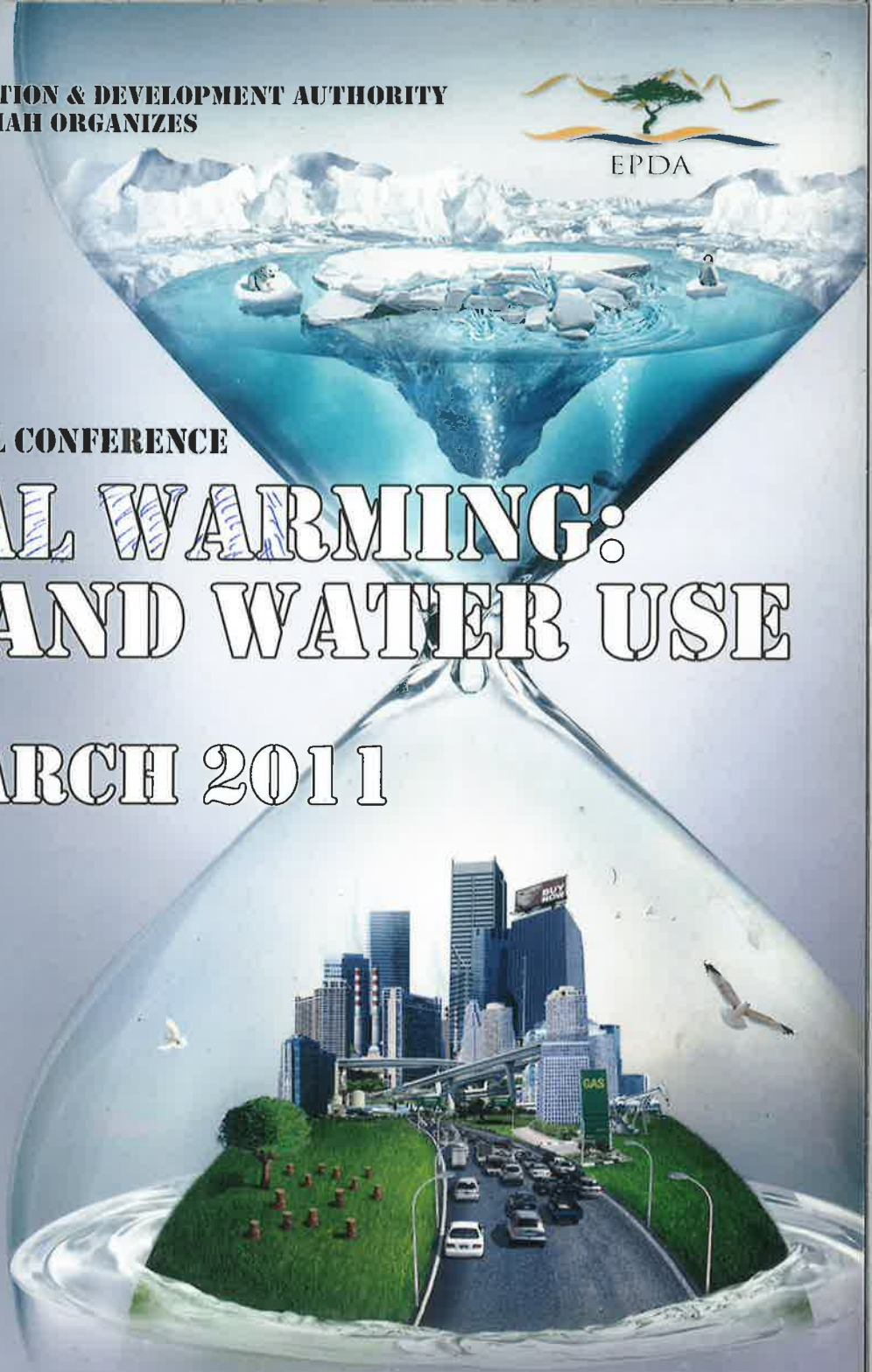
ENVIRONMENT PROTECTION & DEVELOPMENT AUTHORITY
(EPDA) – RAS AL KHAIMAH ORGANIZES

EPDA



1ST INTERNATIONAL CONFERENCE

GLOBAL WARMING: LAND AND WATER USE

6 – 8 MARCH 2011

MAJOR TOPICS :

FISHERIES AND COASTAL DEVELOPMENT

CLIMATE CHANGE & BIODIVERSITY

URBANIZATION AND INDUSTRIAL DEVELOPMENT

WATER USE AND WATER BORN DISEASES

SUSTAINABLE LAND AND WATER USE MANAGEMENT

CONFERENCE PROCEEDINGS

1ST INTERNATIONAL CONFERENCE

GLOBAL WARMING

LAND AND WATER USE

(A MULTIDISCIPLINARY APPROACH)

MARCH 6-8, 2011

Environment Protection and Development Authority (EPDA)
Government of Ras Al Khaimah
United Arab Emirates

Scientific committee

Dr. Saif M. Al Ghais
UAE University, UAE

Dr. Anwar Huq
University of Maryland, USA

Dr. Basheer Ali
EPDA, UAE

Dr. Irshad Ahmad
EPDA, UAE

Organizing Committee

Mr. Ahmed Beheri

Eng. Mustafa Khalifa

Mrs. Maryam M. Allay

Mrs. Moza Al Meheri

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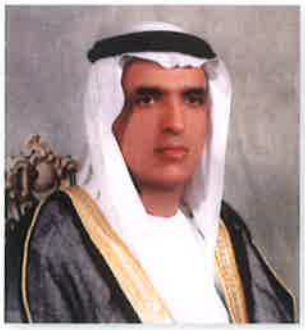
MESSAGE



It is a matter of great pleasure that the Environment Protection and Development Authority – Ras Al Khaimah is organizing the 1st International Conference on "Global Warming: Land and Water Use" during March 6 – 8, 2011 at Ras Al Khaimah.

Climate change is a growing threat to our planet. A sharp rise in Global Warming over the last five decades due to increasing natural and human activities and the resultant environmental pollution has been adversely affecting our ecosystem. Environmentally sustainable economic development rewards beneficial and sustainable socio-economic activities and achievements. To approach this goal in Ras Al Khaimah and the United Arab Emirates we encourage and support the use of technological, educational, social and policy options for keeping the momentum of economic development without compromising with environmental protection and security.

I hope this conference will provide a forum for regional and overseas scholars and experts to discuss and share their knowledge on the environmental and socio-economic issues of climate change and the latest advancements towards finding their solutions needed for the survival of our present as well as future generations.

I welcome all the delegates and other participants to this conference and extend my greetings and good wishes for the success of the conference.

