International Meet on Land Cover and Land Use Change Dynamics and its Impacts in South Asia: Focus on Water Resources

January 7-8, 2013

Centre for Water Resources Development and Management

Web: www.cwrdm.org

"LCLUC and water resources in coastal zones and Western Ghats"

The International meeting was organized on the above topic as a joint effort of the:

NASA's LCLUC Program, University of Maryland

Centre for Water Resources Development and Management (CWRDM, Calicut, Kerala, India)

Karunya University (Coimbatore, Tamil Nadu, India)

Monsoon Asia Integrated Regional Studies Program (MAIRS)

GOFC-GOLD Program

International System for Analysis Research and Training (START) Program.

DELEGATES MARCHING WITH THE TRADITIONANAL DRUM BEATS !!

Flower carpet Welcome!!

START of the EVENT

A Special Focus Meeting on "LCLUC and water resources in coastal zones and Western Ghats"- **January 7-8, 2013**

Background:

The increasing population pressure has created adverse environmental changes and a subsequent impact on the total eco-system of this region, especially on fresh water resources.

PARTICIPANTS

- Registered Delegates : 30
- Institutional Representation:
  - International :
    - NASA; USGS; Univ. of Maryland, Michigan, Illinois & OregonSU
  - National :
    - NRSC; NIT-K & C; NIO (Kochi & GoA); CSIR; Univ. of Karunya & Mangalore
  - Kerala State :
    - KSREC; KSCSTE; CESS; KFRI; CUSAT; College of Eng (Thrissur); CWRDM

TECHNICAL PRESENTATIONS

- USGS
- CWRDM
- Uni. Of Maryland
- NRSC
- KSCSTE
- KSREC

REMOTE SENSING APPLICATIONS IN C W R D M

Water Spread Areas – Reservoir

- Flooding

- Water Logging / Wetlands

Drainage Network & Characteristics

Deforestation

Cropping Pattern & Crop Details

Vegetation Index

Landslide Prone Areas

REMOTE SENSING APPLICATIONS IN C W R D M - *cont*

Terrain Characteristics – DEM

- Slope

- Aspect

Geomorphology

Lineaments

Landuse

Shoreline Changes

Chlorophyll Concentration – OCM

Manpower & Scientific Infrastructure
Multidisciplinary Scientific Manpower
Water Resources Data Bank
Modelling Software Facilities
Laboratories
Library

NASA Programmatic on LCLUC Science in Coastal Zone: Focus on Kerala

Garik Gutman,
LCLUC Program Manager
NASA Headquarters
Washington, DC

Land-Cover/Land-Use Change Program

- LCLUC is an interdisciplinary scientific theme within NASA's Earth Science program. The ultimate vision of this program is ***to develop the capability for periodic global inventories of land use and land cover from space, to develop the scientific understanding and models necessary to simulate the processes taking place, and to evaluate the consequences of observed and predicted changes***
- http://lcluc.hq.nasa.gov/

- LCLUC: Drivers of Disturbance/Stress
- LCLUC Consequences/Impacts
- Change in Land-Use Pattern – Kerala Context
- Currently, agriculture has shrunken into a minor sector offering limited employment
- Transition from the agriculture oriented to fishery and shrimp farming or fish processing
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- Mangroves in Kerala have been significantly impacted by Urbanization

LCLUC Research in South Asia and some relevant Global Scale Projects

Chris Justice
Dept. of Geographical Sciences,
University of Maryland College Park, USA

Land-Cover / Land-Use Change Program

Agriculture:

Quantifying Changes in Agricultural Intensification and Expansion in Monsoon Asia during 2000-2010 (Xiaming Xiao Oklahoma University, USA)

Advancing methods for Global Crop Area Estimation(Matthew, Hansen University of Maryland College Park, USA)

Urbanization:

Multi-Scale and multi-sensor analysis of Urban cluster development and Agricultural land loss in China and India (Karen, Seto Yale University, USA)

