of traditional and indigenous knowledge and skills, the country is well positioned to be at the forefront of the transition towards the national and global demand for green and safe products, processes and services that underpin a transformational green paradigm.

Food availability, safety, diet and nutrition are central to health and disease burdens. A balanced nutritious diet with more vegetables and fruit and less sugar and salt, contributes to better health. To reduce the risk of foodborne illness, consumers need to change behaviors that are not consistent with safe food storage and preparation practices. There need to be also public awareness of the role of diet and eating habits in contributing to the health status. What people buy and eat and the way they manage food depends not only on the individual but also on social, cultural, economic, and environmental factors. Identifying an effective strategy to improve consumers’ behavior is needed. The Nutrient, hazard Analysis and Critical Control Point (NACCP) process, for total quality management (TMQ), and optimize nutritional levels based on EU Regulation CE 852/2004, international agreed approach for food safety control, is based on four general principles of : *i) guarantee of health maintenance; ii) evaluate and assure the nutritional quality of food and TMQ; iii) give correct information to the consumers; iv) ensure an ethical profit.*” Ten Actions are proposed for implementation.

Bamboo fibers micro cellulose food additives are widely used in food industries as an ingredient because of its water-binding and texturizing properties in many processed food products varying from bakery products, dairy products, meat and fish products, beverages, sauces, and dressings, as a low-calorific additive to avoid moisture loss and to preserve taste and flavor of food products. Food made with these additives are sometimes labelled as all natural food.

Textiles & Clothing Wearing appropriate clothing in hot humid weather is sensible, improves comfort, health and wellbeing as well as environmentally responsible. The December 2016 Fifth GEGG Forum Yangon Segment at Yangon University, organized the Myanmar Green Fashion Design Show and Competition, in cooperation with Myanmar Fashion Designers Group; Talents & Models. Over 800 dresses and accessories, all made with natural materials and dyes and free of toxic chemical, were worn and displayed by 40 shortlisted contestants. The winners were chosen by an independent panel of Judges. The televised evening event was attended by over 1500 invited guests. The event highlights and underscores the interest and talent of designers and manufactures of all natural and green fabrics. The website www.geggmyanmar.org has more details.

Natural fibers for textiles and fabrics include:

Organic cotton, certified by a third party is grown without the use of toxic and persistent pesticides and synthetic fertilizers and use methods and materials that have a low impact on the environment. All cotton sold as organic in the United States must meet strict federal regulations on how the cotton is grown.

Bamboo fibers, from the world's fastest-growing plant, is sustainably grown, biodegradable, recyclable, naturally pest- and insect-resistant. The yarn is used for a wide range of textile and fashion applications and can also be blended with other textile fibers such as hemp.

Tencel fabric is organically produced from sustainably harvested wood pulp.

Hemp is naturally insect-resistant, anti-microbial, and requires no herbicides, pesticides or chemical fertilizers to produce.

Lotus fibers from the species *Padonma Kyar*, from Inle Lake, Myanmar, woven into fabrics is amongst the most expensive fiber in the world. Using natural materials e.g. from tree barks, seeds and ashes, the fibers are dyed into other colored fabrics and woven. The whole process is very labor intensive and provides employment opportunities, particularly to women. The lotus stem fibers produce very high quality clothing and is very expensive in the international market. The fabric is lightweight, soft and are known to keep the wearer cool in summer and warm in winter

Keeping Homes and Buildings green Basic recommendations of "Green America" prevent the release of toxic and hazardous volatile organic compounds (VOCs) such as formaldehyde and harsh acids. Natural products for cleaning and antifungal include White vinegar, Lemon juice, Baking soda, Borax, Hydrogen peroxide (3% concentration), Club soda, Liquid castile (vegetable based) soap,

Water Conservation and Efficiency. Many countries are confronted with water deficits and an increasing number of cities around the world are experiencing water shortage.

Formulate and implement programs and practices to help change behaviors, use less water, and only when needed.

Water efficiency means doing more with less water and usually relies on well-engineered products and fixtures such as low-flow toilets, showerheads, faucets.

Energy Conservation and Efficiency, products, services and applications have enormous business potentials.