H. H. Sheikh Saud Bin Saqr Al Qasimi
Member of Supreme Council of UAE and Ruler of Ras Al Khaimah

WELCOME MESSAGE

It is a great pleasure and privilege for us to host the **1st International Conference on "Global Warming: Land and Water Use"** under the patronage of **His Highness Sheikh Saud Bin Saqr Al Qasimi, Supreme Council member of UAE and Ruler of Ras Al Khaimah**, in Ras Al Khaimah, United Arab Emirates, during March 6-8, 2011.

Global warming is one of the most serious environmental threats faced by humanity and could have disastrous ecological and economic impacts. According to the United Nation's Intergovernmental Panel on Climate Change (IPCC) report, the 20th century was the hottest century (temperature 0.6-0.8 °C rise) in the past 1,000 years and the mean earth surface temperature is likely to increase more sharply by 2.5-3.5 °C in the 21st century. Projected harmful effects of a warmer climate include fresh water scarcity, decreased food production, loss of terrestrial and marine biodiversity and natural resources, spread of diseases, melting of glaciers leading to sea level rise, submerged coastal areas and declined fish stock.

The scientific program of the conference has been planned with an aim to bring together regional and international experts and scholars to address the forefront environmental and socio-economic issues associated with the global warming and their solutions.

I take this opportunity to express my gratitude to His Highness for his patronage and support.

I, on behalf of the EPDA-RAK, welcome the distinguished delegates and esteemed guests and wish to extend gratefulness to them for making this conference successful and enriched by their thought provoking deliberations.

In the last but not the least I must thankfully acknowledge the untiring effort, help and support of my office staff and colleagues in organizing this conference.

Dr. Saif M. Al Ghais
Executive Director
EPDA-RAK

ENVIRONMENT PROTECTION AND DEVELOPMENT AUTHORITY (EPDA)

Ras Al Khaimah's Environment Protection and Development Authority (EPDA) was formerly known as the Environment Protection and Industrial Development Commission (EPIDC), originally established in 1999. In March 2007, EPIDC was restructured and renamed through Local Emiri Law No (2) of 2007.

EPDA is Ras Al Khaimah's nominated body (Competent Authority) responsible for implementing UAE Federal Law No. 24 of 1999 for the Protection and Development of the Environment in collaboration with the Ministry of Environment and Water, UAE and other concerned parties and stakeholders at international, federal and local level.

EPDA main objectives are:

1. Protect and develop the environment of Ras Al Khaimah, from the negative impacts of activities that may cause damages to human health, agricultural crops, wildlife, marine life, other natural resources and climate by implementing necessary policies, plans and actions.

2. Promote the sustainable development of the Emirate and propose the necessary regulations to link environmental concerns to the planning and development policy of the entire Emirate, by coordinating between the Authority and different private and governmental organizations.

Important responsibilities of EPDA are:

1. Conduct scientific studies and researches related to natural resources, pollution, human settlement, industrial and economic development.
2. Suggest and offer projects, technical solutions, recommendations and contingency plans to issues related to environment for all the sectors of the Emirate.
3. Prepare laws, rules, regulations, systems and procedures. As well as in force and execute federal and local environment rules.
4. Inspect and evaluate industrial, agriculture, economic developmental projects that have direct and indirect effect to the environment.
5. Establish a benchmark laboratory in the emirate for the purpose of scientific research & technologies.
6. Work in co-operation and co-ordination with official and non official organizations and institutions inside and outside the country.

1st International Conference on Global Warming: Land and Water Use (A Multidisciplinary Approach) March 6 - 8, 2011

Organized by:	Environment Protection and Development Authority, Ras Al Khaimah, UAE
Venue:	**Al-Hamra Fort Hotel and Beach Resort, Ras- Al-Khaimah, UAE**

Day 1 Sunday, March 06, 2011

18:00 – 20:00	Welcome and Get-together/Registration
20:00 onwards	Dinner

Day 2 Monday, March 07, 2011

Inaugural Session

08:00 – 09:00	Registration
09:00 – 09:15	Recitation from the Holy Quran
09:15 – 09:25	**Welcome and Introduction** **Dr. Saif M. Al Ghais** Executive Director, EPDA
09:25 – 09:35	**Minister Speech** **Dr. Rashid Ahmed Bin Fahad** Minister of Environment and Water, **UAE**
09:35 – 09:50	**Inaugural Address** **H.H. Sheikh Saud Bin Saqr Al Qasimi** Member of the Supreme Council of UAE and Ruler of Ras Al Khaimah
09:50 – 10:30	**Keynote Address "Oceans, Climate, Infectious Disease, and Human Health: The Cholera Paradigm"** **Dr. Rita R. Colwell**, Professor, University of Maryland and Johns Hopkins University Bloomberg School of Public Health, **USA** Ex. Director of National Science Foundation, **USA**
10:30 – 11:00	***Refreshment***

Session I: Fisheries and Coastal Development

Chairman	**Dr. Anwar Huq,** Professor, University of Maryland, **USA**
11:00 – 11:45	**Keynote Address "Potential Fisheries Impacts from Global Climate Change"** **Dr. Jeffrey Polovina**, Chief of the Ecosystem and Oceanography Division at the Pacific Islands Fisheries Science Center, NOAA Fisheries, Honolulu, Hawaii, **USA**

11:45 – 12:05	**Effect of Climate Change on Marine Environment** Dr. Saif Al Ghais, UAE University – Al Ain and EPDA – RAK, Ras Al Khaimah, **UAE**
12:05 – 12:25	**Climate Change Impacts on Selected Migratory Species** Douglas Hykle, IOSEA Marine Turtle MoU Secretariat, UNEP Regional Office for Asia and the Pacific Bangkok, **Thailand**
12:25 – 12:45	***Discussion***
12:45 – 14:30	***Prayer and Lunch Break***

Session-II: Urbanization and Industrial Development

Chairman	**Dr. Saif Al Ghais,** UAE University and Executive Director of EPDA- RAK, **UAE**
14:30 – 15:15	**Keynote Address "Nanotechnology in Environmental Applications"** **Dr. Meyya Meyyappan**, Chief Scientist, NASA Ames Research Center, Moffett Field, California, **USA**
15:15 – 15:35	**Developing Renewable and Sustainable Energy for Clean Environment in Turkey** Dr. Ibrahim Yuksel[1] and Dr. Hasan Arman[2], [1]Sakarya University, Dept. of Construction, Sakarya, **Turkey** and, [2]Department of Geology, UAEU, Al-Ain, **UAE**
15:35 – 15:55	**A Cross-sectional Study of PAHs in Urban Anthropogenic-Particulate-Aerosol and Associated Health Risks along with Health-Economics Computations.** Sushil Kumar, AK Srivastava, Neeraj Mathur - Indian Institute of Toxicology Research (CSIR), Lucknow – **India**
15:55 – 16:15	**Tackling the Global Warming by Implementing Sustainable Waste Management Structure on National Level.** Franz Josef Hoffmann, Green Environment W.M. – RAKIA Ras Al Khaimah, **UAE**
16:15 – 16:30	***Discussion***