River/Delta Systems:

Global scale assessment of Threatened River Delta Systems: Evaluation of Connections Between the Continental Land Mass and Oceans Through Integrated Remote Sensing and Process Modeling

(Vorosmarty, Charles University of New Hampshire, USA)

- Land Use Climate Ecosystems
- LCLUC Modeling and C,N Dynamics
- Mangrove Mapping -Global Tropical Mangrove Mapping **Chandra, Giri,** EROS Data Center, USA
- Forests
- Biomass Burning in Asia
- Atmosphere - Land Cover And Land Use Change And Its Effects On Carbon Dynamics In Monsoon Asian Region **Atul, Jain,**
  University of Illinois at Urbana Champaign

NRSA

Dr. Venkateshwar Rao V.
Group Head, Water Resources, NRSC,
ISRO Dept. of Space, Govt. of India.

**Water and Agril.Resources Management-
The National Imperatives**

Indian Imaging Capability

NATIONAL LAND USE AND LAND COVER MAPPING USING MULTITEMPORAL AWiFS DATA (LULC-AWiFS)

Indian Imaging Capability

Geo stationary

Sun Synchronous

1990
INSAT-1D
VHRR

1992
INSAT-2A
VHRR

1993
INSAT-2B
VHRR

1999
INSAT-2E
VHRR, CCD

2002 KALPANA-1
VHRR

2003 INSAT-3A
VHRR,CCD

2005 CARTOSAT-1
