



ADD Colloquium

ENGAGING STAKEHOLDERS IN CLIMATE CHANGE ISSUES

8 to 10 October 2015

Municipal City Council of Port Louis

ABSTRACTS



Acknowledgements

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Introduction

2015 is a crucial year as all nations will adopt a new legal instrument at the **Paris Climate Change Conference (COP 21)** in December just as it has adopted the Post-2015 Development Agenda, the Sustainable Development Goals (SDGs), at the United Nations in September this year. The binding instrument will determine the socio-economic and environmental models for a low-carbon and climate-resilient society of the future.

The new legal instrument that will enter into force no later than 2020 will require the **Republic of Mauritius** to implement its commitments under the Intended Nationally Determined Contributions (INDC). The private sector, the citizens and NGOs will have a major role in the process. The **countries of the region** share similar concerns. The instrument will allow adaptation or re-engineering of existing systems and re-imagining new lifestyles, production and consumption patterns that are essential for the sustainability of our entire life-sustaining systems.

Why the colloquium?

In view of the potential impacts of the Paris legally binding agreement on development alternatives, the Association pour le Développement Durable (ADD), a non-governmental organization that has the necessary expertise in climate change issues, is organizing a stakeholders' colloquium in collaboration with the **public and private sectors, academic, research institutions and NGOs** to bring about greater awareness of the challenges related to climate change.

Overall theme of the colloquium

The theme of the colloquium is: **Engaging stakeholders in climate change issues**. The stakeholders refer to the public sector, the private sector, NGOs and concerned groups, organisations or individuals that will be affected by the adverse impacts of climate change.

The three thematic areas are:

- The challenges posed by climate change and the adequacy of current and planned actions and existing mechanisms to ensure sustainability
- National commitments and expectations - incorporating these in the framing of a new legal instrument
- Opportunities and challenges that a new instrument may offer and the strengthening of mechanisms for implementation

The **objectives of the colloquium** are to provide a platform, at national and regional levels, and engage stakeholders in:

- Exchanging experience on climate change issues and identify areas that need to be addressed for long-term sustainability.
- Discussing issues of concern that have to be included in the new legal framework that is expected to be adopted at the Paris Climate Change Conference (PCCC).
- Proposing ways of optimising benefits from such an instrument and addressing challenges in the implementation and discuss suitable mechanisms for follow-up.

The Colloquium has received wide support from numerous stakeholders including women and the young generation. The momentum generated augurs well for the successful implementation of the INDC (Mauritius).

At the conclusion of the Colloquium, a **Statement** addressed to all concerned ahead of the next round of negotiations on climate change will be issued. Through this Colloquium, the Association pour le Développement Durable (ADD) expresses its commitment to pursue and complement the efforts of the authorities, the private sector, the civil society and the public in addressing, with optimism, the challenges of climate change and in availing of opportunities in building a resilient Republic with a bright future. ..

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josypierre10@gmail.com

THEME 1

PARIS CONFERENCE – STATUS

The Climate Change Convention – Status and Prospects for Developing Countries

R Nayamuth¹

Director, CLIMAGRIC Ltd

E-mail: rnayamuth@gmail.com

Abstract

The climate change (CC) process started with observations of weather departing significantly from the normal as from the 1980s. In-depth analysis under the aegis of the World Meteorological Organisation (WMO) that goes back to 1957 concluded in 1975 that this is more of a global nature. Investigations using a holistic global approach led to the creation of the Intergovernmental Panel on Climate Change (IPCC) through the joint efforts of WMO and the United Nations Environment Programme (UNEP) in 1988. IPCC was mandated to synthesize the science of CC and its environmental and socio-economic impacts for policy options. It confirmed CC and attributed it to elevated atmospheric concentrations of carbon dioxide, methane and nitrous oxide, which were creating a greenhouse effect and resulting in global warming. This was in turn affecting other climate variables, weather events, and causing sea level rise from melting of snow caps and ocean expansion.

Further work led the IPCC to confirm the anthropogenic origin of the greenhouse gases and provide scientific information for nations to decide on alternative measures to limit global temperature increase and the resulting climate change. Countries joined in an international treaty to cooperatively work on limiting global warming, and the United Nations Framework Convention on Climate Change (UNFCCC) was launched in 1992. The ultimate objective of the Convention is embedded in Article 2 and reads

“The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner”.

Under the principle of “*common but differentiated responsibilities and countries respective capabilities and their social and economic conditions*”, developing (Non Annex I) countries had as only obligation to report on their emissions and removals by sink of greenhouse gases, and programmes containing measures to mitigate, and adapt to climate change. Enhanced level reporting now requires national communications to be submitted every 4 years and Biennial Update Reports every 2 years. These reports have to be supported by the Nationally Appropriate Mitigation Actions and the National Adaptation Plan, themselves tracked under a Measurement, Reporting and

Verification system to be implemented by each country. The binding Kyoto Protocol (KP) for Annex I Parties has not yielded expected results such that the latest IPCC report indicated global temperature heading beyond 2°C, which cannot be sustained by natural ecosystems. This has led to the submission of Intended Nationally Determined Contribution (INDC) whereby NAI Parties are committing themselves over a period of time, namely reducing emissions towards meeting the ultimate objective of the Convention. Cop 21 decision will rule on how this commitment will work. An analysis of submitted INDCs outlines major difficulties ahead of the COP to reach a binding agreement to replace the KP and control greenhouse gases at a level not detrimental to humankind in the atmosphere.

THEME 2

CLIMATE CHANGE SCENARIOS AND IMPACTS

Challenges and Opportunities – The INDC (Mauritius)

Representative of Ministry of Environment, Sustainable Development, and Disaster and Beach Management

Email: jseewoobaduth

Climate change scenarios at Global and Indian Ocean levels

Representative of Mauritius Meteorological Services

E-mail: meteo@intnet.mu

Climate change scenarios at the level of the Republic of Mauritius

Representative of Mauritius Meteorological Services

E-mail: meteo@intnet.mu

Evaluation of the Impact of Climate Change on Maize Production over Ethiopia

Kidist Abera¹, Olivier Crespo² and Jemale Seid²

²Climate System Analysis Group, University of Cape Town, Cape Town.

¹Ethiopian Institute of Agricultural Research, Ethiopia.

¹E-mail: kidistabera03@gmail.com

Abstract

Numerous studies show that agriculture production in Africa will decrease under the future climate. However, the impacts of climate change studies over Ethiopia are limited. This study evaluates the impact of climate variability and change on maize production in three representative sites of maize growing areas in Ethiopia, in relation to the agro-ecological conditions of the country. The assessment relies on future climate projections resulting from the ensemble mean of 19 Global Climate Models (GCMs) and 2 Representative Concentration Pathways (RCPs), and the DSSAT crop model. Crop management data and variety information for all three study areas were collected from the respective research centers sites. Results showed that maize yield decrease by 20 % and 40% by the end of the century in Melkasa and Bako stations respectively. However, maize yield increase by 40 % at Hawwasa station.

