Bridging Climate Information Gaps to Strengthen Capacities for Climate Informed Decision-making

FORESIGHT STUDIES AND RESEARCH PRIORITY SETTING IN CLIMATE SCIENCE AND POLICYMAKING TRAINING MODULE

For policy makers, Scientists and practitioners

Prepared by

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INTRODUCTION TO THE TRAINING MODULE

The critical Stakeholders will be able to realize the full potentials/benefits of Foresight Studies and Research Priority Setting in Climate Science and Policymaking;

An established Climate information data that will inform decision making and support development planning;

Build capacities and knowledge of stakeholders to collect and utilize high quality, and demand driven climate information for adaptation planning and decision making in the identified thematic areas. Mainstream climate change issues in regional policy dialogue.

In total the training modules have 5 units;

- UNIT 1: Understanding Foresight Studies, Its link with Climate Science and Policy Making
- UNIT 2: Institutionalization and Phases of Strategic Foresight Studies
- UNIT 3: Foresight Studies, Climate Science and Policy Making
- UNIT 4: Case Study1: Sustainable Rail Programme in UK: Foresight Studies in Sustainable Development
- UNIT 5: Case Study 2: Foresight Studies, Policy Planning and Execution in Africa

TRAINING MODULE OBJECTIVES

The module on Foresight Studies and Research Priority Setting in Climate Science and Policy making has the following general objectives:

- Equipping policy makers to realize the full potentials and benefits of Foresight Studies and Research Priority Setting in Climate Science and Policymaking;
- Equipping policy makers with content and skills to train others on foresight studies and research priority in climate science and policy making;
- Motivating policy makers and practitioners on the value of Scenario Process-a foresight process in planning and implementation.
- Motivating policy makers and practitioners to develop 'Strategic Agenda' for the relevant Ministries, Departments and Agencies(MDAs)

These objectives should be written on a manila card, white board, newsprint, or chalk board or use transparency and over head projector or any appropriate material to share them with your colleagues and trainees.

Some Assumptions

- Policy makers will make well informed decisions on long term development planning when they have complete and accurate knowledge on foresight studies and research priority setting in climate science;
- Policy makers and practitioners have the opportunities to gain the appropriate skills in Scenario Process, a key foresight studies long term planning tool;
- Policy makers will be able develop long term Strategic Agenda for their various MDAs using the Scenario Process.

  One of the most crucial assumptions that this module will makes is about the facilitator who is key to the success of this intervention. The facilitator should have the following traits:
- Be social and enjoys interaction with people from different backgrounds;
- Be knowledgeable in climate science and foresight studies;
- Be respectful of others and their opinions;
- Be enthusiastic about facilitating this module;
- Have good communication and good facilitation skills;
- Be non-judgmental
- Be proficient at using a variety of participatory and experiential programme techniques

  Facilitators are free to add questions to exercises or alter the sessions in other appropriate ways to make the content more relevant to the participants. If you are training people who have little experience of the subject matter, facilitators are advised to present the training in its entirety. If the trainees have had some knowledge of the subject matter, conduct a needs assessment to determine what information they have and what gaps exist. Then select the topics that best fulfill their training needs.

FACILTATION APPROACHES AND TECHNIQUES

i. Experiential Education
ii. Specific Technique/Games and exercises (Introductory game systems study-ways of dancing the system)
iii. Participatory –hinging more on group discussion(inter-sector)
iv. Lecturette

v. Discussions

vi. Case studies/ scenarios- Assignment/Task

EVALUATION OF THE TRAINING SESSIONS:

i. Moodmeter

ii. Flash

HOW TO USE THE TRAINING MODULE

The module is intended primarily to train policy maker and practitioners. However it has been written for adaptation of various uses.

In summary the training module has five units, as follows:

- UNIT 1: Understanding Foresight Studies, Its link with Climate Science and Policy Making
- UNIT 2. Institutionalization and Phases of Strategic Foresight Studies
- UNIT 3: Foresight Studies, Climate Science and Policy Making
- UNIT 4: Case Study1: Sustainable Rail Programme in UK: Foresight Studies in Sustainable Development
- UNIT 5: Case Study 2: Foresight Studies, Policy Planning and Execution in Africa

  Each unit is broken down in sessions. All sessions have experiential activities that address the topics objectives in a variety of interesting ways. Each unit specifies the purpose, the materials needed, the approximate time required, and steps to follow. All the units specify the preparation that must be done before the session. Some session have hand outs for the trainees.

  To design and conduct a programme tailored to the needs of learners, you need to do the following:

- Familiarize yourself with the entire training module. In particular, note each unit may have several sessions.
- The time allocated to each session is only a guide. Adjust the time according to the needs of the trainees.

- Prepare hand outs or other materials that may be needed before the session begins. If guest speakers are required, make sure they are invited ahead of time and have been properly briefed about what you expect of them.
- Introduce each unit by presenting the units objectives.

UNIT 1: UNDERSTANDING FORESIGHT STUDIES, ITS LINK WITH CLIMATE SCIENCE AND POLICY MAKING

UNIT 1: Understanding Foresight Studies, Its link with Climate Science and Policy Making	
Content	This unit will describe: • Some concepts: Systems thinking, forecasting, foresight study, complexity, linear and non-linear development studies, technology, innovation, horizon scanning, climate change, climate system and scenario, Adaptation, Mitigation, Resilience, and Policy making • Link between foresight studies, climate science and policy making
Objectives	At the end of this unit, it is expected that participants will: • Improve understanding on the concept of foresight studies • Improve understanding of the link between foresight studies, climate science and policy making
Target Participants	Policy makers and practitioners, NGOs, Scientists
Method of Training	Participatory training/facilitation methodologies, lectures, group discussions, case studies, Quiz, etc.
Training Material	Flip charts, notebooks and pens, marker pens, white board, white board markers, power point projection.
Exercises	Start-off Dancing Systems Lesson (Random picking play)
Classroom setup	This will depend on the Facilitator and the methodology adopted
Duration	60 min
Evaluation	The facilitator to decide the most appropriate evaluation method
Reference Material	Foresight as a Strategic Long-term planning Tool for Developing Countries, 2014, UNDP Global Center for Public Service Excellence, Singapore. Donella Meadow Leverage points: http://www.sustainer.org./pubs/leverage-_point, Accessed 15th Dec. 2007. Onuoha MC (2014)Transiting to a Green Economy(From Economic Growth to Sustainable Development of Africa, GEIN Climate Change Impacts, UNDP Samoa, Goggle

Description of facilitation methods

Before starting the training, the facilitator is required to go through the facilitation notes and the facilitation methodology for each session. Additional materials for the unit are provided in the links available in the sessions and in the facilitation notes.