PAN, F/A

2007/ 08
CARTOSAT-2 & 2A
PAN

2009
RISAT-2
X-SAR

2009
Oceansat-2
OCM, SCAT, ROSA

2011 Risat-1
Resourcesat-L3&4,AWiFS

2012

2003
RESOURCESAT-1
LISS 3; LISS 4; AWiFS

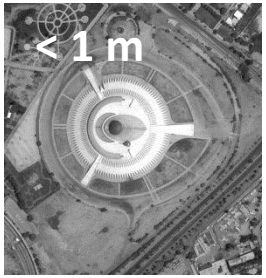
2001 TES
Step& Stare
PAN

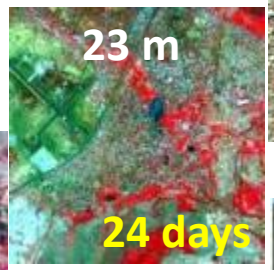
1999
OCEANSAT-1
OCM & MSMR

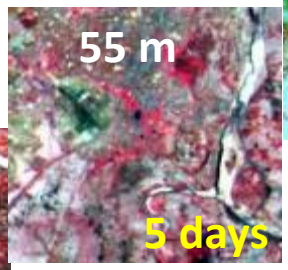
1995/97 IRS-1C/1D LISS-3, PAN & WiFS

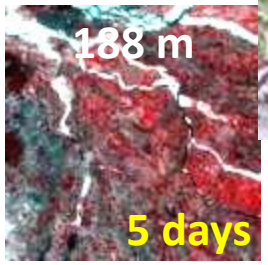
1996 IRS-P3 WiFS, MOS X-Ray

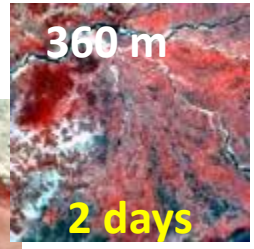
1988/91
IRS-1A & 1B
LISS-1&2

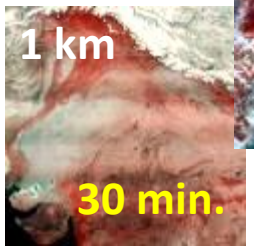


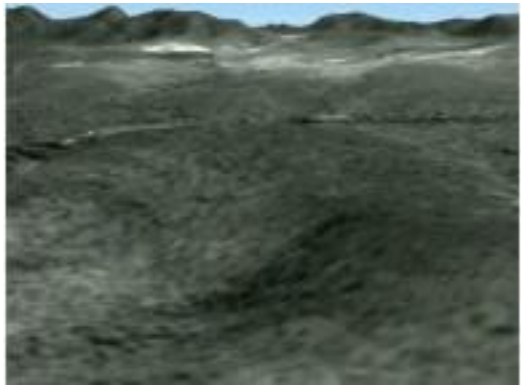




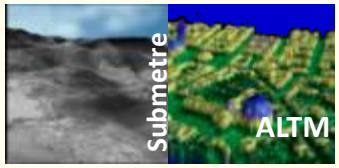








Aerial



Digital Camera
Laser Terrain Mapper

A Valuable infrastructure in Space for monitoring NR & Environment

NNRMS: A Unique Institutional Framework

….. NNRMS integrate the data obtained through Remote Sensing into the existing system with appropriate technical, managerial and organisational linkages

– NNRMS Mandate 1985

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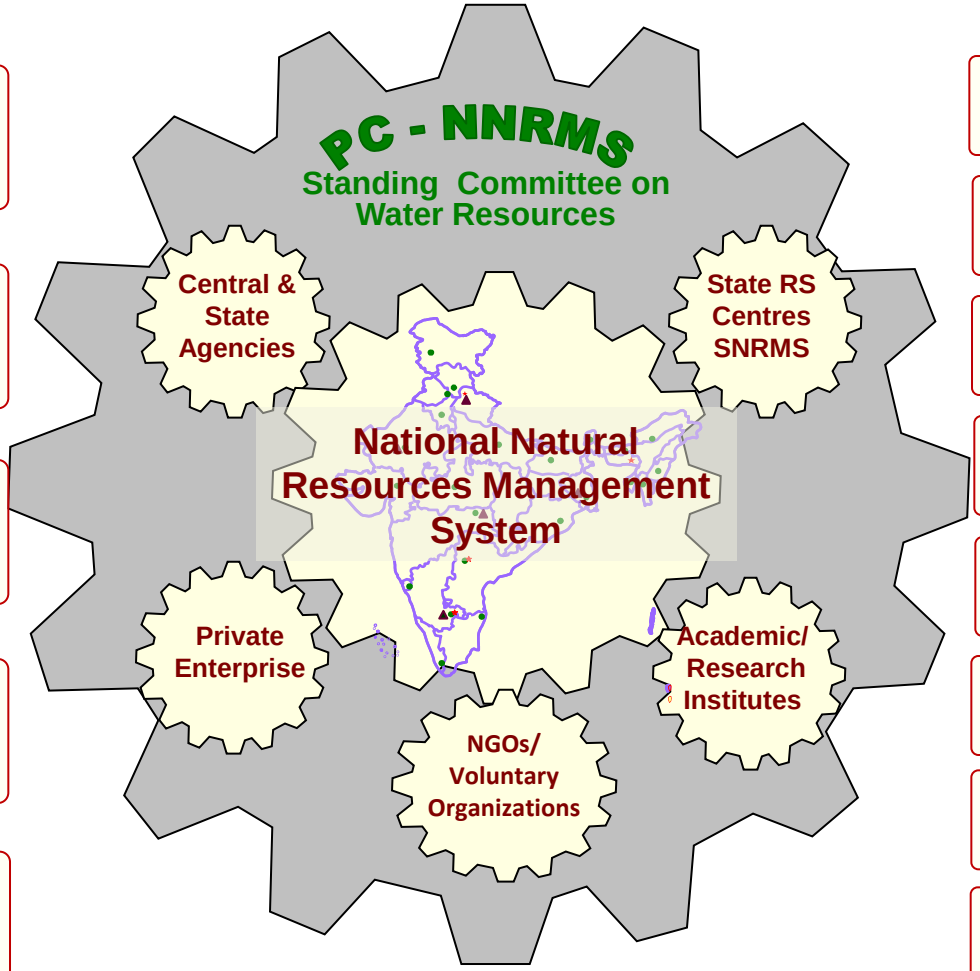
National Imperatives