Keywords: climate change; maize yield; crop management; ago-ecology; climate projection; climate models

Recent acceleration in sea level rise in Mauritius and Rodrigues

Representative of The Ministry of Environment, Sustainable Development, and Disaster and Beach Management

jseewoobaduth@govmu.org

Abstract

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. One of the direct consequences of global warming is Sea Level Rise. Over much of the 20th Century, global mean sea level rose at a rate between 1.3 to 1.7 mm yr⁻¹. However, in the last decade, satellite and in situ data indicate that global sea level rise has been accelerating to around 3.2 mm yr⁻¹ due mainly to temperature increase, enhanced melting of the ice caps particularly, of the Alaska and Greenland ice caps with marked regional variation. Global increased coastal erosion in the last decade in many regions has been attributed, to a large extent, to the accelerated sea level rise. Over both Mauritius and Rodrigues an accelerated Sea level rise of about 5.6 mm yr⁻¹ has been observed recently. Physical evidence and anecdotes indicate that coastal erosion has also increased in the region. However, no long term series of reliable data on coastal erosion is available to determine if there is any linkage between the recent accelerated sea level rise

and the observed increase in coastal erosion in the two countries. Global Sea level rise will undoubtedly continue to occur even during the next century. The consequences will have far reaching socio-economic and ecological implications on coastal resources. More precautionary, proactive and smart measures should thus be taken to protect and sustain the integrity of coastal and marine ecosystems. Some concrete actions and urgent policy options which can effectively be implemented are proposed.

Keywords: Sea level Rise; WIO countries; coastal erosion; marine ecosystem; climate change

Impact of Climate Change and Sea level Rise on Our Beaches in Mauritius

Gaj Pyndiah

Consultant

E-mail : 4blav@intnet.mu

Abstract

Beach erosion in Mauritius is a severe, widespread and yet unattended problem, which deeply affects both the public and the environment along our coastal areas. This paper outlines the history behind the current state of our beaches. It covers the formation of the island, its lagoons and the generation of our coral reefs from slow growing Polyps. It also describes several important geological milestones such as the lifting of La Prairie beach from the sea due to volcanic activity as well as the creation of Ile aux Benitier following a massive tsunami. Finally, it proves how climate change and sea level rise contribute to the acceleration of our beach erosion. These include the extraction of sand for construction, over-fishing of the Parrotfish, human activity on beaches and pollution which leads to poor production of sand and sediments grading.

Keywords: coastal area; environment; climate change; volcanic activity; tsunami

Enhancing community resilience to flood risk in the advent of climate change in Mauritius

Dr Anoradha Chacowry

Association pour le Développement Durable (ADD)

E-mail: achacowry@gmail.com

Abstract

One of the main impacts of global climate change is the increase in frequency or the intensity of extreme weather events. In Mauritius, observations and media reports indicate an unprecedented increase in flood events in the last two to three decades. On two recent occasions in 2008 and 2013, these hazards turned into national disasters with life loss. These observations raise the issue of the vulnerability and resilience building of the people who are exposed to flood risk. Traditional approach to flood risk reduction has proved ineffective as an increasing number of community groups have become vulnerable and they are often unable to recover by the time the next flood event strikes.

The aim of this paper is to examine the vulnerability of three groups of communities living in flood risk zones, each in a different geographical setting and why the traditional approach at disaster mitigation have been ineffective in the case of flood. The study provides a new approach to studying vulnerability from a holistic perspective of human use-environment interaction. This is done by exploring factors that influence the building of community resilience to increasing flood risk with the advent of climate change. The methodology consists in carrying out focus group interviews at household level in the three zones. The data collected are analysed and the results assessed in terms of various indicators of community resilience.

The findings of the study confirm the intuitive understanding that lower income groups were the most vulnerable, hence showed the least resilience and a low adaptive capacity to the impact of future flooding. However, in one of the case studies, the poorer sector of the community was found to be endowed with a certain level of resilience. The results also showed the unexpected lack of psychological and institutional resilience in all the three case studies. Likewise, issues of environmental justice and marginalisation were prevalent in two of the case studies where the underprivileged sectors of the population are often compelled to live in poor environmental conditions due to their social and economic conditions. An important factor, often ignored, is the strength of local knowledge that effectively prepares the community groups to cope with flood disasters in the absence of support or very limited assistance or timely warnings from the authorities. This is confirmed in all three case studies by historical accounts and the statements about resilience gained from previous experience in overcoming flood impacts. These findings could be useful in flood risk management, in defining policy options and in the implementation of strategies at expert level so as to increase community adaptive capacity or resilience to climate change. The approach could also be useful in the case of other natural hazards.

Keywords: climate change, community, flood risk, resilience, vulnerability, local knowledge

Engaging youth and community in coral reef restoration and beach monitoring

Mrs S.Ramlugun¹, Dr J.Naugah², Mr R. Ragoonaden³, Mrs S.Domah⁴,
Dr B.Pathack⁵, Mrs J.Pierre⁶

¹ Deputy Rector, Gaëtan Raynal College; sitaramlugun@gmail.com

² Chairperson, RGSE Trust Fund Board; gasatgb@yahoo.com

³ ADD; rajouma@yahoo.com

⁴ Deputy Director, DAV College; deeya_1515@yahoo.com

⁵ ADD; bpathack@yahoo.com

⁶ josypierre10@gmail.com

Abstract

Mauritius is a small island surrounded by a fringing coral reef that protects our shoreline and provides habitat to marine species in our lagoon. However, this important asset for our tourism industry which is a pillar of our country's economy is also vulnerable to climate change impacts as well as anthropogenic activities.

This case study aimed at investigating the outcome of engaging young girls and women in a sensitisation programme and hands-on activities on their actual involvement in adaptation and mitigation measures to protect our coral reef.

The programme which has been funded by GIZ was implemented by young students of Gaetan Raynal State College and DAV College in partnership with the Association Pour le Développement Durable (ADD) and the Association for Gender and Science and Technology (GASAT) with the participation of Reef Conservation, the Ministry of Fisheries and Mauritius Oceanography Institute.

A survey was carried out before and after the implementation. While very few of the participating students were initially aware of climate change impacts on corals and consequently marine environment, findings show the positive outcome of the programme over one and a half years on daily habits, simple measures taken and 'walking the talk' by not only students at school level but also by parents at home and in the surroundings at community level.