Notes for the facilitator

Section 1: Start-off Dancing Systems Lesson (Random picking play)

There are fourteen (14) systems thinking-dancing with the systems. They are called the ‘’start off dancing systems lesson. They are:

i. **Get the beat**: Before you disturb the systems in any way watch out how it behaves

ii. **Listen to the wisdom of the system**: Aid and encourage the forces and structures that help the system run itself.

iii. **Explore your mental models to the open air:** Remember that everything you know, and everything everyone knows is only a model to be subjected to peer-review.

iv. **Stay humble. Stay a learner:** Systems thinking reminds us how incomplete our mental models are, how complex the world is and how much we don’t know. We must learn by experiment-by trial and error, error, error(apologies to Buckminster Fuller)

v. **Honour and Protect Information**: A decision maker can’t respond to information he or she doesn’t have and can’t respond to information that is inaccurate.

vi. **Locate Responsibility in a System**: Intrinsic responsibility means that the system is designed to send feedback about the consequences of decision making and quickly and compelling to decision makers.

vii. **Make a feedback Policies for feedback systems:** A dynamic, self –adjusting system cannot be governed by a static, unending policy.

viii. **Pay attention to what is important, not just what is quantifiable**: Don’t be stopped by ‘if you can define it, measure it’. But no one can precisely measure the all important justice, security, freedom, truth and love.

ix. **Go for the good of the whole:** Don’t maximize parts of the systems or subsystems while ignoring the whole. Don’t go to the great trouble of optimization (extrapolation).

Aim to enhance the total systems properties such as creativity, stability, diversity, resilience and sustainability.

x. **Expand your Horizon:** In a tricky, curving, unknown, surprising, obstacle- strewn path, you need to be watching both the short and long term-the whole system.

xi. **Expand your Thought Horizon**: Defy the disciplines and what you think you are expert at, follow a system where it leads. It will be sure to lead across traditional disciplinary lines.

xii. **Expand the Boundary of Caring:** It will not be possible in this integrated world for your heart to succeed if your lungs fail and for Europe to succeed and Africa fails. These are moral lessons of caring.

xiii. **Celebrate Complexity**: The universe is messy. It is non-linear, turbulent and chaotic. It organizes and evolves. It creates diversity and not uniformity. That's what makes the world beautiful and interesting. There is something in human mind that is attracted to mathematical, straight lines and not curves, to whole numbers and not fractions, to uniformity and not diversity, to certainties and not mystery (uncertainties).

Hold Fast to the goal of Goodness: Public discourse is full of cynicism. It is much easier to talk about hate than to talk about love. Don't weigh the bad news heavily than the good and keep standards absolute

Section 2: Definition of some Concepts:

What is Systems thinking? Systems-thinking is a complex science requiring one to organize opportunities within a system to intervene, make impact and these interventions are known as leverage points.

What is Forecasting? It creates a narrow view of the future its predictions in long term forecasting has increasingly become discredited because most of the predictions have proved to be incorrect.

What is Foresight and futures thinking? They are useful long-term planning tools for anticipation and preparation for plausible, possible, probable and desired futures.

What is Horizon Scanning? It is the systematic gathering of evidence on future opportunities and threats. In other words, it means systematically monitoring a wide range of information

sources and indicators with the intent of identifying patterns and ‘weak signals’ of coming disruption that would have a severe or transforming impact in our world.

Scenario Planning: It is a long term strategy and policy implementation tool. It is about generating narratives of the future to imagine how the world may evolve and what problems, challenges and opportunities could occur.

Sustainability in Futures Work: It is defined as incorporating environmental, social and economic sustainability in futures work. Environmental sustainability requires that the stock of ‘natural capital is preserved and developed, social sustainability is about maintaining and developing social institutions and people within them, while economic sustainability seeks to utilize man-made capital(financial reserves, buildings, infrastructure and other assets) while not drawing down or reducing the stock of natural or social capital.

Climate Change: It is a situation in which a change in climate continues in one direction at a rapid rate and for an unusually long period of time, lasting several years. In the case of the present condition which we are experiencing, the footprint of this change is a steady and general increase in temperature.

Climate Science: It is the study of the complex challenges of climate change. It provides scholars with substantive knowledge required to analyze and diagnose multi-dimensional negative effects of climate change such as low agricultural productivity as a result of drought and desertification, erosion and salinization, hunger, infectious diseases, extreme poverty etc.

What is Adaptation, Mitigation and Vulnerability?

Adaptation: It is a set of tolerant responses (solutions) to the negative or positive effects of climate change. It can be done naturally, spontaneously especially during natural disaster or anticipated as part of planning.

Mitigation: It is a concrete measure to limit global warming

Vulnerability: It is the level at which a system can be degraded or damaged by climate change. It depends on both the environmental and socio-economic factors.

Resilience: It is a concept derived from physics which is the ability of a material to recover its original shape after deformation. But in sociology and psychology, it refers to an individual or group to rebuild after trauma while in the field of ecology it is define as the ability of an ecosystem to recover its function after major disturbances, whether natural (fire, flood, storm etc), or related human activities(hunting, agricultural activities, pesticides etc)

Public Policy: It refers to the actions (decisions) taken by government that are intended to solve problems and improve the quality of life for its citizens

Linear and Non-linear Development Studies:

- **The Linear (Optimization) field of development studies** is simplistic in assumptions, methods and conclusions. By extrapolation so you will be capturing a narrow view of event.
- **Non-linear field of development studies**: It is a shift towards a complexity aware approach that favours adaptation as a way to deal with problems in unpredictable complex system.

Section 3: Understanding Foresight Studies

(i) What is foresight studies?

Foresight studies are processes of anticipation that identifies opportunities and threats which may arise in mid-to long –term versions of the future. As a way of thinking, foresight also encourages innovation, strategic evaluation and proactive shaping of the future. Where traditional planning has sought to prevent failures, foresight prioritizes resilience namely early detection and fast recovery.

(ii) Advantages of Foresight Studies

- It allows organization and stakeholder network to identify:

(a) The long-term trends which are likely to form their operating environment;

(b) Actions which are 'robust' across all of the scenarios (that is have a positive or neutral effect), 'tipping points' or inflection points(whereby the levels at which the momentum for

change outcome look unstoppable) which will have a significant effect on the operating environment.

(iii) Why Foresight Studies?

(a) It provides a broad view to be taken of a sector or strategic issues and also enable participants to relate their sector to wider competitive set, rather than looking narrowly at their own industry;