End of 2nd Day Program

17:00 – Onward Sightseeing & Outside Dinner

Day 3 Tuesday, March 08, 2011

Session III: Water Use and Water Born Diseases

Chairman	**Dr. Ahmad Al-Majali**, Dean, Faculty of Veterinary Medicines, Professor of Animal Health & Microbiology Jordan University of Science. & Technology Irbid, **Jordan**
09:00 – 09:45	**Keynote Address** **Natural Water and Importance of Monitoring of Water Borne Pathogens – Cholera as an Example** Dr. Anwar Haq, University of Maryland, **USA**
09:45 – 10:05	**Validation of Tissue Biomarkers in Tilapia sp. for Impact Assessment of Pollution in Sewage-water Fish Culture** Saif Al Ghais, Troy Richardson[1] and Basheer Ali[2] UAE University – Al Ain, **UAE**[1], University of Stellenbosch, **South Africa,** [2]EPDA – RAK, **UAE**

10:05 – 10:25	**"Global Warming and its Consequences: Bangladesh a Paradigm"** Dr. Munirul Alam, International Center for Diarrhoeal Disease Research, Dhaka, **Bangladesh**
10:25 – 10:45	**Water Saving in Aridland Agriculture: A Hydrophobic Approach** Dr. Mohammed A. Salem, Department of Aridland Agriculture, UAE University, Al Ain - **UAE**
10:45 – 11:00	***Discussion***
11:00 – 11:15	***Refreshment***

Session IV: Climate Change and Biodiversity

Chairman	**Dr. Sushil Kumar,** Deputy Director, Indian Institute of Toxicology Research (CSIR), **India**
11:15 – 11:35	**"Impact of Climate Change on Animal Health"** **Dr. Ahmad Al-Majali,** Jordan University of Science & Technology, **Jordan**
11:35 – 11:55	**Desert Plant Responses to Elevated CO_2: Lessons from the Desert FACE Experiment** Dr. Amrita G. de Syza, AzSPU Environmental Specialist, Team Leader, HSE &TD, BP **Azerbijan**
11:55 – 12:15	**The Global Warming and Climate Change Effects on the Medicinal Plants of Arabian Peninsula** Prof. Dr. Abdulnasser Al-Gifri, University of Aden, Aden, **Yemen**
12:15 – 12:35	**The Impact of CO_2 Enrichment on Growth Allocation in *Cenchrus ciliaris* Under Nutrient Stress** Noor Osman Elshaygiy, Taoufik Ksiksi, Biology Department, UAE University, Al-Ain, **UAE**
12:35 – 12:45	***Discussion***
12:45 – 14:30	***Prayers and Lunch Break***

Session V: Sustainable Land and Water Use Management

Chairman	**Eng. Mohammed Al Asam,** Director General, RAK Municipality, **RAK-UAE**
14:30 – 14:50	**Climate Change Impact on Water Resources in the United Arab Emirates (UAE)** Dr. Ahmed Murad, Department of Geology, UAE University, Al-Ain, **UAE**
14:50 – 15:10	**Towards a Lesser Carbon Footprint** Fahem A. Y. Aal Abdulla, Ras Al Khaimah Co. for White Cement, Khor Khwair, RAK, **UAE**
15:10 – 15:30	**Restoration of Deteriorating Deserts by Native Plants: Toward Increasing Soil Carbon Sink** Ali El Keblawy, Biology Department, Sharjah Research Academy & Applied Biology Dept., Sharjah University, Sharjah, **UAE**
15:30 – 15:45	***Discussion***
15:45 – 16:00	***Refreshment***

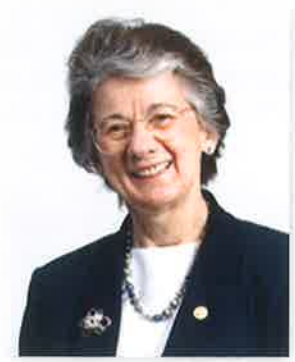
Closing Session:

16:00 – 16:30	Resolution and Closing Remarks

End of 3rd day Program

KEYNOTE SPEAKERS

KEYNOTE SPEAKER



Dr. Rita R. Colwell
Distinguished University Professor, University of Maryland College Park and Johns Hopkins University Bloomberg School of Public Health Senior Advisor and Chairman Emeritus, Canon U. S. Life Sciences President and CEO, CosmosID, Inc. Ex. Director of national Science Foundation, USA.
Email: nbrinkle@umiacs.umd.edu

Dr. Rita Colwell is distinguished University Professor both at the University of Maryland at College Park and at Johns Hopkins University Bloomberg School of Public Health, Senior Advisor and Chairman Emeritus, Canon US Life Sciences, Inc., and President and CEO of CosmosID, Inc. Her interests are focused on global infectious diseases, water, and health. She is currently developing an international network to address emerging infectious diseases and water issues, including safe drinking water for both the developed and developing world.

Dr. Colwell served as the 11th Director of the National Science Foundation, 1998-2004. In her capacity as NSF Director, she served as Co-chair of the Committee on Science of the National Science and Technology Council. One of her major interests include K-12 science and mathematics education, graduate science and engineering education and the increased participation of women and minorities in science and engineering.

Dr. Colwell has held many advisory positions in the U.S. Government, nonprofit science policy organizations, and private foundations, as well as in the international scientific research community. She is a nationally-respected scientist and educator, and has authored or co-authored 17 books and more than 750 scientific publications. She produced the award-winning film, Invisible Seas, and has served on editorial boards of numerous scientific journals.

Before going to NSF, Dr. Colwell was President of the University of Maryland Biotechnology Institute and Professor of Microbiology and Biotechnology at the University Maryland. She was also a member of the National Science Board from 1984 to 1990.

Dr. Colwell has previously served as Chairman of the Board of Governors of the American Academy of Microbiology and also as President of the American Association for the Advancement of Science, the Washington Academy of Sciences, the American Society for Microbiology, the Sigma Xi National Science Honorary Society, and the International Union of Microbiological Societies. Dr. Colwell is a member of the National Academy of Sciences, the Royal Swedish Academy of Sciences, Stockholm, the Royal Society of Canada, and the American Academy of Arts and Sciences, and the American Philosophical Society. She is Immediate Past-President of the American Institute of Biological Sciences (AIBS).