Key words: climate change; coral reef; anthropogenic activities; youth engagement; community involvement

Climate change as an external stimulus to changes in the structure and functioning of ecosystems and the redistribution of communities

P. Khurun

Deputy Conservator of Forests

pkhurun@gmail.com

Abstract

Climate change is no doubt an external stimulus that is meant to bring about a change in the structure and functioning of ecosystems as well as the redistribution of communities and determinant of species survival. Many comprehensive papers and scientific studies that have been published and modelling of future scenarios. The way such studies have been carried out have also evolved moving from the study of individual species to community and ecosystem level. This paper gives an insight on the evolution of the studies and the latest trends and methodology of studies, but however discusses on the mechanics of evolution and the need for predictions not only from a single source of stimulus i.e. climate change but also from other sources of threats that are directly human induced i.e. introduction of exotic species, genetically modified species, over use of pesticides and new conservation methods. The last section of this discussion paper raises the issue of land space in small island developing state which makes the setting aside of land for conservation purposes a real challenge with Mauritius as a vivid example.

Keywords: climate change; communities; ecosystems; species: pesticides; external stimulus

Building Community Resilience against Disasters

D. Ellayah

National Disaster Risk Reduction and Management Centre (NDRRMC)

E-mail:

Abstract

The National Disaster Risk Reduction and Management Centre (NDRRMC) is the national coordinating body for all phases of disaster management for the Republic of Mauritius. One of its prime objectives is to develop a National Resilience Programme (NRP) for the country for vulnerable communities, private and public social-economic actors, para stataal departments, government agencies and NGO's; through coordinated activities to promote a culture resilience to disasters.

The NRP is aimed at building capacity and knowledge sharing on the steps to be taken to become resilient to existing and emerging disasters. This will be developed with a view to come forward with a National Resilience Framework.

Broad Scope of the Project

- Develop an in-depth understanding of the NRF on building a resilient nation.
- Build a resilience programme network with other governments.
- Mobilise resources to implement the National Resilience Programme Strategy.
- Plan and implementation Resilience activities.
- Develop a national resilience profiles in order to address the gaps in resilience-building initiatives.
- Establish technical support needs to strengthen national resilience programme.
- Develop a National Resilience work plan.

Key deliverables:

- Mapping of National Resilience Strategy based on needs assessments and socio-economic study
- Production of relevant resilience activities and stakeholders
- Country resilience profiles developed, needs assessments and socio-economic study and institutional mapping completed
- Gaps, linkages, lessons learned and good practices in resilience building identified and addressed

THEME 3

MITIGATION

Mitigation – Low carbon emission mechanisms

**Representative of the Ministry of Environment, Sustainable Development,
and Disaster and Beach Management**

jsewoobaduth@govmu.org

Abstract

Climate change is real and happening. According to the latest scientific reports such as the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2014), the world's climate is unequivocally heading on a dangerous pathway causing irreversible adverse impacts on the economy, ecosystems, lives and livelihoods of peoples, in particular, in Least Developing Countries (LDCs), Small Islands Developing States (SIDS), Africa and Landlocked Developing Countries (LLDCs). All the climate indicators are in the red and are projected to worsen over the decades even if the emissions of greenhouse gases are halted completely.

Additionally, according to latest reports, in order to limit the temperature rise to 2°C, net greenhouse gas emissions in the year 2100 will have to be zero, that is, we have to achieve carbon neutrality globally. This paper gives an overview of the greenhouse gas emissions in the global and in the local context. The key mitigation measures being adopted by the Government of Mauritius have also been elaborated whereby emphasis is on building a low carbon energy system.

Keywords: Climate change; mitigation; greenhouse gas; SIDS; climate indicators; low carbon emission

Climate change and food security issues (mitigation)

Representative of AREU, Ministry of Agro Industry and Food Security

farei@intnet.mu

Affordable & Sustainable Housing: A Case for Mauritius Small Island Developing State

Mr Boopen Doobah

Chairman, Community Development Programme Agency (CODEPA), IOCDAFRICA-
GREENACO

iocd africa@gmail.com

Abstract

This discussion paper concerns IOCDAFRICA- GREENACO Affordable and Sustainable Housing VILAZ100 (ASH VILAZ100). It focuses on ECO Designing, Sustainable building and maintaining 100 integrated people centered housing units that highlights the triple bottom line approach, hence, socially, environmentally and economically sustainable. Phillip Mofitt rightly illustrates the philosophy underpinning this discussion paper thus:” *A house is a home when it shelters the body and comforts the soul.*” Apart from being people centered, AFSH VILAZ100 is safe, secure, cost effective and universally **designed to be green based on the 12 Premaculture principles and energy efficient**. It serves the needs and empowers generations and communities. Social Housing issues in Mauritius are complex and interrelated, compacted by a host of social and economic factors such as poverty, lack of affordable and sustainable amenities, overextended community services, funding limitations, amongst others. Walking the challenge of reducing housing costs and maintaining sustainability, and focusing on lower middle class housing requirements, remain the principal focus of this paper

Keywords: Eco Design; sustainable; green-built; people centered; permaculture; affordable housing

Introducing renewable energy and presenting a technical economic analysis of photovoltaic in Mauritius

Gaj Pyndiah¹ and Kevina Mahadeo²

¹Consultant

4blav@intnet.mu

²Engineer, Renewable Energy

Abstract

With the current growing awareness of the destructive impacts of fossil fuel on our environment, renewable energy is increasingly playing a very important role in our battle against climate change. In this paper, we start with an overview of the different methods of conventional and renewable electrical energy production across the world. However, among

the green energies, it is photovoltaic which is gaining ground as a competitive, clean source of electricity. Such is the case in Mauritius where solar power is called to contribute to our limited energy portfolio. In this presentation, we therefore proceed by outlining the steps in the design of a photovoltaic system by taking into account the critical factors affecting the performance of the system. Furthermore, using our experience as renewable energy designers and installers, we present the real cost of installing a grid tie photovoltaic system in Mauritius. The final aim of this presentation is therefore to give the Mauritian home owner a detailed insight into the modelling of a photovoltaic system.

Keywords: fossil fuel; phovoltaics; climate change; green energy; renewable energy; solar power

Wetlands Protection in Mauritius: A Community Based Approach

Mr Boopen Doobah

Chairman, Community Development Programme Agency (CODEPA)

iocdafrica@gmail.com

Abstract

Wetlands in Mauritius are subject to serious threats. Major portions of wetlands have been converted to support alternative land uses including housing, agriculture, urbanization, industry, and tourism. Mauritius Island is a signatory party of the Ramsar Convention since 30 September 2001 (*Ramsar Strategic Plan 1997-2002*). Most of the wetlands are found in region of low altitude and along the littoral. They are of great ecological importance and they act as barriers to pollution thus protecting nearby lagoons. These unsustainable and unsafe actions actually put at stake not only the ecological stability, but also threatens the social and economic development particularly tourism, a main pillar. Backfilling of wetlands in Mauritius for housing and tourism promotion as well as degradation by surrounding local communities has already done much harm in certain places particularly Rivulet Terre Rouge Estuary Bird Sanctuary and Mare Sarcelle at Poste Lafayette, in the north-east coast of Mauritius, and is considered an important problem which should be tackled urgently. The National Environment Award winning Ngo CODEPA, has initiated sustainable actions involving active participation of stakeholders namely local communities, public and private actors in its fight for wetlands protection in Bras D'Eau and other strategic regions.