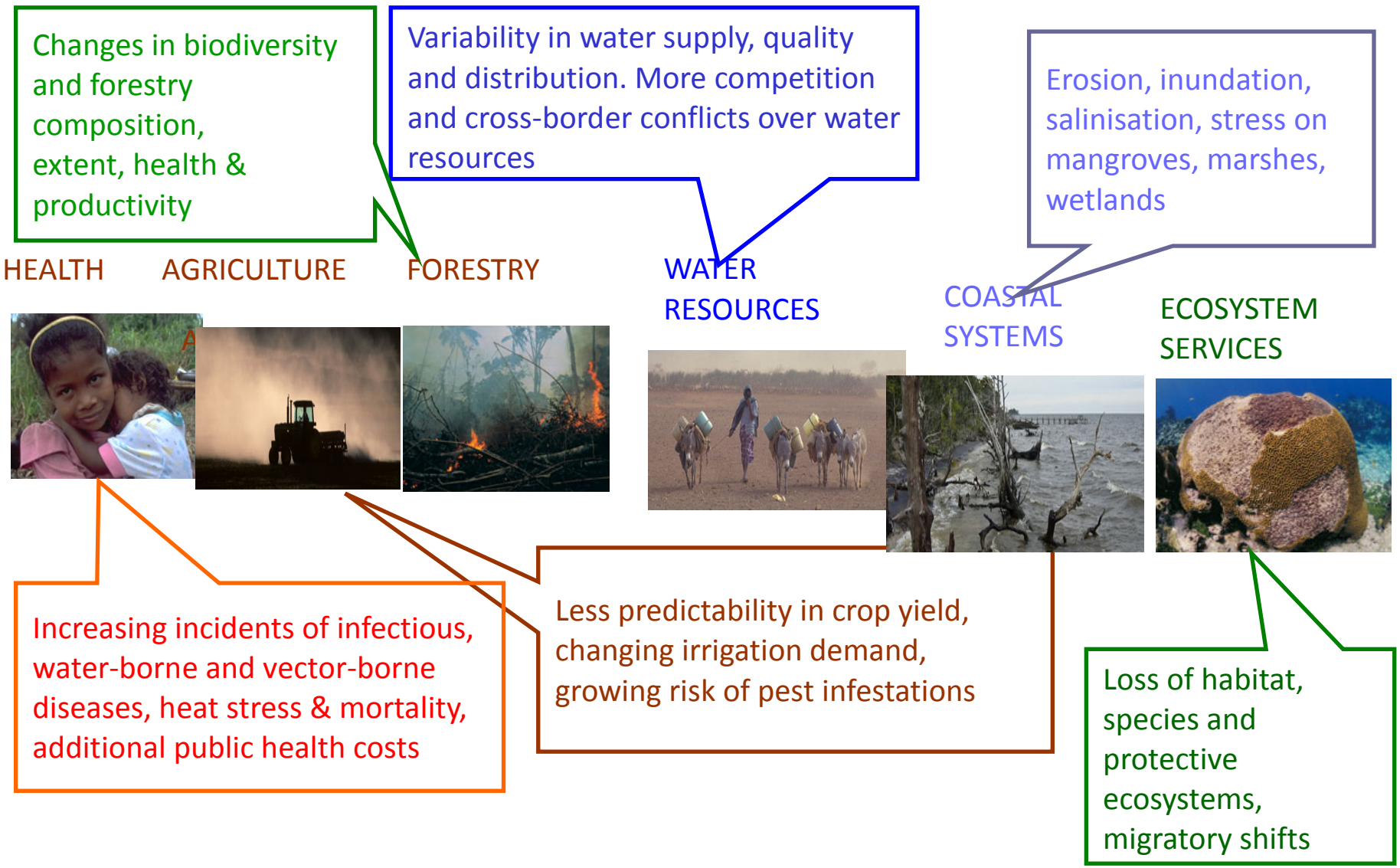
(b) It enables a system based view to underpin discussions about the future, making connections between different interventions and priorities, which helps both to identify unintended consequences and also the 'leverage point' which might create large effects through intervention;

(c) The practice ensures the creation and exchange of shared knowledge between stakeholders**.**

Section 4: The Link between Foresight Studies, Climate Science and Policy Making

There is no doubt that governments have increasingly realized that few contemporary challenges can be confined to one policy area and a single –issue focus is in many instance insufficient. Climate change (the main crux of the matter in this training module) for instance, crosscuts other issues of concern including access to water, agriculture, food security, energy, and urban planning. Information silos common in highly decentralized and bureaucratic organizations can hinder the 'whole- picture' perspectives. This presents a further challenge for policy makers tasked with formulating strategies and policies that effectively address interconnected and interdependent problems. In an increasingly complex and rapidly changing world, the value of future thinking and foresight programmes as long term planning tools in strategic policy making and implication for sustainable development especially in African context cannot be over emphasized.

COMPLEX WEB OF CLIMATE CHANGE IMPACTS (SOURCE: UNDP SAMOA)



UNIT 2: INSTITUTIONALIZATION AND PHASES OF STRATEGIC FORESIGHT STUDIES

UNIT 2. Institutionalization and Phases of Strategic Foresight Studies	
Content	This unit will describe: • The paradigm shift from bureaucracy of atomization work task to capturing knowledge, information sharing and anticipatory thinking • Links the three phases of strategic foresight studies
Objectives	At the end of this unit, it is expected that participants will: • Improve understanding of paradigm shift from linear to non-linear field of development studies, that is, there is a shift towards a complexity aware approach that favours adaptation as a way to deal with problems in unpredictable complex system • Improve understanding of the link between the three phases of foresight studies: scanning (information gathering), interpreting data and formulating versions of the future and developing strategic options for action.
Target Participants	Policy makers and practitioners, NGOs, Scientists
Method of Training	Participatory training/facilitation methodologies, lectures, group discussions, case studies, Quiz, etc.
Training Material	Flip charts, notebooks and pens, marker pens, white board, white board markers, power point projection.
Exercises	Quiz
Classroom setup	This will depend on the Facilitator and the methodology adopted
Duration	40 min
Evaluation	The facilitator to decide the most appropriate evaluation method
Reference Material	Foresight as a Strategic Long-term planning Tool for Developing Countries,2014, UNDP Global Center for Public Service Excellence, Singapore. Horton, Averil " Complexity Science Approaches to the Application Foresight .

	Foresight 14, no 4. (2012) 294-303 Donella Meadow Leverage points: http://www.sustainer.org./pubs/leverage-_point, Accessed 15th Dec. 2007. Onuoha MC (2016) Green Growth Pathway for Nigeria(SEPAN) www.sepan.org.ng Henley Centre Head Light Vision EU/Fed. Min of Environment, Nigeria, MRV Training/Capacity Building, 2017, Abuja

Description of facilitation methods:

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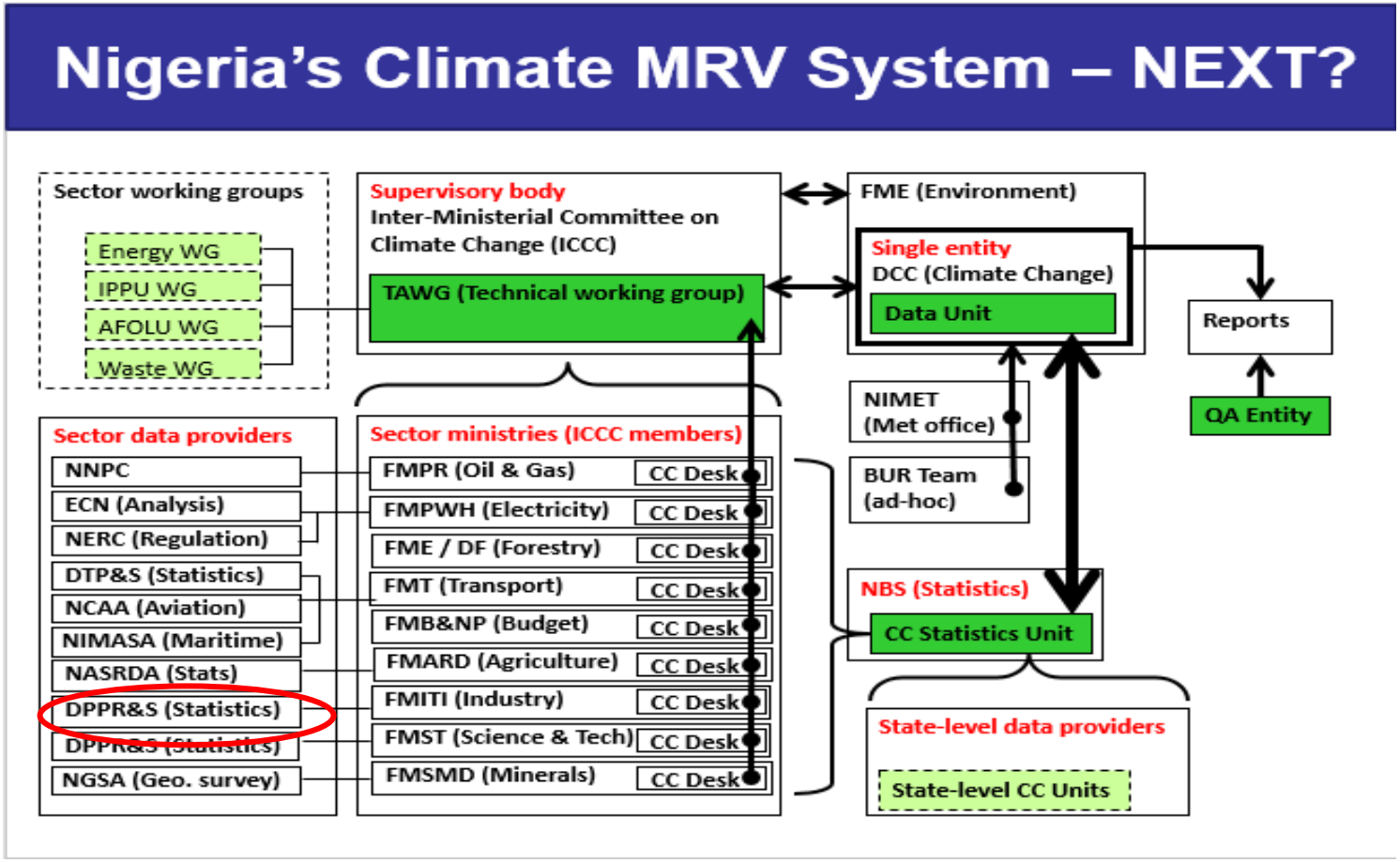
Notes for the facilitator

Section 1: Institutionalization of Foresight Studies

Setting up an Institutional Arrangement for NIMASA/MARITIME Sub-Sector



The common features of bureaucracies particularly government is the atomization of work task from the upper echelon of ministers to frontline public officers. The resulting lack of flexibility is an obstacle that impedes the institutionalization of foresight studies to address interdependent and cross cutting issues. The non-linear nature of increasing complex and wicked problems of climate change requires a more subtle and continuous form of integration between policy and management. Consequently public policy and management need to drive adaptation, innovation and technological advancement in a stake holding (collaborative nature) for the realization of sustainable development.

(i) **Adaptation**: From linear to non-linear field of development studies there a shift towards a complex aware approach that favours adaptation as a way to deal with problems in unpredictable complex system. Adaptation works by making small changes, observing the results and then adjusting. This is contrary to the planning approach widely used in development design of complicated programmes and tracking implementation milestones. The training will ensure that adaptability combined with foresight work allows for quick, insightful and decision making that enables 'doing things right' versus 'doing the right things'.

Adaptation Measure: Rainfall Harvesting

Rainfall Harvesting

Water harvesting and moisture conservation (through construction of rainwater control and management structures and conservation agriculture or) and rainwater storage (in farm ponds, water pans, sand/sub-surface dams, earth dams, tanks, etc.) are gaining prominence as viable techniques providing supplemental irrigation.

Farmers are adopting a variety of innovative rainfall harvesting mechanisms (RHM) to cope with recurrent droughts (Ngigi et al., 2008).

Demonstration and Promotion of Rainwater Harvesting as a viable climate change adaptation option in Nigeria

Innovation: Design thinking particularly at the policy development stage which allows Africa to anticipate its future needs and maximize its limited capabilities to addressing its identified weaknesses and probable future challenges. Such sustainable development blue print should exemplify proactive rather than reactive approach to policy making. It should have integrated national strategies to cope with resource constraints of land use, urban design, transport needs, water, environmental and emissions policy, energy policy, smart agriculture and other areas impact climate change. Africa's living lab for innovation to continue to invest heavily in research and development while positioning itself as a hub for innovation and creating sustainable development solutions with partners across globe. Besides fostering good relations, global partnership will bring investment to Africa while helping to solve her domestic challenges

Below: *Adaptive and Innovative Measures-Rehabilitation of Water Reservoirs in the Savanna Region to enhance climate change resilience and livelihood particularly for the benefit of women and youth group.*

Degraded Reservoir

Rehabilitation works

Rehabilitated Reservoir

Technology: Here we will be looking at Africa engaged in foresight exercises to identify urgent and important short term policy goals for the region in particular to address the 'digital divide' problem and secure digital opportunities for development. The purpose of the foresight studies is to mediate between the ambitions of the global agenda and local demands of individual countries in the region by indentifying common regional priorities.