Dr. Colwell has also been awarded 55 honorary degrees from institutions of higher education, including her Alma Mater, Purdue University and is the recipient of the Order of the Rising Sun, Gold and Silver Star, bestowed by the Emperor of Japan, the 2006 National Medal of Science awarded by the President of the United States, and the 2010 Stockholm Water Prize awarded by the King of Sweden. Dr. Colwell is an honorary member of the microbiological societies of the UK, Australia, France, Israel, Bangladesh, Czechoslovakia, Royal Irish Academy, and the U.S. and has held several honorary professorships, including the University of Queensland, Australia. A geological site in Antarctica, Colwell Massif, has been named in recognition of her work in the polar regions.

Born in Beverly, Massachusetts, Dr. Colwell holds a B.S. in Bacteriology and an M.S. in Genetics, from Purdue University, and a Ph.D. in Oceanography from the University of Washington.

KEYNOTE SPEAKER

Dr. Jeffery Polovina
Chief of the Ecosystem and oceanography Division at the Pacific Islands Fisheries Science Center, NOAA Fisheries, Honolulu, Hawaii, USA
Email: Jeffery.Polovina@noaa.gov

Jeffrey Polovina is a biological oceanographer and Chief of the Ecosystem and Oceanography Division at the Pacific Islands Fisheries Science Center, NOAA Fisheries, in Honolulu, Hawaii. He received a B.S. in mathematics from Carnegie Mellon University in 1970 and a Ph.D. in mathematical statistics from the University of California at Berkeley in 1974. His research focuses on understanding the spatial and temporal dynamics of marine ecosystems with an emphasis on high tropic levels. Dr. Polovina began his career studying the Hawaiian Islands coral reef ecosystem trophic web where he developed the ecosystem model approach ECOPATH. Over the past several decades he has focused on physical biological linkages in marine ecosystems, especially regime shifts and climate impacts. He is also interested in understanding how large pelagic animals use oceanic habitats and has sent out fleets of turtles, tunas, and sharks equipped with electronic tags and used satellite remotely-sensed oceanographic data to describe the migration paths and foraging "hotspots" of these mobile predators. Dr. Polovina's current research uses climate and ecosystem models to identify potential climate impacts on marine ecosystems.

While most of his work focuses on the central North Pacific, Dr. Polovina has had 2 Fulbright Senior Research awards for work in Kenya and the Galapagos. Dr. Polovina is also an adjunct faculty in the Oceanography Department at the University of Hawaii and a Senior Fellow at the Joint Institute of Marine and Atmospheric Research (JIMAR) in Hawaii.

KEYNOTE SPEAKER

Dr. Meyya Meyyappan
Chief Scientist, NASA Ames Research Center, Moffett Field, California, USA
Email: m.meyyapaan@nasa.gov

Meyya Meyyappan is Chief Scientist for Exploration Technology at NASA Ames Research Center in Moffett Field, CA. Until June 2006, he served as the Director of the Center for Nanotechnology at NASA Ames. He is a founding member of the Interagency Working Group on Nanotechnology (IWGN) established by the Office of Science and Technology Policy (OSTP). The IWGN is responsible for putting together the National Nanotechnology Initiative.

Dr. Meyyappan has authored or co-authored over 200 articles in peer-reviewed journals and made over 200 Invited/Keynote/Plenary Talks in nanotechnology subjects across the world. His research interests include carbon nanotubes and various inorganic nanowires, their growth and characterization, and application development in chemical and biosensors, instrumentation, electronics and optoelectronics.

Dr. Meyyappan is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), the Electrochemical Society (ECS), AVS, the Materials Research Society (MRS), the Institute of Physics, American Institute of Chemical Engineers (AIChE), and the California Council of Science and Technology. In addition, he is a member of the American Society of Mechanical Engineers (ASME). He is currently the IEEE Nanotechnology Council (NTC) Distinguished Lecturer on Nanotechnology, IEEE Electron Devices Society (EDS) Distinguished Lecturer, and was ASME's Distinguished Lecturer on Nanotechnology (2004-2006). He served as the President of the IEEE's Nanotechnology Council in 2006-2007. He currently serves as the VP for Education of the IEEE EDS.

For his contributions and leadership in nanotechnology, he has received numerous awards including: a Presidential Meritorious Award; NASA's Outstanding Leadership Medal; Arthur Flemming Award given by the Arthur Flemming Foundation and the George Washington University; IEEE Judith Resnick Award; IEEE-USA Harry Diamond Award; AIChE Nanoscale Science and Engineering Forum Award. For his sustained contributions to nanotechnology, he was inducted into the Silicon Valley Engineering Council Hall of Fame in February 2009. For his educational contributions, he has received: Outstanding Recognition Award from the NASA Office of Education; the Engineer of the Year Award (2004) by the San Francisco Section of the American Institute of Aeronautics and Astronautics (AIAA); IEEE-EDS Education Award; IEEE-EAB (Educational Activities Board) Meritorious Achievement Award in Continuing Education.

KEYNOTE SPEAKER

Anwar Huq

Professor, Maryland Pathogen Research Institute, University of Maryland

Dr. Anwar Huq received B. S. (Hon) in Zoology and Masters in Marine Zoology from Karachi University in 1973 and Ph.D. in Microbiology, in 1984 at the University of Maryland.

After Ph.D., Dr. Huq returned to Bangladesh to work at the International Center for Diarrheal Disease Research, Bangladesh (ICDDR,B), where he became Scientist and Head of Microbiology Branch.

Joined the Department of Microbiology, University of Maryland as Assistant Moved to the Center of Marine Biotechnology (COMB) at the University of Maryland Biotechnology Institute in Baltimore as Associate Professor.

Currently, a Professor at the Maryland Pathogen Research Institute (MPRI) University of Maryland at College Park.

Dr. Huq was elected to prestigious fellowship of the American Academy of Microbiology in 1999

He has published over 160 papers in peer reviewed journals, chapters in books and proceedings, and presented invited talks all over the world.

ABSTRACTS

"Oceans, Climate, Infectious Disease, and Human Health: The Cholera Paradigm"

Dr. Rita R. Colwell
Professor, University of Maryland and John Hopkins University Bloomberg School of Public Health, USA

ABSTRACT

Since the mid 1980's, when utilization of satellite sensors to monitor land and oceans for purposes of understanding climate, weather, and vegetation distribution and seasonal variations became possible, refinement of the inter-relationships of the environment and infectious diseases was accomplished, both qualitatively and quantitatively. Seasonality of diseases like malaria and cholera, which had been documented by epidemiologists, but the new research yielded knowledge of the very close interaction of the environment and distribution of many infectious diseases. With satellite sensors, these relationships could be quantified and comparatively analyzed. Recent studies of epidemic diseases provide models, both retrospective and prospective, for understanding and predicting those disease epidemics, notably those that are vector borne, the best examples of which are malaria, plague, and many viral diseases these can now be tracked effectively. Cholera can be predicted reasonably well by monitoring environmental parameters, including sea surface temperature, chlorophyll (as a tag for phytoplankton which precede zooplankton in abundance in coast and river waters. Zooplankton carry the cholera bacteria as their natural flora), salinity, and rainfall. These studies and new findings are beginning to be used to provide an early warning system for public health and, more importantly, for measuring effects of climate change on public health.