Keywords: wetlands; land use; agriculture; urbanisation; community- bases approach

Prospects for an enhanced mangroves restoration programme in Mauritius

Mr Sachooda Ragoonaden¹ and Mr Naim Ahmad Shaik Joomun²

^{1,2} Association pour le Développement Durable

¹ rajouma@yahoo.com

² nshaikjoomun@yahoo.com

Abstract

Mangrove forests are considered to be more effective than terrestrial forests as an important sink of GHG and contribute much to mitigate climate change. In the past, mangrove forest covered a very large area of the coastal strip of Mauritius and an area of 2000 ha is even cited. With time most of it has been cleared for settlement and building infrastructure. In 1980 it was estimated that only an area of 45 ha was left. As a consequence of an aggressive mangrove propagation programme of the Ministry of Fisheries as from 1995, the area estimated in 2009 was 145 ha. The Association pour le Développement Durable (ADD), a non-profit NGO, actively participated in the Republic of Mauritius (ROM) Mangrove propagation programme as from 2008. It has planted so far more than 80 000 mangrove seedlings with the full engagement of local communities from vulnerable groupings at Le Morne, Case Noyale, Quatre Soeurs/Pointe Aux Feuilles and Poudre d'Or with technical assistance and guidance from the Ministry of Fisheries and financial support from various funding agencies/programme including EU/IOC, EU/DCP/Ministry of Finance and MCB Forward Foundation. However, there is still a large area of potential sites where mangroves could be planted. ADD has taken a unique and innovative initiative to carry out an island wide field survey to identify potential mangroves site using latest 2008/2009 aerial photography obtained from the Ministry of Housing and Lands. The study has identified 31 potential sites for mangroves plantation around the island of an extent of 73.5ha using hand held GPS. A GIS based map for each site depicting potential extent of regions favourable for mangroves planting were prepared.

Keywords: mangrove; climate change; local communities; GIS; carbon sink.

THEME 4 ADAPTATION

Adaptation – Impacts and carbon sequestration systems

Representative of the Ministry of Environment, Sustainable Development, and
Disaster and Beach Management

jseewoobaduth@govmu.org

Abstract

There is no further doubt that human interference with the climate system is occurring and that climate change poses risks for human and natural systems. Throughout history, people and societies have adjusted to and coped with climate, climate variability, and extremes, with varying degrees of success. This paper focuses on the observed and projected impacts of climate change as well as the key adaptive responses which have been undertaken to address the impacts of climate change and enhance the resilience of Mauritius. Several priority sectors like disaster risk reduction and management, water, coastal zones, fisheries, tourism, public infrastructure, health and agriculture have been targeted and actions are being taken at different levels to reduce our vulnerability and increase our resilience.

Keywords: carbon sequestration; climate change; coastal zones; vulnerability; resilience

Climate change and food security issues (adaptation)

Representative of AREU, Ministry of Agro Industry and Food Security

farei@intnet.mu

Consumption of Mauritian exotic fruits, vegetables and tea: towards a reduction of the ecological footprint

Dr Vimla A Luximon-Ramma¹ and Dr J Naugah²

¹ Association pour le Développement Durable (ADD), vimlux@yahoo.com

² Chairperson, RGSE, Trust Fund Board; jayanaugah@gmail.com

Abstract

Mauritius, a tropical island in the Indian Ocean, has a relatively high prevalence of cardiovascular diseases, diabetes and cancers which impact drastically on ecological footprint of the Mauritian population. Literature data indicates that dietary phenolic antioxidants can be an important restorative approach through their free radical scavenging, metal chelating activities and capacity to modulate aberrant signal transduction pathways in the treatment of diseases. This study investigated the biopotency and antioxidant prophylactic capacities of the Mauritian exotic fruits, vegetables and locally produced black tea with emphasis on the protective effects of black tea infusates on specific biomarkers of ischaemic heart diseases among the Mauritian population. Data obtained revealed very high phenolic contents, antioxidant potential of the Mauritian exotic fruit, vegetable and tea extracts with significant protective effect of the black tea infusate on certain high risk factors of ischaemic heart diseases. This suggests that a number of these food items with rich sources of antioxidant nutraceuticals can be used as supplements in a balanced diet within existing nutritional programs in the management of chronic diseases in Mauritius. Under regulated practices, this could reduce strain on government budget for health management, dependency on drugs and drug discovery thus lowering the overall ecological footprint as one of the challenges of climate change in Mauritius.

Keywords: Exotic fruits, vegetables, black teas, phenolics, antioxidant nutraceuticals, biomarkers, high risk factors, ischaemic heart diseases, diabetes, ecological footprint, climate change

Issues in the rehabilitation of estuarine and in-land ecosystems as a way to adapt to climate change

S. Chacowry

Association pour le Développement Durable (ADD)

schacowry@gmail.com

Abstract

Some 25 rivers of length up to 25 km flow into estuaries around Mauritius. They carry with them an increasing amount of silt, waste and chemical pollutants. During flooding there is an increase in the volume of silt dumped by the swollen rivers. These effluents accumulate in the estuaries and cause pollution and harm all life forms. In the case of a strong circulation between the estuarine water and the wider lagoon, the silt and pollutants from the estuaries are often carried away causing serious often irreversible harm to coral reefs. If the circulation is weak, the soil from the river flows accumulate and over the years can result in damage to the estuarine ecosystem and to the formation of mudflats. The estuary eventually becomes narrow and life forms that thrived in the ecosystem decline. The changing geomorphology results in

severe coastal erosion in hitherto unaffected areas leading to a depletion of resources from mudflats.

The above phenomena are highlighted in the case of Rivière La Chaux and Rivière des Créoles which end up in a common estuary. Over the years, insidious degradation from human activities, pollutants and erosion especially during flooding has set in. Encroachment of land for agricultural practices along the river banks have led to the loss of freshwater biodiversity and indigenous plants along river banks. Overexploitation of coastal areas has resulted in considerable damage to coastal and estuarine ecosystems. Two large mudflats have developed in the estuary in the last three to four decades modifying the morphology of the estuary and its marine resources. The modified freshwater flow and ocean waves have increased coastal erosion in some areas. During very low tides the mudflats are visible above the sea water. During high tides the mud is washed ashore making the beaches impracticable for leisure activities. Fishers have increasing difficulty in catching fish from the estuary. Leisure and economic activities in the coastal areas, estuary and the river banks have nearly waned leading to further disinterest in revival of biodiversity resources. Climate change and sea level rise are expected to lead to further encroachment of the coast line and loss of biodiversity in the estuary. In the light of the above conditions, there is a need for improved understanding of the biogeochemical processes of estuarine systems in Mauritius. These studies are essential in any environmental development schemes and effective coastal zone management.