An increasing number of countries are phasing out incandescent light bulbs and replacing them with LED fixtures, Florescent light tubes consume more electricity than LED and importantly, have mercury. The tubes are often classified as hazardous waste when disposed. There could also be requirements for recycling or safe disposal.

Time and /or motion activated light switches save and conserve energy.

There is increasing use of smart glass windows and designing buildings that maximize natural light

Good housekeeping and engineering practices, apply to both Water and Energy, are cost effective and readily implemented.

From 3 R to 4 R: Reduce, Reuse, Recycle, and Rethink.

The amount and composition of waste generated is closely linked to consumption and production. The number and range of products entering the market is increasing. Demographic changes, urbanization, increase in standards of living, also affect the waste cycle and how the waste should be managed. In major urban cities, packaging wastes is the major source of household waste. Waste is not only an environmental problem, but also an economic loss.

Critically important is the safe reuse and disposal of wastes, particularly hazardous wastes

A fundamental step in waste management must be prevention

There is an imperative to Rethink past and current practices of Reduce, Reuse and Recycle and to Rethink innovative actions that will make significant and sustainable solutions towards a Green Paradigm.

Waste to Resource need to be an important component of waste management.

Turning waste into a resource by 2020 is one of the key objectives of the EU's Roadmap to a Resource Efficient Europe. The roadmap also highlights the need to ensure high-quality recycling, eliminate landfilling, limit energy recovery to non-recyclable materials, and stop illegal shipments of waste. Household, kitchen and garden waste constitutes a large fraction of municipal solid waste, can be turned into an energy source or fertilizer.

The processes for converting waste to resource include:

Anaerobic digestion, a biological decomposition process, produces biogas and residual material, which in turn can be used as fertilizer, like compost.

Microbial biotechnology described as 'natural' way of addressing environmental issues ranging from bioremediation techniques to green bio hydrometallurgical processes for industrial, agricultural and municipal effluents and residues.

Bio hydrometallurgy based on the application of microbial catalyzed processes, extracts metals from different raw materials. Biotechnological cutting-edge process of bio hydrometallurgy, include bioleaching, bio precipitation, bio flotation, bio flocculation, bio oxidation, bio sorption, bio reduction, bioaccumulation.

Hydrometallurgical, Physical and Chemical process including acid leaching and immobilized chelating agents recover precious metals from e-waste.

Incineration burns the waste, generate energy, and create less ash for disposal. Electrostatic precipitators, dry and wet scrubbers, fabric filter remove potentially harmful particulates and gases from the incinerator's emissions. The remaining ashes must be properly disposed of in a landfill.

SESSION 17

14.45 to 16.00 UNLEASHING 5G POTENTIALS. *(Speakers to be announced)*

(Cross reference with Session 6)

The advent of 5G opens up many potentials for products, processes, applications and services, and in particular R & D. These include: providing infrastructure services to attract more investments; technical testing programme to evaluate the application of the technology in various applications; supporting automation and artificial intelligence; strengthening network security to protect the safety of internet users and data; promoting digitalization in e.g. production, energy, agriculture, horticulture, healthcare and education. Some examples of applications underscore the exploding range.

Smartphones, and infrastructure are enabling new mobile experiences and technologies that are evolving to make it fast, smooth, and increasingly more immersive communication.

For energy, three major categories are smart metering; Smart homes; and Smart grids, for a more resilient, less wasteful and more affordable energy. 5G and Internet of Things (IoT) will improve the usability and usefulness of the IoT as it makes homes and grids more intelligent and energy-efficient. Energy metering for data-gathering and forecasting across individual facilities as well as complex supply chains will be considerably enhanced. This knowledge will help spread out spikes in demand as well as identify opportunities to invest in more capable infrastructure

Healthcare and Empowering Patients. 5G will usher in an era of personalized, self-directed healthcare, empowering patients with the ability to manage their health and medical conditions better. 5G will provide an unprecedented level of connectivity, enabling continuous monitoring and sensory processing devices of wearable technologies feasible, and help patients achieve wellness and independence. 5G technology has the potential to help healthcare organizations meet the growing demands of IoT-focused transformation by providing a pathway for more significant amounts of data to be shared — faster — across networks. Remote monitoring tools powered by 5G will enable doctors to not only keep an eye on local patients but also to attend to anyone elsewhere without having to leave the office.