Potential Fisheries Impacts from Global Climate Change

Dr. Jeffery Polovina
Chief of the Ecosystem and Oceanography Division at the Pacific Islands Fisheries Science Center, NOAA Fisheries, Honolulu, Hawaii, USA

ABSTRACT

Potential fisheries and ecosystem impacts from greenhouse gasses over this century in both the oceanic North Pacific and the coast of the United Arab Emirates (UAE) are discussed. For the North Pacific, output from NOAA's Geophysical Fluid Dynamics Lab Earth Systems Model is used to define three large oceanic biomes - the equatorial upwelling, the subtropical, and the temperate biomes. The model estimates that over the course of the 21st century, the subtropical biome will expand in area by about 30% while the temperate and equatorial upwelling biomes will decrease by about 34 and 28% respectively. As the more productive temperate and equatorial biomes are replaced by less productive subtropical biome it is estimated that the fisheries catches of the North Pacific will decrease by at least 7% over the 21st century.

Regarding the coral reef ecosystem along the coast of UAE, corals in this region experience some of the largest seasonal changes in temperature of anywhere in the world. A bleaching event in 1996 impacted primarily one species of corals and only on a portion of the coast, suggesting that there are species-specific tolerances to temperature and different sites along the same coast experience different oceanographic processes and hence temperature fluctuations. However, both rising temperatures increasing acidification will result in slower coral growth so management action should limit herbivore catches, reduce land-based nutrient input, and protect corals at sites that have more stable temperature regimes.

Effect of Climate Change on Marine Environment

Dr. Saif M. Al Ghais
Department of Biology, UAE University, Al Ain and Environment Protection & Development Authority, Ras Al Khaimah, United Arab Emirates

ABSTRACT

Global warming has been adversely affecting the marine ecosystem directly or indirectly. Sea level rise caused by the collapse of ice sheets and glaciers is projected to flood low-lying urban areas, coastal estuaries, wetlands, coral reefs, and beaches. Rising temperatures and acidity of the oceans due to absorption of atmospheric heat and carbon dioxide (about 50%) are posing threat to marine organisms and their habitat and food chain. Increasing pollution, productivity and eutrophication have been further amplifying the degradation of marine environment. Due to a worldwide fisheries decline, the sea food industry has been greatly affected. Changing climate could influence the growth, fecundity and behavior, and survivorship leading to decreased recruitment of commercial species to the fish stock. The impacts of climatic changes could be more pronounced in the Arabian Gulf and other closed water systems where ocean currents/loops are not active to circulate water and regulate its temperature and salinity.

Climate Change Impacts on Selected Migratory Species

Douglas Hykle
IOSEA Marine Turtle MoU Secretariat
c/o UNEP Regional Office for Asia and the Pacific
United Nations Building, Thailand

ABSTRACT

Migratory species of wild animals, such as birds, marine turtles and terrestrial mammals, are vulnerable to climatic disturbance. Many species are already or are likely to be affected by the impacts of climate change, including loss or alteration of critical habitats. The effects of climate change may be manifested, for example, in altered breeding success, shifts in species distribution, and perturbation of migration patterns. There is evidence that some species are already adapting their life cycles due to the phenomenon of climate change, which must be considered in the context of existing anthropogenic threats.

Nanotechnology in Environmental Applications

Dr. Meyya Meyyappan
NASA Ames Research Center, Moffett Field, California, USA

ABSTRACT

Nanotechnology, as an enabling technology, is widely viewed as the technology of the 21st century. Nanomaterials have been explored for a wide range of applications impacting every economic sector. This talk will discuss the implications on the environmental sector covering sensor technology for environmental monitoring, water purification and desalination technologies, nanomaterials for environmental remediation and U-Environmental initiatives.

Developing Renewable and Sustainable Energy for Clean Environment in Turkey

Ibrahim Yuksel[1], Hasan Arman[2]
[1]Sakarya University, Technical Education Faculty,
Department of Construction, Sakarya, Turkey
[2]United Arab Emirates University, Faculty of Science
Geology Department, Al-Ain, UAE

ABSTRACT

Turkey is heavily dependent on expensive imported energy resources that place a big burden on the economy and air pollution is becoming a great environmental concern in the country. The major cities of western Turkey are cosmopolitan centers of industry, finance and trade, whereas the eastern part of the country is relatively underdeveloped. Turkey's high rate of energy-related carbon emissions growth is expected to accelerate, with emissions climbing from 57 million tons in 2000 to almost 210 million tons in 2020. Carbon intensity in Turkey is higher than the western developed nation average. For example Turkey's total CO_2 emissions amounted to 239 million tons (Mt) in 2006. In this regard, renewable energy resources appear to be the one of the most efficient and effective solutions for clean and sustainable energy development in Turkey. This paper deals with to develop renewable and sustainable energy for clean environment in Turkey.

A Cross-Sectional Study of PAHs in Urban Anthropogenic-Particulate-Aerosol and Associated Health Risks along with Health-Economics Computations

Sushil Kumar, AK Srivastava, Neeraj Mathur
Indian Institute of Toxicology Research (CSIR)
Lucknow, India

ABSTRACT

Urban particulate aerosol is an urban anthropogenic complex-matrix that results in rapid urbanization and industrialization. It is feared to harbor a variety of toxicants. Notably among them is PAH group of mutagen & carcinogen. Its concentration in urban aerosol and exposure to subjects has seldom been assessed with a view angle of health economics in rapidly urbanizing cities in India where a considerable number of underprivileged subjects with outdoor occupation get unprotected exposure to PAHs everyday in addition to other airborne organic and inorganic matter plus RSPM. In this cross-sectional study, we quantified (a) PAHs content and its profile in RSPM samples from urban hot spots of the city of Lucknow in India (b) assessed potential risk of adverse health effects in PAHs exposed subjects and (c) computed cost of health damages to urban subjects associated with PAHs exposure.