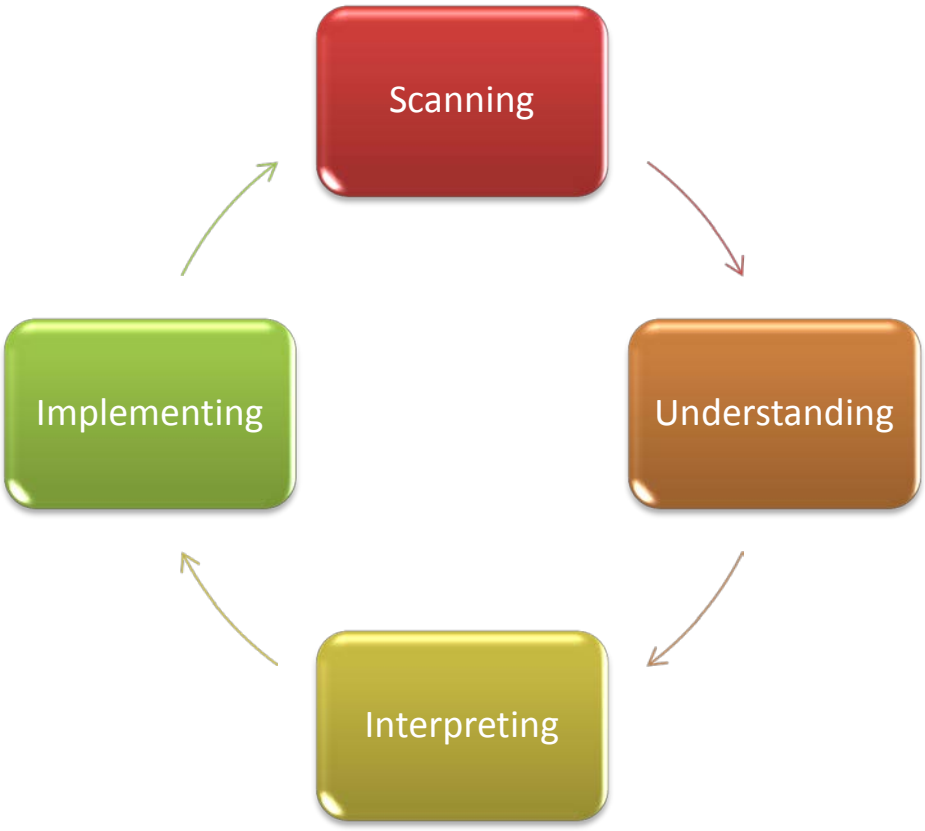
Sectors	Examples of Innovations and Technologies
Electricity Access	• Smart power grids • Indoor cooking stoves using renewable energy (for example, solar, wind) • Off-grid technologies such as local wind turbines
Water Management	• Desalinization plants • Wastewater treatment facilities
Climate Change/Reducing Emissions	**Mitigation technologies:** • Smart power grids • Renewable energy technologies: wind, solar, geothermal, marine energy, biomass, hydro power, etc. • Electric and hybrid vehicles • Carbon capture and storage **Adaptation technologies:** • Higher-yield seeds (for more arid and saline soils) • Drought resistant crops and cultivation practices • Climate resistance infrastructure: sea walls, drainage capacity, water, forest and biodiversity management, etc.
Transport	• Bus rapid transit • Low emission vehicles and fuels: biogas, hybrid and plug-in electric vehicles
Building Energy Efficiency	• Smart power grids and smart meters • Thermal insulation • Energy efficiency lighting: energy efficient compact fluorescent lamps, electroluminescent light source • Energy recovering stoves using thermoelectric generators
Agriculture	• Genetically modified crops • Mechanically irrigation and farming techniques

Collaboration: The collaborative nature of foresight studies and work means that that network of thinkers practitioners such as parliamentary advocacy, academia, business and government already exist. Foresight workshops and conferences provide excellent platform for knowledge sharing and networking. There is the prospect of low capacity countries(such as Africa) to develop long term sustainable development policies by collaborating with independent foresight academic, practitioners, institutions providing current research. More importantly opportunities exist for Africa to collaborate and leverage on resources to begin institutionalization of foresight studies within their own government

Section 2: Strategic Phases (Cycle) of Foresight Studies:

Foresight Studies Cycle

It generally consists of four phases



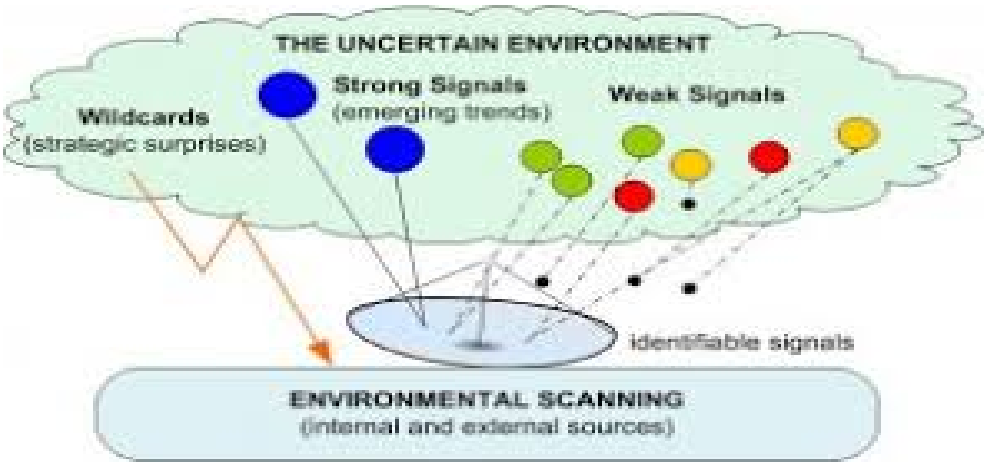
- **Horizon Scanning (collecting information)**:

It involves looking across the future landscape taking a broad view, to identify over all changes which are likely in the external and internal environments. In other words, scanning look at trends and drivers that are shaping the world including those within and outside a given context. The main function of futurist here is to collect knowledge about the future, specifically current knowledge that could have influence on the future or 'insight'. Though horizon scanning that is both wide and deep, produces a pool of insights that form one big knowledge base about the future.

- **Understanding**:

It involves making connection between these drivers of change to understand how different trends connect or collide, to construct the landscape in which an industry sector or organization will be operating.

- **Interpreting and Formulating versions of the Future**:



It is the application of a combination of techniques and practices such as identify weak signals, or emerging strategic issues, casual layered analysis, wild card exercises, participatory method, road mapping, scenario planning, etc.

- **Development /Implementation of Strategic Options for Action:**

It involves the actions required to respond effectively to the challenges identified.

(c)The Role of Horizon Scanning in Planning for the Future a Climate Science Scenario

Horizon Scanning can play a key role in planning for the future in all sectors of the economy by seizing the opportunities of knowledge and technology transfer, and identification and mitigation of emerging risks especially in the climate science regime.

There three stage (methodology) approach to enable the gathering of information and extraction of value from it:

i. Scan-capture early and weak 'signals' on the horizon scanning radar

-Sources-currently used: expert judgment, technology news, and socio-economic news

-**New sources in development**: patents, research funding application and awards, and social media.

ii. **Quick Assessment of the 'Signals':** Analyzing what are the opportunities and threats for all the sectors. But here take the case of railway transport sector as an instance.

-Underway: conduct emergency technology analysis to briefly summarize the key features of the technology, assess its readiness, and evaluating its potential application(s) to rail.

-In development: conduct trend and disruptor analysis to access the pace and likelihood.

(iii**). Engaging Industry on the insights gathered and possible actions, and initiate detailed analysis when required:**

- **Over the horizon campaigns,** linking together different fields of expertise on themes of importance to the industry

Deep drives-on selected topics that warrant further analysis. These could

Include gap and solution analysis scenario generation etc

UNIT 3: FORESIGHT STUDIES, CLIMATE SCIENCE AND POLICY MAKING

Unit 3: Foresight Studies, Climate Science and Policy Making	
Content	This unit will describe: • The complexity and hydra-headed nature of climate change and the need to apply foresight studies in addressing these challenges • Foresight studies as a means of transmitting these complexity to policy makers who sometimes are blinded by traditional forecasting methods based primarily on linear extrapolations(optimization) • The Integration of foresight studies in climate science and policy making.
Objectives	At the end of this unit, it is expected that participants will: • Improve understanding of the cost of addressing climate change and adaptation is uncertain hence the need for foresight studies. • Improve understanding on the need for an integrated manner of proffering solutions to climate change and poverty alleviation with the of foresight studies.
Target Participants	Policy makers and practitioners, NGOs, Scientists
Method of Training	Participatory training/facilitation methodologies, lectures, group discussions, case studies, Quiz, etc.
Training Material	Flip charts, notebooks and pens, marker pens, white board, white board markers, power point projection.
Exercises	Participatory
Classroom setup	This will depend on the Facilitator and the methodology adopted
Duration	60 min
Evaluation	The facilitator to decide the most appropriate evaluation method
Reference Material	2017. Strategic Action Plan of West Africa Green Economic Development Institute(WAGEDI) Gregory University Uturu, Abia State, Nigeria Onuoha MC (2014)Transiting to a Green Economy(From Economic Growth to

	Sustainable Development of Africa, GEIN Onuoha MC (2016) Green Growth Pathway for Nigeria(SEPAN) www.sepan.org.ng Foresight as a Strategic Long-term planning Tool for Developing Countries, 2014, UNDP Global Center for Public Service Excellence, Singapore.