Keywords: estuary; ecosystem; biodiversity; erosion; mudflats; climate change

Eco-friendly garden

Representative

cactuswg@intnet.mu

Abstract

I am a social worker for more than 30 years now and my aim is always to work for a better environment, a small paradise on earth. Unfortunately nobody cares and nobody wants to hear. It is so interesting and fascinated to see how the nature works, acts and what it all brings to us. If only once you stop and take sometimes to see how a bee or a butterfly, flies around and jump all over our flowers .The world as it is needs all of every existing creations , where everything and everybody ,as its importance. How many of us Mauritians in a small island surrounded by water ever swim or dive and learn about the underwater life. I dream so often I am swimming on the back of a fish. I used to play with the dolphin and I must tell you the joy is so intense, that there are no words to explain this happiness. In this world how many of us use to say ‘I better have an animal as a companion instead of Human Being. My dear friends the nature is giving us signs but we still do not want to hear or to accept, So long we have enough to eat or to drink, we do not care, we are destroying everything just

for money. There was a time when we used to live free in the nature, but the world have change, the food is no good anymore, the people are afraid of other people. We human being we are the biggest destroyer in this world.

Most of us are aware but we always give the responsibility to others. It is time to act, stop being negative before it is too late, now that there is still time even if it is very little. Every little thing that we can do is always a step forward.

My responsibility is a dream which I want to share with you now. I would like to build up a garden but this time without Eve and Adam, but with all Mauritians who can benefit from it. The garden should be a unique multi- eco-friendly garden concept. Where we will produce vegetables, flowers and fruits?. But in parallel we will have activities in collaboration with ministries concerned, to educate, prevent, awareness, sensitise, the inhabitants of Mauritius about climate change and its effects.

The project is in line with the ‘Maurice Ile durable’ (MID) concept. We, the promoters have a deep commitment to sustainable farming and the protection of the environment.

We also wish to bring our elders who are hard workers with a lot of experience and youngsters to work together. Not only they bring their family together but they bring a lot to us mostly the values in life which is the most important gift a human being can get.

The universal wish is that it will be the right thing to let them spend their time, by giving the youngsters this precious gift.

Our elders have worked mostly with and in the nature. Nothing better as a good environment that is a land with green and flowering, which nowadays seem to disappear. If ever our youngsters can be brought back to the land, working in farms, among vegetables, flowers and animals with the support of our elders this would have been fantastic. At least on both sides, they will feel useful and this will contribute enormously to help our youngsters economically. Being together they will learn to know each other, get their respect, love and affection and share experiences. Everybody knows how positive it is the energy from the earth.

What is better than a personal satisfaction when each of us will eat their own fruit or vegetable, a satisfaction no money can buy?

THEME 5 CAPACITY BUILDING, TECHNOLOGY TRANSFER AND SENSITISATION

Role of climate Change Education in the Formal Education Context

Dr. Oomandra Nath Varma

Director, Mauritius Institute of Education,

Institutional approach to Climate Change Education for Sustainable Development in the Republic of Mauritius: A case Study

Dr Ravhee Bholah¹ and Mr Mohun Cyparsade²

¹Senior Lecturer; MIE, rbholah@mieonline.org

²Senior Lecturer, MIE, mcparsade@mieonline.org

Abstract

Climate Change Education in the context of SIDS in the Indian Ocean region

**Mr Mohun Cyparsade¹, Dr Ravhee Bholah², Mr Pierre André Boullé³ and
Mr Chandrashekhar Padaruth⁴**

¹ Senior Lecture, MIE, mcparsade@mieonline.org

²Senior Lecturer; MIE, rbholah@mieonline.org

³ Senior Lecturer, MIE, a.boulle@mieonline.org

⁴ Senior Lecturer, MIE, s.padaruth@mieonline.org

Fostering youth engagement in climate change issues through science centre programmes: an overview of the contribution of the Rajiv Gandhi Science Centre to climate change Education in Mauritius

Mrs Bhamini Kamudu Applasawmy

kamudu.rgsc@gmail.com

Abstract

A proper understanding of climate change issues better equips citizens with the right attitudes and behavior to address and adapt to the impacts of global warming and climate change (CC). As informal educational institutions aiming to enhance scientific literacy, science centres and museums worldwide are very active and effective in public engagement in climate change by offering opportunities for active, inquiring-based, hands-on and experience based learning to take place. The Rajiv Gandhi Science Centre (RGSC), the unique science centre in Mauritius has been organizing science education programmes targeted at young people as part of its core activities.

The aim of this paper is to describe the contribution of the RGSC towards CC Education in Mauritius since 2008 and to assess whether RGSC has been able to raise awareness on CC issues among students participating in Science Project based competitions it organizes.

RGSC has been hosting youth forums on Sustainable Development (SD), distributed Renewable Energy kits to primary schools and delivered teacher training workshops. In 2012, RGSC developed and opened a whole exhibition gallery entitled 'Climate Change: threats and Challenges' which is open for public. Content analysis of the project titles submitted by students was carried out. Titles of projects submitted by students during competitions were categorized into 4 main themes: **Description**, **Adaptation/mitigation to CC** and sustainable development, **Health issues** and **Other Science and Technology** topics.

Both primary (age 9-10yrs) and secondary school students (age 12-18yrs) are very interested in investigating issues related to CC and sustainable development (SD). For secondary school, project titles falling under the umbrella of Descriptive and Adaptation/mitigation to CC made up of 64.3% of submissions in 2013, 72.6% in 2014 and 67.9% in 2015. Among primary school students, CC related themes were as follows 56.2% in 2013, 60% in 2014 and 69% in 2015. The majority of these student projects were proposing measures and solutions to adapt and to mitigate the effects of climate change.

The results confirm that RGSC has been effective in inculcating an awareness among students on CC and SD through the Project based learning approach. Students went through a process of scientific inquiry and ultimately proposed concrete solutions for example they considered renewable energy technologies as alternative to fossil fuels and constructed working models/ devices.

The competition also encourages students to implement projects at school or community level. Projects on rainwater harvesting, waste management, recycling works, green spaces were successfully implemented at school.

Through such competitions, RGSC has been inciting students to take meaningful actions by using S&T to solve problems they encounter daily. Concern of the youth for the environment is obvious.