PAHs levels in urban particulate aerosol were found to be higher than the WHO prescribed limit. Concentration changed with traffic density. Seasonal effects were also seen. Levels increased in winter by several orders of magnitude. In winter, Benzo(a)pyrene levels in urban aerosols showed a modest correlation with RSPM levels. A detailed study of individual PAH showed an abundance of 3-6 rings (particle bound) PAHs in urban areas at high density traffic site. A substantially higher percentage (82%) of population in traffic congested areas tested positive for PAHs exposure marker viz. urinary 1-hydroxypyrene (uhp). It is a first report on uhp levels in Indian subjects. These subjects excreted more than the cut-off (or the normal) levels of 0.5µmol/mol creatinine. A population of 16.4 lakh persons in Lucknow was estimated to be excreting higher than normal levels of uhp and hence considered as exposed to PAHs. Proportion of subject excreting more than the cutoff levels was significantly higher in group exposed to vehicular emissions (OR=2.32, $p<0.001$) compared to proportion of subjects in group less exposed to vehicular emission in low density traffic areas. We detected a group of short term clinical symptoms related to eye, ear, cardiovascular, and respiratory systems that were significantly more in groups excreting greater than normal uhp levels. Subjects having this symptoms-cluster and excreting more than the normal levels of uhp were observed to be 29.4% compared to 17.3% who had the symptom cluster but excreted normal levels of uhp. These differences were statistically significant. A sizeable population of 3.84 lakh of PAHs exposed subjects suffered from the symptoms cluster that was attributable to PAHs. No statistical association could be observed in subjects with

specific morbidity or affected organ system and high uhp excretion. No links of mortality with uhp excretion could be detected. Average Year Life Loss (YLL) for deaths in the family of both the groups were found to be 15.9y (normal uhp) and 21.3y (high uhp) considering 63 years of life expectancy at 0 age. Subjects excreting more uhp levels experience more days of sickness and lost more money in the form of lost earnings. Total money spent on treatment and that spent on consultation and drugs was more in subjects with greater that normal uhp excretion. This was also true for lost earnings due to sickness and poor quality work/less time devoted to work. The cost of PAHs exposure related health damage (i.e. symptoms cluster) was estimated to range between Rs. 20-163 Crore for Lucknow with an average estimated cost to be 90 Crore.

Tackling the Global Warming by Implementing Sustainable Waste Management Structure on National Level

Franz Joseph Hoffmann
Green Environment W.M.-RAKIA, UAE

ABSTRACT

In recent years, the Global Warming and its implications have prevailed most environmental discussions. In a globalised world, marked by interdependent cultural, social, and economical structures, new keywords like "sustainability" and "carbon footprint" have become essential parts of our daily life.

Waste Management, amongst others, presents one field of human activities, having significant impacts on our environment in general and the Global Warming in particular. But which is the concrete contribution of Waste Management to the later, and how can its impacts get reduced by implementing adequate structures?

This presentation aims at encouraging national, municipal and other Waste Management committed stakeholders to implement sustainable Waste Management related structures, by highlighting strategical and practical ways out of the current situation, characterised by numerous insufficiencies. It will first and foremost point out the necessity of designing and implementing modern and holistic Waste Management approaches in order to successfully face the challenge of "Waste Management and Global Warming".

Natural Water and Importance of Monitoring of Waterborne Pathogens – Cholera as an Example

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ABSTRACT

Diarrheal diseases, many of them caused by waterborne pathogens are major cause of death of children under the age of five in developing countries. Cholera is the most potent disease that can cause epidemic and remains a global concern, affecting primarily the economically deprived, who lack access to safe drinking water or those who interact with water very closely. Natural water, when contaminated with pathogens can cause disease even when the water is just used for recreational purpose. Many of the human pathogens are autochthonous member of the aquatic environment and their existence is directly influenced by environmental factors, such as temperature, precipitation, including chemical and biological components in the environment. All these parameters are directly or indirectly impacted by the climatic changes. *Vibrio cholerae,* the causative agent for cholera is naturally occurring organism in marine, estuarine, and freshwater environments. An effective means of reducing or preventing the disease is by being able to identify environmental conditions favorable for multiplication and geographical distribution of the pathogen and development of computer based predictive models. To be able to develop successful predictive models, it is necessary to understand the mechanisms by which the bacteria metabolize, multiply, and persist in the environment and how transmission to human occurs. This can be archived by systematic monitoring of the environment. Of the environmental parameters shown to be associated with persistence and geographic distribution of the cholera vibrios, temperature has been implicated and considered to be the most influential. Studies conducted in Bangladesh and in the US demonstrate a significant increase in occurrence of *V. cholerae* with a rise in water temperature of only a few degrees. Significant correlation of water temperature, water depth, rainfall, conductivity, copepod count, and presence of bacteria carrying genes coding for production of cholera toxin, with cholera outbreaks has been found, with lag periods from zero to eight weeks from optimum environmental conditions to cholera outbreaks. Results of environmental studies have revealed a direct correlation of water temperature with the occurrence of cases of cholera. Interestingly, among physical and chemical parameters related to detection of *V. cholerae* in the environment and cholera outbreaks, temperature can be accurately measured by readily available remote sensors using satellite global imagery. This has proven extremely useful for development of predictive models for global application. Improved understanding of *V. cholerae* ecology and its route of transmission in causing disease is critical for developing simple methods for mitigation. Therefore, it is extremely important to monitor water both biologically and chemically, that can prevent health problem in case of infections pathogens are present in the natural water used for agriculture, fishing or even for recreational purpose.

Validation of Tissue Biomarkers in Tilapia sp. for Impact Assessment of Pollution In Sewage-water Fish Culture

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ABSTRACT

Biomarkers (physiological and biochemical parameters) are sensitive, cost-effective tools or "early warning signals" for indentifying risks/toxicity potential of environmental contaminants. Fish farming using domestic sewage water (grey water aquaculture) has been practiced for decades across the world owing to its high nutrients contents required for the growth of planktons and algae, the food source of fish. However, due to increasing pollution caused by anthropogenic activities sewage water is also contaminated with deleterious heavy metals, pesticides and other chemicals, and pathogens and their toxins, and is not decontaminated by simple treatment procedures. Moreover, Global Warming further modifies the toxicity potential of pollutants as well as the responses of enzymes and other biomarkers. Short-term transfer of fish raised in the treated sewage water (TSW) to clean fresh water for metabolic detoxification and flushing out toxic contaminants (depuration) has been attempted recently. The current study evaluates and compares the status of two molecular biomarkers, cholinesterase (ChE) activity and reduced glutathione (GSH) level in the muscle and liver of a fresh water fish, Tilapia sp. (*Tilapia mossambica,* Peters) raised in the fish farm (Group I/Clean, Control), treated sewage water (Group II/Sewage), thereafter exposed to clean municipal water for 6 weeks (Group III/Depurated) for depuration. The results show significantly lower levels of muscle and liver ChE activities in the fish reared in the TSW (Group II/Sewage) as compared to those in the fish from fish farm (Group I/Clean), which was fully restored in the muscle but partly in the liver after depuration (Group III/Depurated). In contrast, GSH levels were significantly raised in both muscle and liver of Group II fish as compared to Group I fish raised in fish farm, which seems to be specific biomarker response to pathogens present in the sewage water. The average hepatosomatic index (HSI = weight of liver x 100/total fish weight) in the Group II fish reared in TSW was also significantly higher than that in the reference Group I fish, but decreased to below control level in Group III fish following depuration. This study suggests the importance of fish biomarkers, ChE, GSH and hepatosomatic index in monitoring the impact of sewage water pollution and its mitigation following depuration.