The telemedicine market is expected to grow at a compound annual rate of about 17% through 2023. due to government-driven healthcare initiatives and the demand for better healthcare in rural areas, including access to specialists who might otherwise be unavailable.

5G will also be able to support the high-resolution video requirements patients will have more accessible healthcare, including access to specialists who might otherwise be unavailable.

With the introduction of 5G, old devices and infrastructure elements may be rendered incompatible. Replacing those devices will be costly for providers. These issues need to be addressed with urgency, to bring health care benefits to people, particularly in rural areas.

Farming to ensure the future of food The FAO estimates “the world will need to grow 70% more food in 2050 than it did in 2009.”

Agriculture is using technologies such as remote sensors and drones as key tools to test and collate data; drones with 5G capabilities to boost production through precision agriculture for pest protection and the integrated pest management protocol needed. Other 5G innovations in farming include artificial intelligence and cloud computing methods to monitor soils properties. A smartphone app to track "connected" cows. The collars send updates on the cow's health and behavioral patterns Veterinarians and nutritionists can then monitor data collected for proper feeds and medicines.

Professor Mario Caccamo, Managing Director, National Institute of Agricultural Botany, Kent, UK stated “*We cannot meet the challenge of the food security agenda by producing food tomorrow, the way we produced food yesterday. We have to innovate*” at the GEGG Green Fruits Dedicated Workshop, March 2016, Yangon. (www.geggmyanmar.org) At the six-day

Workshop the importance and potential for harnessing IT technologies revolution were discussed and elaborated. These include: Digital imaging – improving yield forecasts; Thermal imaging – monitoring for abiotic and biotic stresses; Hyperspectral imaging – rapid, non-destructive assessment of quality; Closed loop, multi-sensor, precision fertigation, remote sensing; Canopy growth vs Reference; Benchmark Canopy Development.

To underscore the unfolding future of and expanding application potentials for 5G was presented at the recently held International Horticultural Exhibition 2019 in Beijing's Yanqing district.

SESSION 18

16.00 TO 17.00 ACTIONS SUPPORTING IMPLEMENTATION.

Demonstrating and Supporting HOW. Two mutually supporting initiatives.

(Brief Introduction by GEGG and Speakers to be announced)

18.1 An Enabling Collaborative Green Paradigm Platform for Capacity Building, Innovation, Invention, Competitiveness

A Platform to catalyze, develop, pilot test, demonstrate and promote the integration of state of the art science, technology, engineering, and management systems, with ancient wisdom, traditional knowledge and practice.

There are emerging and expanding opportunities for Myanmar to jump start, fast-track and leap frog towards a bold vision of Green Paradigm that spurs innovation, inventions and entrepreneurship and promotes *integrated and holistic* sustainability, resiliency, equity and inclusivity. This vision and strategy will motivate and increase new forms of investments and development and provide new dimensions and channels for the engine of growth.

Integration requires not only of disciplines and sectors, but also of processes and institutions.

Vision, objectives, goals, policies, strategies, means, institutions, governance all need to be aligned and integrated.

A Transformative Green Paradigm Platform, encompassing the expanding holistic determinants is imperative for future pathways towards decarbonization, safer and cleaner materials, products and processes, healthier and safer future.

18.2 Establishing the Myanmar Green Horticulture Institute, MGHI.

(Cross reference with session 15)

To position Myanmar above and beyond Organic horticulture and towards a Green horticulture of Tomorrow.

Initiatives to support the implementation of Session15 would include:

- An Innovative Experimental and Demonstration Horticulture Farm, including incorporation of “agrohortiforestry” with leapfrog Transformation and Translation Laboratory. This would also be used for training and capacity building.
- Harnessing IT, in particular 5 G applications
- A data Centre
- A Centre to demonstrate and promote Pre and Post-harvest loss
- A Seed Bank to increase collaboration, conserve plant genetic diversity, and spur R&D for seeds to withstand climate change and pests resistance

SESSION 19

17.00 TO 18.00 PANEL DISCUSSION: IMPLEMENTING NEXT STEPS

(Panelists to be announced)

SESSION 20

18.00 CLOSING

(Speaker to be announced)