However, it is recommended to conduct further studies to assess the long term impact of participation in Project based competition at RGSC on students' attitudes and career choice.

Keywords: Science Centres, Rajiv Gandhi Science Centre, Project-Based Learning, Climate Change Education, Informal science education, Youth Engagement

Youth and Climate Change

Mr Jeevesh Augnoo

SYAH

jeevesh.augnoo@live.co.uk

Abstract

The past years have seen a noticeable change in climate with more intense cyclones, severe winters, torrential rain, harsher summers, and a degrading environment. Moreover, an increase in global temperatures have led to a considerable melting of the ice caps and increase in sea levels. With technological progress and the advance of industrialisation, natural resources are being exploited at an accelerated rate, the environmental effect of which is more than too often not taken into consideration. Studies have showed that our agricultural output has decreased, as has the amount of fish in the sea. This paper seeks to explore the role of the Youth in tackling Climate Change.

Starting with a general overview of the science behind climate change, and its impact on the world today, this paper will cover the key issues at stake and the role of the United Nations Framework Convention on Climate Change (UNFCCC) and the history of the Negotiations on Climate Change. In the build up to the Paris Conference of Parties (COP21) in December, this paper will aim to provide an insight on who is involved in the Negotiations, how the negotiations take place, and which are the key concepts to look out for. More importantly, the key issues at stake will be analysed from a youth perspective and elaborated upon.

As Leaders of Tomorrow and Partners of Today, this paper seeks to provide an insight on the role of the Youth in the fight against Climate Change. It aims to provide a youth-focused perspective on Climate Change, in relation to aspects such as Human Rights, Education, Poverty, Employment and Development. It is of utmost importance that the Youth of today should have a say in their tomorrow. Advocacy is one of the most prominent and essential tools which the Youth could and should use to tackle Climate Change, and this paper aims to provide an overview of how to use this tool effectively. It aims to provide a road map for young people to understand the contentious issues and methods on how to educate and equip themselves to lead the debate and actions on Climate Change, with a special focus on Youth from a SIDS (Small Island Developing State) country.

Climate Change might seem to be the abstract, “unseen” elephant in the room but its effects are very tangible. All over the world, rising movements of Youth looking at alternatives to current development models. These include moving from fossil fuels to renewable sources of energy, reducing consumption patterns and improving production methods, investing in sustainable agriculture, farming and fishing methods and divesting from fossil fuels. We can move from these unsustainable development models, which are sacrificing environmental and human dignity to push for bigger profits, just as we moved from development models which sacrificed human dignity to the expense of profit and “progress” by using men as slaves. Young people are making their voices heard and their actions seen. As young islanders, we seek to encourage partners, locally and internationally to stand with the all the Young Global Citizens in this is challenge against climate change.

Keywords: youth, climate change; natural resources; agriculture; SIDS; sustainable development

Climate change: a gender perspective

Dr Vimla.Luximon-Ramma¹, Dr J.Naugah², Dr A.Chacowry³, Mrs S. Domah⁴, Mrs E. Dhunoo⁵ and Mrs S. Ramlugun⁶

¹ ADD, vimlux@yahoo.com

² Chairperson, RGSE Trust Fund Board; gasatgb@yahoo.com

³ ADD, achacowry@gmail.com

⁴ Deputy Director, DAV College; deeya_1515@yahoo.com

⁵ Head Biology, Presidency College; emdhunoo@gmail.com

⁶ Deputy Rector, Gaëtan Raynal College; sitaramlugun@gmail.com

Abstract

Focus on gender differentiated impacts of climate change has recently gained momentum around the world. It is also noted that communities in developing countries are likely to be vulnerable to effects of climate change. This paper attempts to find out girls and women’s views about climate change and how equipped they are to face the challenges of the changes in the natural environment. Women and girls constitute almost 52 per cent of our population and they play an important role in issues concerning sustainable development. Climate change may affect men and women differently. This study investigates the gendered dimensions of climate change by carrying out a survey among girls and women from various backgrounds. It is expected that by addressing and recognising their concerns, appropriate measures can be taken to face the challenges confronting them. Data collection was carried out quantitatively through questionnaires which were administered at random to girls and women living in rural, sub-urban and urban areas. The results showed that over 80 % of the respondents were aware of the concept of climate change through media sources. The majority of them perceived climate change with apprehension and strongly agreed that it was caused by human activities.

The results also showed that the respondents raised ethical issues to mitigate the impact of climate change in society.

Key words: Women; climate change; mitigation; human activities; ethical issues.

THEME 6

IMPLICATIONS OF POSSIBLE OUTCOME OF PARIS CONFERENCE, NATIONAL AND REGIONAL COOPERATION

**Indian Ocean RIM Association
Prof. V. Attri**

Indian Ocean RIM Association

E-mail:

Statement from SADC

**Timothy Gotora
SADC Secretariat**

Climate change and commodities price volatility

Jean Missinhoun

Senior Partner Intangis

E-mail : mcodjo@hotmail.com

Abstract

Climate change is set to create an explosion in price volatility in Energy commodities. Market participants, in particular commodities trading investors are already positioned to capitalise on this through investment strategies based on directional and value trades using liquid and exchange cleared instruments.

Climate Change

Climate has a critical role in setting demand and supply for various commodities. A very large part of energy demand comes from space heating and cooling needs of residential and commercial entities. Natural gas, heating oil, fuel oil and coal are all predominantly used as fuel sources for climate control. Weather abnormalities have therefore drastic effect on their demand and hence on their prices.

Furthermore, the energy infrastructure – crude oil and natural gas pipelines, exploration and production rigs, natural gas processing plants, refineries, power plants, transmission lines, substations, petroleum depots and storage centres, coal mines, rail-system are all vulnerable to numerous climate change and weather systems: pricing of commodities can fluctuate wildly on any event or major unexpected change in weather or climate which would affect the energy infrastructure.

Investment Opportunities

The significant mispricing that often exists due to seasonal tendencies, weather anomalies, structural and technical imbalances, and inadequate supply and demand analysis by market participants offer investment opportunities through directional and relative value trades in the petroleum and natural gas market.

Investors typically seek to employ directional, volatility and relative value approach to trading. Risk is expressed in a number of opportunistic themes across the barrel and pipeline network. Positions are spread across different periods in the curves and different geographical regions in an effort to reduce portfolio volatility and augment returns.

Case Study – BlackJar Fund

BlackJar Fund is a Delaware private investment partnership with target total asset management of \$300 million has offices in London and New York. The Fund seeks to employ directional, volatility and relative value approach to trading.