Global Warming and its Consequences: Bangladesh a Paradigm

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ABSTRACT

Global warming, which has the potential to affect every corner of the world, is a smoldering issue that requires to be addressed immediately. Deliberate human activities namely the massive industrial emissions of green house gases, urbanization, deforestation, increasing vehicular and aviation related gas and fuel combustions are among the major contributors of the global warming. The continued accumulations of green house gases have already begun increasing the global temperature and the resultant extreme weather events like floods, droughts, heat waves, hurricanes and tornados that the world is witnessing frequently for the last fifty years. The glaciers in the Polar Regions are disappearing in an unprecedented rapid pace contributing to the sea surface height. More and more green areas are undergoing the process of desertification. The Ganges Delta of Bay of Bengal has already begun seeing the worst ever surge of sea water that has claimed a significant area and displaced millions of coastal villagers of Bangladesh. Climate change thus bears the disastrous message for many millions of Bangladesh citizens and that country is projected to lose two-thirds of its cultivable land, forcing millions of coastal people to migrate to the highland, causing serious consequences. Global warming is also responsible for low agricultural yields, extinction of plant and animal species, draughts, floods and spread of deadly infectious diseases. This author and his colleagues have obtained data in a biweekly epidemiological and ecological surveillance conducted during 2004 - 2007 to understand the relationship among (i) local climate variables, (ii) the presence of etiological agent of disease in estuarine waters, and (iii) the occurrence of cases of infectious disease in the cholera endemic coastal villages of Bangladesh. A steady increase in local climate variables and infectious disease during the study period strongly suggest sea-level rise and the consequential saline water intrusion into the inland demonstrate that the catastrophe of global warming is no longer prediction, but a reality for Bangladesh.

Water Saving in Aridland Agriculture: A Hydrophobic Approach

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ABSTRACT

The UAE has one of the highest per capita rates of consuming water in spite of its limited water resources. In Emirates, some 95% of farm irrigation water comes from deep wells, putting them under question of sustainability. According to the latest statistics, the agriculture sector produces 2.4% of Abu Dhabi's gross domestic products and uses up to 1.5 billion cubic meters of water for irrigation, about 52% of the emirate's total water consumption. In development of more sustainable food and farming, nanotechnology possess broader challenges to the conventional agricultural systems. In this age of threatening climate change, there is growing public interest to find out alternate ways to save resources and an ultimate aim of producing "*more crops per drop*". In Middle East countries, it is estimated that the annual rate of land expansion under irrigation must be 2.25% to meet the increasing global demand for food. In this regard, the use of a protection measure to reduce the water consumption in agricultural practices is promising as it can conserve water in the arid even desert climates. Hydrophobic sand made by using Nanotechnology is a noval concept, in which the natural sweet sand is coated with nano particles of pure silica by vapours of a silicon compound called trimethylhy droxysilane (CH3)3SiOH by special chemical treatment. Commonly, this can be used as a hydrophobic material and find its way in modern sewage treatment plants and pipe lines, which prevent leakage. We conducted an experiment in a variety of plants [in field as well as pot experiments] to exploit the hydrophobic nature of hydrophobic sand in minimizing the irrigation requirements. We evaluated the growth and yield responses of plants after using this sand in cultivation. The results were promising. So, apart from the common concerns like economic aspects and challenges, nanotechnology seems to be a potential tool to enhance the global sustainable food production in arid zones.

Impact of Climate Change on Animal Health

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ABSTRACT

The impact of climate change (CH) has been acknowledged worldwide and concurrent alarming ramifications have occurred. Animals could be affected directly or indirectly by CH. Direct impacts include increased temperature and droughts. Indirect impacts include the changes that occur in the environment which may promote the spread of contagious diseases through increased contact between animals, or increased survival or availability of the agent, insect vector or its intermediate host. The shift in the incidence and prevalence of vector-borne diseases may be the most significant effect of CH. To control and minimize the impact of CH on animal health, strong and efficient Veterinary Services is irrefutable, combined with good co-ordination of public health services, as many the resulted infectious diseases are zoonoses. Developing countries have acute weaknesses in their Veterinary Services, which jeopardises the global surveillance network essential for early detection of hazards. Co-operation with international organizations that target upgrading veterinary services and surveillance systems (such as OIE) is perhaps the most important strategy for dealing with CH in developing countries.

Desert Plant Responses to Elevated CO2: Lessons from the Desert FACE Experiments

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ABSTRACT

A Free-Air CO_2 Enrichment (FACE) experiment in the Mojave Desert of Southern Nevada, USA studied various aspects of ecosystem responses to a step-increase in atmospheric CO_2 to 550ppm, approx 50% above current levels. Multi-disciplinary teams of scientists studied various aspects of plant responses to the elevated CO_2 levels, including changes in photosynthesis, respiration, water- and nitrogen-use efficiency, growth and morphology. In some species, short-term increases in primary productivity (photosynthesis) do not persist as acclimation re-adjusts source-sink relationships, while in deciduous species the increase occurred when sufficient water was available to the plants. Water savings due to reductions in stomatal conductance were also variable by species; with some species, especially C4 species, exhibiting reduced stomatal conductance. Because soil-surface evaporation dominates in desert ecosystems, savings in soil water due to reduced stomatal conductance may have insignificant impacts on the water budgets of desert ecosystems. The response of annual above-ground production to elevated CO_2 is highest in deserts, because plant growth is driven by important carbon and nitrogen allocation processes, as well as photosynthesis - as demonstrated by the fact that most productivity increases at the FACE site occurred during times when soil resource availability was high. Therefore, growth responses of desert plants to elevated CO_2 appears to be species-specific and related to source-sink relationships and phonological patterns, together with the timing of resource availability.

The Global warming and Climate Change effects on the Medicinal plants of Arabian Peninsula

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ABSTRACT

The Arabian Peninsula is located somewhere at the center of the earth and according to the new Map of the world it would be safe from most of the GWACC disaster effect, it would be more wet with lots of rainfalls and green. The Position of Arabia at the meeting point of Holercatic botanical kingdom with Paleotrpic botanical kingdom, makes it flora are very rich and versatile. With more rainfalls the medicinal flora would be spread all over Arabia. It is the time to prepare our land to be the promising source for the medicinal plant all over the world. The medicinal plant would the green treasure of Arabia in near future.