Description of facilitation methods:

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Notes for the facilitator

Section 1: Justification of Foresight Studies in Climate Science and Policy Making:

(i) **Cost of Addressing Climate Change and Adaptation are Uncertain and Risks of Inaction and Welfare Consequences Enormous**: The call for foresight studies in climate science and policy making scenarios are born by the fact that the cost of addressing climate change and adaptations is very uncertain. This is in addition to the risks of inaction and the attendant welfare consequences are expected to be enormous. This is further compounded by the fact that policy makers and practitioners focuses exclusively on economics, policy analysis, and organizational management and therefore does not adequately prepare individuals to address the complex challenges of development particularly extreme poverty and which results from the interplay of multiple complex factors and to a large extent traced to the negative effects of climate change: low agricultural productivity resulting from drought and desertification, erosion, salinization, to high disease incidence and general environmental decline.

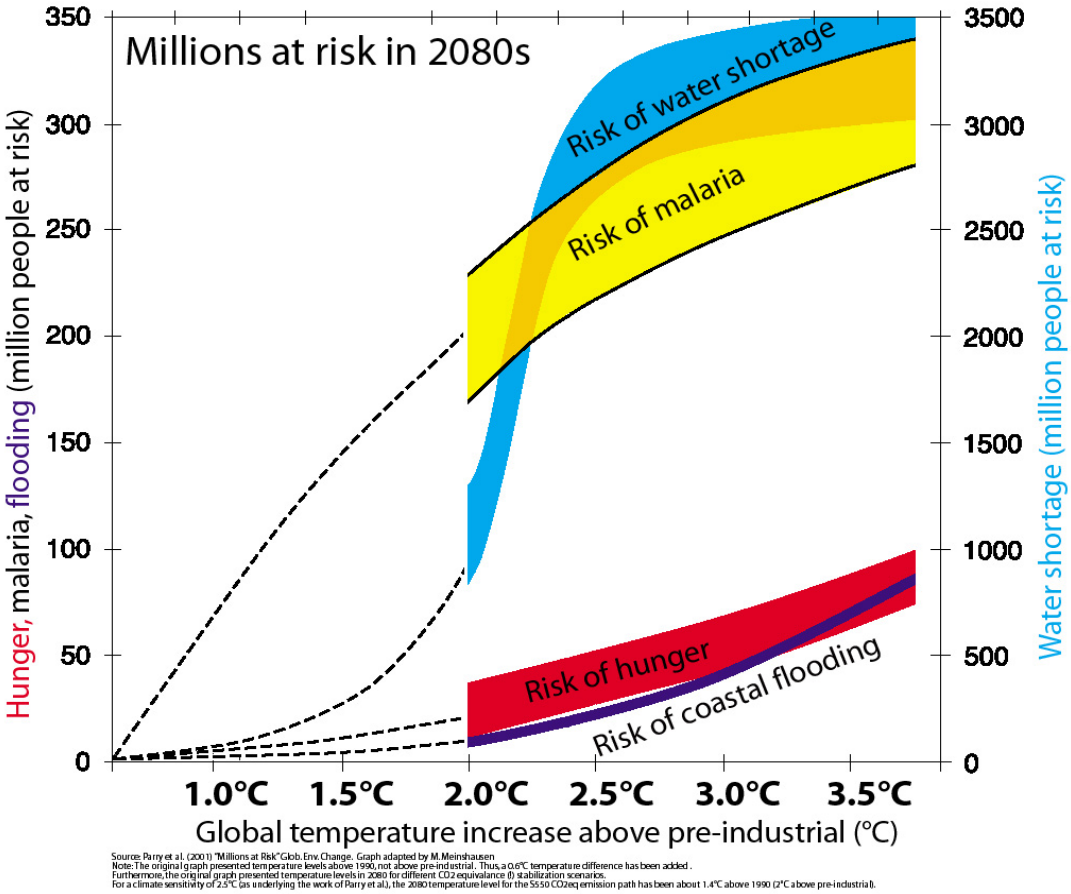
(ii) **Integrated Manner of Proffering Solution to Climate Change and Poverty Alleviation**: Further justification of foresight studies in climate science and policy making is further buttressed by the pervasive gap between development –oriented disciplines and institutions which contrast starkly with the recognized need for policy

solutions to help the poor of the poorest. Knowledge of macroeconomics and health related issues in an integrated manner will help tackle the crisis of AIDS, malaria and tuberculosis. Likewise tacking hunger requires an understanding of agriculture, which in turn requires an understanding of water systems, as well as an understanding of climate patterns, and by similar stroke, of global energy systems.

(iii) Foresight studies as a non-linear long term planning tool

Above all these complex hydra-headed climate change scenarios cannot be handled by simple assumptions and optimization (linear method) but by non-linear foreside studies and its attendant long term planning tool for anticipating, and preparing for plausible, possible, probable and desired future.

"Millions at Risk" due to adverse impacts of CC



Source: Parry et al. (2001) "Millions at Risk" Glob. Env. Change. Graph adapted by M. Meinshausen
Note: The original graph presented temperature levels above 1990, not above pre-industrial. Thus, a 0.6°C temperature difference has been added.
Furthermore, the original graph presented temperature levels in 2080 for different CO2 equivalance (!) stabilization scenarios.
For a climate sensitivity of 2.5°C (as underlying the work of Parry et al.), the 2080 temperature level for the 550 CO2eq emission path has been about 1.4°C above 1990 (2°C above pre-industrial).

Section 2: Integration Foresight Studies in Climate Science Research for effective Policy delivery.