Keywords: climate change; investment opportunities; BlackJar Fund; risk; weather anomalies; commodities; volatility

Implications of the outcome of Paris Climate Change Conference (COP21)

**S.N. Sok Appadu
President ADD**

luxmi80@hotmail.com

Abstract

The Kyoto Protocol, adopted in 1997, failed to become operational. Parties, to the UNFCCC, decided to put into place a new mechanism which will reduce the concentration of greenhouse gases in the atmosphere and, at the same time , stabilize the global climate system.

Negotiations started way back in 2005 during COP meeting. Parties came to an agreement , only , in 2011 ,at Durban , to launch the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) . The mandate of the ADP is to develop a protocol, another legal instrument or an agreed outcome with legal force under the climate change convention and applicable to all Parties, who will decide on the quantum of their reduction of GHGs through the submitted INDCs . The task is to be completed no later than 2015and entered into force by 2020.

The ADP met on 11 occasions and prepare a negotiating text to be adopted in Paris at the COP21 session. The text is divided into 12 parts namely : a Preamble ,Definitions ,General/Objectives , Mitigation , Adaptation and Loss and Damages ,Finance ,Technology

Development and Transfer ,Capacity Building, Transparency , Timeframes ,Implementation and Compliance ,Procedural and Institutional provisions.

Negotiations are being held at 3 levels .Heads of States and Governments are generating the political will and visions. Ministers are unlocking sticky political issues and paving the way for differentiation and finance. The third category are the Technical ones who will provide the bulk of elements in the Paris package. The complexity of this global task is not only enormous but strange.

Keywords: Kyoto Protocol; ADP: Political issues; Paris package; climate change

Roles of Civil Society in mitigating the effects of climate change

Mr Ram Nookadee

President, Development Practitioners in Network (DPIN)

ramnookadee@hotmail.com

Abstract

This paper reviews the current level of engagement of Civil Society Organisations (CSOs) in mitigating the effects of climate change on the well-being of the people. By using examples of the damages that are caused by climate change and its potential growing threat to life, to the socio-economic resources and to the environment, the paper demonstrates how CSOs can meaningfully contribute to self-help measures in several sectors and at various levels of the society including women, youth, the elderly and the decision makers. It defines the whole gamut of CSOs as well the grass root partners that they are best able to leverage. In fact what is Civil Society which has become a popular jargon?

A set of roles that these organizations can play to enhance the mitigation of climate change is presented. It also provides an overview on how civil society can partner with other concerned parties including the Government, the private sector and international organizations in addressing climate change issues.

In particular, the paper analyses how the work of CSOs would become more effective with ensuing recognition for their role and the availability of adequate resources for their activity. It also looks at possible mechanisms for them to work efficiently and effectively with all stakeholders. Finally, the paper presents some recommendations to the CSOs so that they can operate as an integral partner in the process.

Keywords: NGOs; civil society; stakeholders; climate change; stakeholders

Climate Justice ‘Trading Carbon, Betting the Earth’

Ajay Lachhman

International Trainer, ANSA and: President Aid Action

info.aidaction@gmail.com

Abstract

The Multi-dimensional nature climate injustice: Climate change relates to environmental, social, economic, energy, food, political ethical and moral crisis. The Climate Crisis have an direct linkage with sustainability crisis. All efforts started in the 1960’s by many African countries are being nullified by increasing natural disasters such as droughts, floods, earthquakes including epidemics of killer diseases such as HIV/AIDS, Malaria, Malnutrition, among many others .

Commodification of Nature: World Bank and the World Trade Organisation (WTO) supported by global North and the elites in developing countries are suggesting solution which is lock to the logic of market. The Climate crisis is perpetuated and fuelled by the endless pursuit of maximisation of profit, growth and prosperity. The solutions proposed promote profiteering and the commodification of nature.

The danger Neo-liberalism: The Neo liberal development model has a destructive impact on the poor nations: Violence, exclusion and loss of sovereignty over natural resources

Overcoming human-induced factors .There is a need to review our consumption and production pattern

Who bear the burden? The paradox is that the poor nation with least carbon production responsibility suffers the most.

A development for the people. The is a mismatch between the desire for a putting people first development model and the understanding of nation welfare solely based on economic growth indicators .We are witnessing an unsustainable exploitative economic growth

Change in paradigm. Progressive forces should go for pro – climate justice agenda. We need to advocate for an alternative production system based on domestic demand & human needs as opposed to the present system that is dominated by an export-oriented strategy & FDI

Keywords: climate change; climate justice; natural disasters; economic growth indicators; sustainability

Association pour le Développement Durable (ADD)

**ENGAGING STAKEHOLDERS IN CLIMATE CHANGE ISSUES
(Municipal City Council of Port Louis, 8 to 10 October 2015)**

Programme

THURSDAY 8 October 2015

09h00-10h00 **Registration**

Morning session 1: 10h00 to 11h00

Chairperson: Dr J. Naugah, Chairperson Rajiv Gandhi Science Centre Trust Fund Board
Rapporteur: Dr Anoradha Chacowry, ADD

Welcome address: Mr S.N. Sok Appadu, President, ADD

THEME 1 PARIS CONFERENCE – STATUS

Keynote address 1: The Climate Change Convention – Status and Prospects for Developing Countries

Mr R Nayamuth, Director, CLIMAGRIC Ltd

Discussions (Lead Session Chair assisted by Session Rapporteur)

11h00 to 11h30 **Coffee/Tea break**

Morning session 2: 11h30 to 12h30

THEME.2: CLIMATE CHANGE SCENARIOS AND IMPACTS

Chairperson: Dr Aman Kumar Maulloo, Director Rajiv Gandhi Science Centre
Rapporteur: Mr Ajay Lachhman, International Trainer: ANSA, President: Aid Action

Keynote address 2 : Challenges and Opportunities – The INDC (Mauritius)

Representative of the Ministry of Environment, Sustainable Development, and Disaster and Beach Management

- Climate change, Reunion and the challenge of Paris Conference
Director Meteo Reunion
- Climate change scenarios at Global and Indian Ocean levels
Representative of Mauritius Meteorological Services
- Climate change scenarios at the level of the Republic of Mauritius
Representative of Mauritius Meteorological Services
- Evaluation of the impact of climate change on maize production over Ethiopia
Dr Kidist Abera, Ethiopian Institute of Agricultural Research, Ethiopia, Dr Olivier Crespo and Dr Jemale Seid, Climate System Analysis Group, University of Cape Town, Cape Town.
- Recent acceleration in sea level rise in Mauritius and Rodrigues
Representative of the Ministry of Environment, Sustainable Development, and Disaster and Beach Management

12h30 to 13h30 **LUNCH**

Afternoon session1: 13h30 to 14h45

CLIMATE CHANGE SCENARIOS AND IMPACTS (THEME 2 Continue)