The Impact of CO_2 Enrichment on Growth Allocation in *Cenchrus ciliaris* Under Nutrient Stress

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ABSTRACT

The world is undergoing major environmental stresses and challenges. One of which is the increases in greenhouse gases such as CO_2. The challenge remains, though, as to what extent increased CO_2 will impact fragile ecosystems, such as deserts. Moreover, desert species may respond differently to such phenomenon. The United Arab Emirates deserts, for instance, are facing additional challenges such as extremely low soil nutrients. Nutrients in theses ecosystems highly influence how plants respond to increased atmospheric CO_2. The effect of atmospheric CO_2 enrichment was studied using the C4 grass *Cenchrus ciliaris* L., an important grass species in the UAE. The response of the species to nutrient stress as affected by increases atmospheric CO_2 was investigated. Specifically the objectives of the trial were to study the impact of CO_2 on the response and growth allocation of *C. ciliaris* under nutrient deficiency. Growth allocation of *C. ciliaris* under ambient CO_2 (500 ppm), high CO_2 (1000 ppm), and alternating between ambient and high CO_2 conditions every two weeks was monitored. Starting at the beginning of the trial, and for 6 weeks inflorescence growth allocation was highest under enriched CO_2 conditions. It reached a maximum of 1.5g per plant during the trial. This was similar for dry blades production, where plants grown under enriched CO_2 remained highest for the duration of the trial. The maximum of 1.6g per plant was reached during the plants mid growth stages. Green blades had the lowest growth allocation weight under enriched CO_2 at the beginning of the trial, but ended up as the highest average weight at the end of the trial (0.4g per plant). Therefore, it is believed that nutrient stress increased the growth of *C. ciliaris* under high CO_2 conditions.

Climate Change Impact on Water Resources in the United Arab Emirates (UAE)

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ABSTRACT

The arid climate countries are suffered from high evaporation rate and low amount of precipitation. The UAE among those countries which located within an arid region and the availability of natural water resources is limited. The average annual precipitation in the country is 110 mm and the evaporation rate exceeds 2000 mm/yr. Such condition will increase the effect of climate change on the natural resources such as water resources. The stress on the non-conventional water resources such as desalinated water is increased to meet the demand of the country. In order to investigate the effect of climate change on water resources, climatic data is essential. Lack of sufficient data is the main problem of climate change studies in the UAE. The temperature and precipitation measurements in the country were started since 1971 and 1967 respectively. The data showed that during the period of 1992 to 2000, the range of total increasing temperature is 1.5 to 1.6 °C. This increase is consistent with the temperature increase of Arabian Peninsula in which the increase ranges from 1 to 5 °C. Evapotranspiration and evaporation will increase due to temperature increase and this will limit the availability of water resources. Also, it found that there is a cycling pattern of increasing precipitation and temperature every 5 years in inland areas. The average of 5-year in precipitation and temperature data in the coastal areas are slightly consistent which might reflect local effect.

Towards a Lesser Carbon Footprint

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ABSTRACT

Global warming in its broadest sense of word is an average increase in the Earth's temperature which in return causes changes in climate. Accordingly, a warmer Earth will cause a drastic effect in rainfall patterns, sea-level rise, and adverse implications on all life form patterns as wildlife, humans and plants.

One of the main key factors in Global Warming is greenhouse effects resulting from CO_2 emissions. Cement industry is accountable for nearly 6% of global CO_2 emissions, due to its process characteristics.

Ras Al Khaimah Co. For White Cement & Construction Materials, being the leading regional white cement producer has clearly identified the cascading effect of CO_2 emissions and took aggressive steps towards reducing its carbon footprint by significant decrease of fossil fuel burning throughout the process, less dependency on fuel oil, alternative fuel thorough studies with prominent OEM's and conducting researches on a lesser CO_2 emitting cement to name a few.

The above mentioned points cope with the vision of H.H. Sheikh Saud Bin Saqr Al Qasimí Supreme Council Member and Ruler of Ras Al Khaimah of defining our emirate as UAE industrial base with clear emphasis on tangible environmental improvement and sustainability to withstand the forthcoming challenges.

Global warming – global warning.

Restoration of Deteriorating Deserts by Native Plants: Toward Increasing Soil Carbon Sink

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ABSTRACT

Global concern has increased over greenhouse gas emissions and their potential impact on climate change over the past decade. As a result, an international agreement, the Kyoto Protocol, was signed to mitigate greenhouse gas concentrations in the atmosphere through improving the terrestrial carbon sinks. There are three main reservoirs regulating the carbon cycle on earth, namely the oceans, the atmosphere and the terrestrial systems. Deserts are among the terrestrial ecosystems that have little carbon sinks. Greening the deserts with native plants could contribute, sustainably, in carbon dioxide reduction. The most important is to use evergreen native plants that can grow without any kind of irrigation. The aim of this study was to assess the type and level of innate dormancy and how storage condition and duration could help in overcoming such dormancy in some potential native plant able to restore the degraded deserts.

Fresh seeds were collected from nine potential forage grasses (*Cenchrus ciliaris, Dichanthium annulatum, Lasiurus hirsutus, Pennisetum divisum, Sporobolus spicatus S. arabicus, Halopyrum mucronatum Coelachyrum brevifolium* and *Eragrostis barrelieri*), one forage crucifer (*Farsetia aegyptia*), one forage legumes (*Tephrosia apollinea*) and three sand dunes binders (*Cyperus conglomeratus, Haloxylon salicornicum* and *Salsola imbricata*). Considerable proportion of fresh seeds germinated in *C. ciliaris, C. brevifolium, S. arabicus, F. aegyptia, S. spicatus, S. imbricata* and *H. salicornicum*, but seeds of the other speceis showed deep dormancy. Some species, such as ***C. ciliaris*** and *P. divisum,* need high temperature for best germination and consequently, it is better to grow them at the hotter time of the year (Nov, March and April). However, other species, such as *S. imbricata and H. articulate* require lower temperature and consequently the time of germination must be during colder time of the year (e.g., Dec. and Jan.). Germination at different temperatures depended on presence or absence of light. This indicate that the suitable time of germination must be selected carefully based on these two conditions in some species such as *D. annulatum, C. ciliaris, P. divisum* and *L. scindicus*

Cold storage increased germination in some species and decreased it in others and the reverse was true for field storage. The study indicates that it is very important to store seeds of some species before their use in restoring desert rangelands or in agriculture.

Seed viability has been lost or greatly deteriorated in both *S. imbricata* and *H. salicornicum* after 9 months storage. Some species were very sensitive to salinity, whereas seeds of other species tolerated up to 600 mM NaCl.

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