Africa's need for rapid socio-economic and ecological transformation has fuelled private sector driven growth, thereby increasing the demand for evidenced –based inclusive growth-promoting policies in public and private sectors of the economy. The continent needs sound foresight studies (Scenario process) to address climate induced ecological and development challenges in form of:

(i) **Presence of externalities such as climate change and its consequences**-deforestation, ocean surge, erosion, desertification, depletion of biodiversity, waste and pollution, and poverty alleviation;

(ii) **Failure of the free market system** which emphasizes competitive markets, optimal growth theory, cost-benefit analysis and financial models, short term discount of the future and unsustainable use of the natural resources;

(iii) **Prevalence of an economic structure** which does not enhance sustainable development resulting in exclusive production and consumption patterns, unemployment, underemployment and environmental non-sustainability;

(iv) **Failure to reconcile social goal with other objectives of economic policy** such as poverty alleviation, building livelihoods, improving quality of life etc and;

(v) **Failure to align macroeconomic framework development strategy with sustainable development**. Such policy frameworks yet to be aligned include but not limited to subsidy reforms, environmental fiscal reforms, promotion of technology transfer and diffusion, appropriate land reforms and policies, targeted public investments and strengthening transparency and good governance.

Foresight Studies arising thereto will ensure growth, equity, inclusiveness and sustainable development for the Fifty four (54) countries that make up the African continent. As the world is changing rapidly and transiting to low carbon, climate resilient economy, Africa must not be left out. Therefore advancing frontiers futures research studies for the continent that is sustainable and inclusive is imperative. This is the relevance of foresight studies and research priority settings in climate science and policy making in Africa.

UNIT 4: CASE STUDY1: SUSTAINABLE RAIL PROGRAMME IN UK: FORESIGHT STUDIES IN SUSTAINABLE DEVELOPMENT

Unit 4: Case Study1: Sustainable Rail Programme in UK: Foresight Studies in Sustainable Development	
Content	This unit will describe: • Scenarios and future works, Sustainability, Making connections across the set of travel choices, Analysis of drivers of change, The Scenarios and Rail White Paper, Strategic Questions and Building Strategic Agenda • Emerging technologies that have been mapped out in the rail sector(12) in number and routinely conduct Emerging Technology Assessments (ETAs) for continuous update and review as new technologies could emerge • The key socio-economic trends and disruptors and likely impact on transport demand and railway competitiveness
Objectives	At the end of this unit, it is expected that participants will: • Develop a shared understanding of scenario work, their operating landscape and how it will evolve into the future so as to form a view of critical uncertainties and identification of opportunities and risks • Understand the three broad objective of sustainability for the project- social, economic and environmental, with strong emphasis on environmental sustainability (both carbon impact and resource use) as this has been informed by the overall context for the railway identified through the future process. • Use the above information for evidence based decision making process and planning.
Target Participants	Policy makers and practitioners, NGOs, Scientists
Method of Training	Participatory training/facilitation methodologies, lectures, group discussions, case studies, Quiz, etc.
Training Material	Flip charts, notebooks and pens, marker pens, white board, white board markers, power point projection.
Exercises	Participatory
Classroom setup	This will depend on the Facilitator and the methodology adopted
Duration	60 min

Evaluation	The facilitator to decide the most appropriate evaluation method
Reference Material	Henley Centre Head Light Vision: Strategic Implication for UK Sustainable Rail Programme: Foresight Studies in Sustainable Development (DEC. 2007) For: Rail Safety and Standards Board (RSSB) LTD

Description of facilitation methods:

Before starting the training, the facilitator is required to go through the facilitation notes and the facilitation methodology for each session. Additional materials for the unit are provided in the links available in the sessions and in the facilitation notes.

Notes for the facilitator

Case Study1: Sustainable Rail Programme in UK: Foresight Studies in Sustainable Development

Section 1: The Framework

Objective: The primary objectives of the project is to enable industry leaders to explore and gain a shared understanding of the future landscape in which the rail industry will operate; agree on key areas to be addressed; build support; create a platform; for the development of the rail industry sustainable development vision and strategy. Sustainability includes environmental, economic and social factors.

Background to the Sustainable Rail Programme:

With the increasing global political and social importance of Sustainable Development, the UK Government in March 2015 launched Sustainable Development Strategy Securing the Future and the Department of Transport Sustainable Development Action Plan in January 2006. Great Britain rail industry has established Sustainable Rail Programme (SRP) to respond to the opportunities and challenges presented by sustainable development and to contribute to the delivery of key government objectives such as reduction of green house gas, sustainable mobility, increased social inclusion and thriving economy. The three pillars of sustainable development for rail are: Environment(climate change, including energy use, noise and vibration, air quality, land take, waste and pollution, biodiversity, heritage and visual intrusion, water and material use; Economic(train service performance, capacity, government policy and

subsidy, purchasing and procurement, asset management, regional and economic development, and pricing of external cost/benefits to society; Social(safety and personal security, customer priorities, perception and experience, accessibility, affordability, social inclusion, employee relations and health.

Gathering Data and background research:

The 1st work stream was completed at the end of 2006 and saw the development of metrics for sustainable development and benchmarking of the railway's performance against other modes (road and aviation) and selected European countries (Sweden, Germany and Italy). In addition, a clear picture of the state of knowledge of sustainability issues was established through comprehensive literature reviews.

Analysis

A significant milestone was reached in the 2nd work stream with the publication of "the case for rail in 2007'', the industry's first sustainable development report. The report outlines key industries sustainability issues and identified strength and weaknesses that will enable the industry to capitalize on areas where it is better than other transport modes and direct attention to areas that needs greatest attention.

Following from this, '' Foresight Studies for Sustainable Development'' commenced comprising the identification of drivers of change and development of scenarios of the future.

Strategy Development and Refinement

The core objective of the 3rd stream work stream is to deliver a 30-year Sustainable Development vision, strategy, and associated action plan. The final stage of '' Foresight Studies for Sustainable Development'', analyzing strategic implications of scenarios, will provide the building blocks for the development of the strategy.

Implementation

The 4th and final work stream represents the support the SRP will provide to duty holders in the implementation of the sustainable strategy through the development of business cases for specific initiatives and modifying business incentives if required.

Section 2: The Process:

The Scenario Development Process

The scenario approach to strategy building is now a well documented as a process to enable organizations to develop strategy under conditions of uncertainty and ambiguity.

The specific adopted for this project was based on the deductive drivers-based methods developed originally by SRI Internationally (founded at Stanford Research Institute) and Global Business Network in the United States and adapted by Henley Centre Headlight Vision (HCHLV) for use with multi-stakeholder groups and for the longer range timescale required for the rail industry (because of its infrastructure and long life capital equipment)

In summary, the stages are as follow:

1. **Agreement on project question (to define scope):** The framing of the question was critical to the process as it enabled consideration of a broad futures landscape, across the full competitive set, rather than a narrow evaluation of the futures from a sectoral perspective**: Eg. What are the potential futures for the rail industry which will affect its operating environment and therefore its ability to deliver a sustainable industry between now and 2040?**

2. **Identification of long list of relevant 'drivers of change':** The objective of this step was to identify 'drivers of change' that represents a broad range of factors, forces, trends, or issues that will significantly impact the sustainability of railways in Great Britain over the next 30 years. To ensure identification of an appropriate range of drivers, a categorization system referred to as STEEPO (Socio-Technologial-Economic-Environmental-Political-Organization) was used. The drivers were also reviewed using a framework developed by HCHLV to enable changes in societal ('macro drivers'), individual values and attitudes ('micro drivers') and in social or group behavior ('meso drivers') to be accommodated.
3. **Prioritization of drivers and filtering for levels of importance and uncertainty:** Usually a day workshop was set enable stakeholders to prioritize the drivers. The workshop allowed a smaller sub set of approximately 20 drivers which are likely to be the most significant in terms of their impact on the rail industry's future operating environment. Participants are

asked to identify any additional drivers of change which they felt had been omitted in the review process. They were then reviewed and were credible, were fully more researched and incorporated into the review process.