- Impact of climate change and sea level rise on our beaches in Mauritius
Gaj Pyndiah, Consultant
- Enhancing community resilience to flood risk in Mauritius in the advent of climate change by
Dr Anoradha Chacowry, ADD
- Engaging youth and community in coral reef restoration and beach monitoring
Mrs S.Ramlugun, Dr J.Naugah, Mr R. Ragoonaden, Ms S,Domah, Dr B.Pathack, Mrs J.Pierre
Members of ADD and GASAT
- Climate change as an external stimulus to changes in the structure and functioning of
ecosystems and the redistribution of communities
P. Khurun, Deputy Conservator of Forests, Ministry of Agro Industry
- National Disaster Risk Reduction and Management Centre
D. Ellayah, NDRRMC

Discussions (Lead Session Chair assisted by Session Rapporteur)

15h00 to 16h00 OPENING CEREMONY
Master of Ceremony: Dr Vimla A Luximon-Ramma

Address: Mr S.N. Sok Appadu, President ADD
Mr S. Chacowry, Honorary President, ADD
Mr. Mohammad Oumar KHOLEEGAN, Lord Mayor , City of Port Louis
Video Message WMO
H.E Mrs Marjaana Sall, The Ambassador of the European Union to the
Republic of Mauritius
H.E. Laurent Garnier, The Ambassador of France to the Republic of
Mauritius

Opening address: Hon. Jayeshwur Raj Dayal, CSK, QPM, PDSM, FBIM psc (UK),
MAIMS, Minister of Environment, Sustainable Development, and
Disaster and Beach Management

Reception

FRIDAY 9 October 2015

Morning session1 09h30 to 09h50

THEME 5: CAPACITY BUILDING, TECHNOLOGY TRANSFER AND SENSITISATION

***Chairperson:* Dr Hemant Bessoondoyal, Associate Professor, Mauritius Institute of Education**

***Rapporteur:* Dr S.Kawol, Senior Lecturer, Home Economics Department, Mauritius Institute of Education**

Keynote address: Role of Climate Change Education in the Formal Education Context
Dr. Oomandra Nath Varma, Director, Mauritius Institute of Education

09h50 to 10h45

- Institutional approach to Climate Change Education for Sustainable Development in the Republic of Mauritius: A case Study
Dr Ravhee Bholah and Mr Mohun Cyparsade, Mauritius Institute of Education
- Climate Change Education in the context of SIDS in the Indian Ocean region
Mr Mohun Cyparsade, Dr Ravhee Bholah, Mr Pierre André Boullé and Mr Chandrashekhar Padaruth, Mauritius Institute of Education
- Education, Training and Public Awareness
Reresentative of The Ministry of Environment, Sustainable Development, and Disaster and Beach Management

- Fostering youth engagement in climate change issues through science centre programmes: an overview of the contribution of the Rajiv Gandhi Science Centre to climate change Education in Mauritius
Mrs Bhamini Kamudu Applasawmy, Rajiv Gandhi Science Centre
- Youth and Climate Change
Mr Jeevesh Augnoo (SYAH)
- Climate change: a gender perspective
Dr Vimla A Luximon-Ramma, Dr J.Naugah, Dr A.Chacowry, Mrs S. Domah, Mrs E. Dhunnoo and Mrs S.Ramlugun, ADD

10h45 to 11h00 Coffee/Tea break

Morning session2: 11h00 to 12h30

THEME 3 MITIGATION

Chairperson: S.N. Sok Appadu, President ADD

Rapporteur: Mrs E. Dhunnoo, ADD

- Mitigation – Low carbon emission mechanisms
Representative of The Ministry of Environment, Sustainable Development, and Disaster and Beach Management
- Climate change and agriculture (mitigation)
Representative of AREU, Ministry of Agro Industry and Food Security
- Affordable & Sustainable Housing: A Case for Mauritius Small Island Developing State
Mr Boopen Doobah,, Chairman, Community Development Programme Agency (CODEPA)
- Introducing renewable energy and presenting a technical economic analysis of photovoltaic in Mauritius
Gaj Pyndiah, Consultant and Kevina Mahadeo, Engineer Renewable Energy
- Wetlands Protection in Mauritius; A Community Based Approach
Mr Boopen Doobah Chairman, Community Development Programme Agency (CODEPA)
Prospects for an enhanced mangroves restoration programme in Mauritius
Mr Sachooda Ragoonaden and Mr Naim Ahmad Shaik Joomun, ADD

Discussions (Lead Session Chair assisted by Session Rapporteur)

12h30 to 13h30 LUNCH

Afternoon session1: 13h30 to 15h00

THEME 4 ADAPTATION

Chairperson: S. Ragoonaden, ADD

Rapporteur: Mr Ahmad Shaik Joomun, ADD

- Adaptation – Impacts and carbon Sequestration Systems
Representative of The Ministry of Environment, Sustainable Development, and Disaster and Beach Management
- Climate change and agriculture (adaptation)
Representative of AREU, Ministry of Agro Industry and Food Security
- Consumption of Mauritian exotic fruits, vegetables and tea: towards a reduction of the ecological footprint
Dr Vimla A Luximon-Ramma and Dr J Naugah, ADD
- Issues in the rehabilitation of estuarine and in-land ecosystems
Mr S. Chacowry, ADD
- Eco-friendly garden
Representative

15h00 to 15h15 COFFEE BREAK

15h15 to 1600 Discussions (Lead Session Chair assisted by Session Rapporteur)

SATURDAY 10 October 2015

Morning session1: 09h30 to 11h00

**THEME 6: IMPLICATIONS OF POSSIBLE OUTCOME OF PARIS CONFERENCE,
NATIONAL AND REGIONAL COOPERATION**

Chairperson: Mr Suraj Rai, President of AHEAD

Rapporteur: Ms S,Domah, Deputy Rector, DAV College

Keynote address: Prof. V. Attri, Indian Ocean RIM Association

- Statement from SADC
Mr Timothy Gatora, SADC Secretariat
- Climate change and commodities price volatility
Mr Jean Missinhoun, Intangis
- Implications of the outcome of Paris Climate Change Conference (COP21)
Mr S.N. Sok Appadu, ADD
- Roles of Civil Society in mitigating the effects of climate change
Mr Ram Nookadee, President, Development Practitioners in Network (DPIN)
- Climate Justice 'Trading Carbon, Betting the earth'
Mr Ajay Lachhman, International Trainer: ANSA and President: Aid Action

11h00 to 11h15 **Coffee/Tea break**

Morning session2: **11h15 to 12h30**

CLOSING EVENT

Master of Ceremony: Dr Vimla A Luximon-Ramma, ADD

- **Adoption of colloquium statement**
- **Vote of thanks**
- **Closing ceremony**

EXHIBITION: Displays by ADD, MIE, MoE and RGSC
Home-made photovoltaic panel (Dr Pathack, ADD)
Renewable energy (Mr Gaj Pyndiah, Consultant)