- Water Security & Equitable Distribution
- Infrastructure: Full Capacity Utilisation
- Increased Water Productivity
- Disaster Management Support
- Adaptation to Climate Change



Various Facets

- Reservoir Sedimentation
- Irrigation Wat.Managmt
- Watershed Management
- GWater Development
- Hydrological Modeling
- Flood Management
- Snow & Glaciers
- Climate Change

…in sync with country's priorities…

HIGH RESOLUTION LONG-TERM CHANGE DETECTION:

PROBLEMS AND PROSPECTS

K.K. RAMACHANDRAN
Member Secretary
Kerala State Council for Science, Technology & Environment
Sasthra Bhavan, Pattom, Thiruvananthapuram 695 004

Kerala State Remote Sensing Centre

- Presented the LCLUC in Trivandrum, Kollam & Palakkad Districts.
- Informed the reduction in agricultural land and increase in built area with time.

CHANGE DETECTION:
PROBLEMS AND PROSPECTS
K.K.RAMACHANDRAN
Member Secretary
Kerala State Council for Science, Technology & Environment
Sastra Bhavan, Pattom, Thiruvananthapuram-695 004
ARGENTINA

Discussions in progress

Outline of the

THE TEAM

FIELD VISITS

- SAROVARAM PARK-Eco-friendly bio-park meant for conservation of wetlands through eco-friendly tourism interventions by sustainable methods.
- KAPPAD BEACH – Rock-studded beach. Gateway to the Malabar coast. Place where Vasco da gama landed first in India
- KADALUNDI BIRD SANCTUARY-Spread over a cluster of islands, surrounded by hillocks. More than 100 species of native birds and 60 species of migratory birds flock during Oct-Mar.
- Experienced Chaliyar river & Beypore traditional sea vessel building unit

SUGGESTIONS & RECOMMENDATIONS

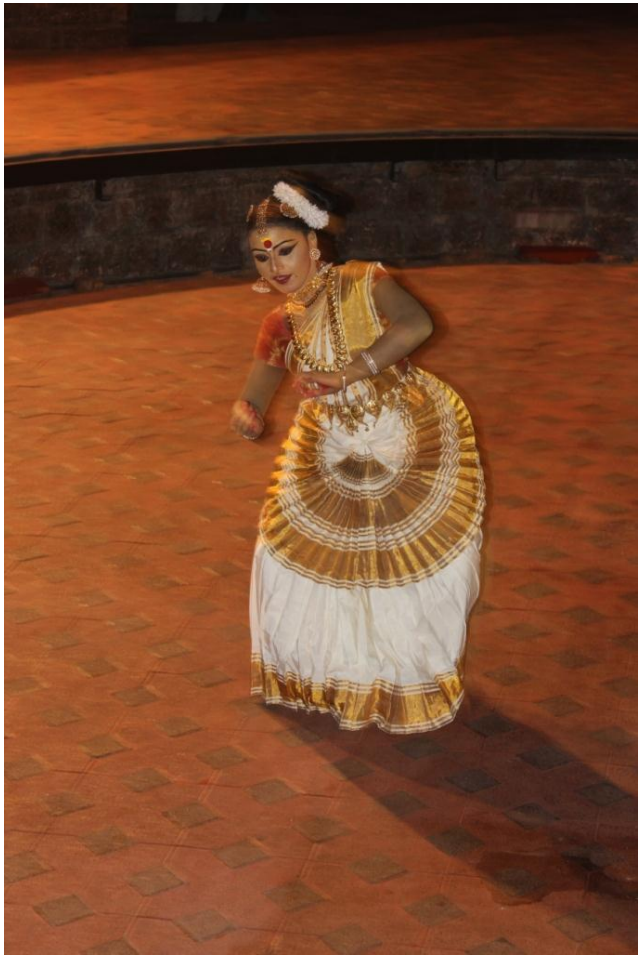
- Improve awareness of the availability of various types of data
- Easy access & availability of ISRO & NASA Data
- International cooperation between ISRO & NASA on sharing of data
- Free & open sharing of data for researchers & students
- University-Organization collaboration/capacity building for using the available data for landuse change research