4. **Identification of scenario axes (based on 'critical uncertainties'):** The scenarios axes were identified using a method known as an 'Impact Matrix' to analyze the relationship between drivers that have emerged as important and/or uncertain. The drivers were clustered to develop two key 'axes of uncertainty'. As reviewed in the discussion in the paper the axes which emerged were, first about travel patterns of individuals and goods, and secondly, the overall policy context for transport. In both cases rail was part of the whole.
5. **Development of scenarios**: Once the set of scenario axes was agreed, Scenarios were then developed further at a second workshop, where the participants were encouraged to immense themselves in future worlds and think about the different world may play out. ''Co-creation with stakeholders and partners was critical in order for the external audiences to consider the scenarios credible.
6. **Testing of scenarios for robustness, and fuller development of scenario narratives:** The third workshop focused on improving and testing the scenarios by surfacing points of conflict and tension, as well as risks and opportunities. The analytical work before hand involved documenting what happens within each scenario with respect to a number of 'dimensions'(e.g. modal behavior and carbon management system) This enabled the scenarios to be compared more easily with each other and to be read through the lens of different stakeholder organizations. In addition, the impact of each scenario on different parts of the rail industry (e.g.) rural versus sub urban rail) was also teased out and documented.
7. **Exploration of strategic implications of scenarios.** The desired output from the project was not the strategy itself (which will be developed by the stakeholders responsible for its implementation) but 'strategic building blocks' which would enable decision makers to focus on critical issues. The translation from development and review of the scenarios into strategic practice require a distinction to be made between 'imperatives' and 'preferences'. So the fourth and final workshop on the identification of the strategic implications of the scenarios for the rail industry. By addressing a set of strategic questions for the sector, which emerged through review and analysis of the scenarios output, participants identified strategic imperatives that need to be addressed as core issues whichever future occurs through share

understanding of the key opportunities and threats and identified the strategic choices that need to be made if the railway in Great Britain is to move toward their desired vision.
Together these constitute a **'Strategic Agenda'** for a sustainable rail industry.

UNIT 5: CASE STUDY 2: FORESIGHT STUDIES, SCENARIO PLANNING AND EXECUTION IN AFRICA

Unit 5: Case Study 2: Foresight Studies, Scenario Planning and Execution in Africa	
Content	This unit will describe: • African policy makers to recognize the necessity to anticipate demands, influence developments and meets African needs in innovative ways for sustainable development and global competitiveness • African policy makers should commence the implementation of Scenario Planning as a long term strategy and policy implementation tool.
Objectives	At the end of this unit, it is expected that participants will: • Facilitate the call for reformation in the African public service in the form of paradigm shift from being satisfied accepting the present to questioning the future against the backdrop of a rapidly changing global and local landscape. • Ensure that for sustainability of Scenario Planning, Africa should initiate the Risk Management and Horizon Scanning (RAHS) programme to develop strategic anticipation, and collaboration is critical as Agencies cannot be working in silos and examining issues in compartmentalized way.
Target Participants	Policy makers and practitioners, NGOs, Scientists
Method of Training	Participatory training/facilitation methodologies, lectures, group discussions, case studies, Quiz, etc.
Training Material	Flip charts, notebooks and pens, marker pens, white board, white board markers, power point projection.
Exercises	Participatory
Classroom setup	This will depend on the Facilitator and the methodology adopted
Duration	40 min

Evaluation	The facilitator to decide the most appropriate evaluation method
Reference Material	Foresight as a Strategic Long-term planning Tool for Developing Countries, 2014, UNDP Global Center for Public Service Excellence, Singapore.

Description of facilitation methods:

Before starting the training, the facilitator is required to go through the facilitation notes and the facilitation methodology for each session. Additional materials for the unit are provided in the links available in the sessions and in the facilitation notes.

Notes for the facilitator

Case Study 2: Foresight Studies, Scenario Planning and Sustainable Development Africa (Adapting the Singaporean Model)

Section 1: Scenarios:

1. African policy makers must recognize the necessity to anticipate demands, influence developments and meets Africa's needs in innovative ways in order to sustain the continents growth and development, as well as meet its global competitive edge;
2. As a result of the above, Africa should as matter of necessity commence the implementation of Scenario Planning, generating narratives of the future to imagine how world may evolve and what problems, challenges and opportunities could occur. Scenario Planning is a long term strategic and policy implementation tool;
3. As the first step to the realization of Scenario Planning in Africa, Africa Civil Service should enter the era of reformation the expected launch of Public Service for the 21st century (PS21) Movement;
4. The PS21 Movement will force a paradigm shift from being satisfied accepting the present to questioning the future against the backdrop of a rapidly changing global and local landscape. By empowering and engaging public officers at all levels, the movement will seek to foster an environment where civil servants are able to anticipate and adapt to changes, responsive and flexible to customer needs and motivated, innovative and enterprising. There is the need to establish Civil Service College;

5. Realizing that over reliance on Scenario Planning may lead to an expectation that events would unfold just as they had been predicted, Africa should initiate the Risk Assessment and Horizon Scanning (RAHS) Programme to develop strategic anticipation. RAHS programme should operate under the principle that collaboration is critical. Agencies cannot be working in silos and examining issues in a compartmentalized way. RAHS requires horizontal collaboration and sharing of information across Agencies;
6. For sustainability and expansion of Futures and Foresights in Africa, numerous centres and offices and units across government departments dedicated to futures thinking, foresight, scanning and anticipation should be set up. To be called Centres of Strategic Futures, it will seek to develop wide capabilities in strategic anticipation by coordinating all futures work of government agencies. The centre will help shape whole- of- government (WHG) policy to manage challenges in an increasingly complex environment;
7. In partnership with Civil Service College, the Centre for Strategic Futures will train public servants to build capacity in public service
8. In conclusion, ultimately the likelihood of Africa governments adopting foresight as a strategic long-term planning tool for sustainable development is dependent on the political will of its leadership. As UN observed "in the end sustainable development is not a fixed state of harmony, but rather a process of change …consistent with future as well as present needs. We do not pretend that the process is easy or straight forward. Painful choices have to be made. Thus in the final analysis sustainable development must rest on political will".

Section 2: Foresight Exercise for the Session (Group Options)

(Open Book Examination)(15min)

i. Develop a Scenario Process for establishment of Centre for Strategic Futures in Africa in 2020.

ii. Develop a Scenario Process for Africa Strategic Agenda for Population Growth in 2050.

iii. Develop a Scenario Process for Africa's Strategic Agenda for Renewable Energies Deployment in by 2030

Develop a Scenario Process for Africa's Strategic Agenda for Sustainable Agriculture by 2040