- Supporting the LCLUC analysis with socio-economic data to understand the influence, impacts and implications of LUC
- Dynamics of the social process has led to the large-scale conversion of paddy
- Land at present is seen only as a real estate needed for residence and status and it is also considered as the safest and best investment
- Spatial data from multiple sources are to be assimilated to make timely assessments and long-term monitoring of LUC.
- In India we have different node specification and theme specification under NRIS, NNRMS as well as NS(G)DI; We should standardize and move ahead…….

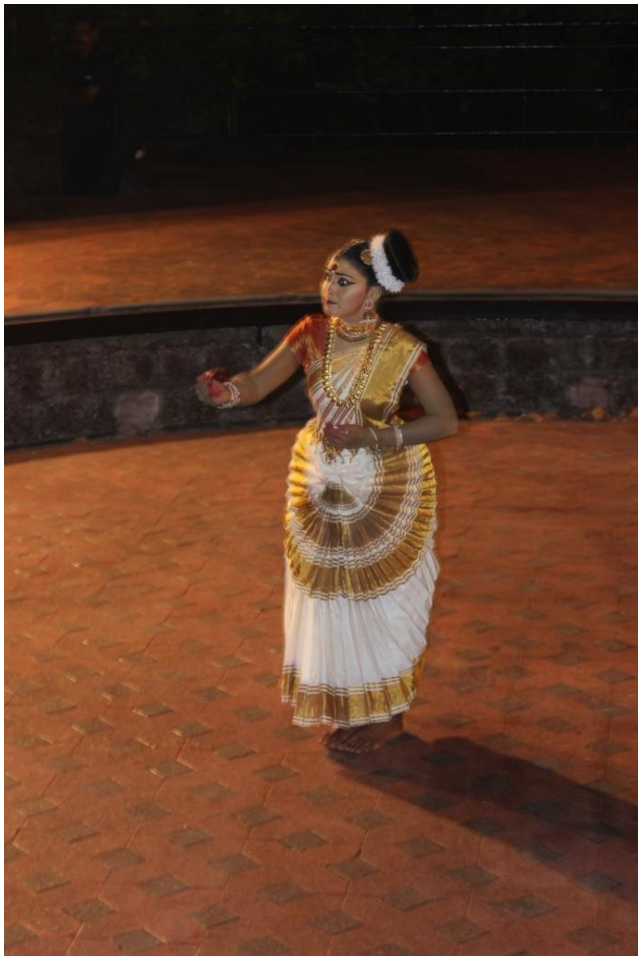
CULTURAL EVENTS

Height of Serious Discussion

HEARTY FAREWELL



THANK YOU



Some Important Ongoing Projects

- Studies on water yield from high land catchments in humid tropics of the Western Ghat regions of Kerala State
- An integrated study on the Kavvayi wetland system of northern Kerala
- Groundwater Resources Evaluation and Prospects for Future Development in Karuvannur River Basin
- Crop water Requirements for different agro climatic zones of Kerala

- Hydro chemical and isotopic characterisation of Thuthapuzha sub-basin of Bharathapuzha
- Impact of rapid urbanization on the hydrologic regime of a selected river basin in Kerala
- An integrated water resources management of Pampa river basin- Preparation of action plan
- Climate change fingerprints on water resources and hydrometeorology of Achencoil river basin in Kerala
- Integrated river basin master plan for Chaliyar

- Investigation on Climatic Change and assessment of its impact on water and land Resources in Wayand Districts, Western Ghat region of Kerala

- Study on long term variability of Groundwater level in Kerala with special emphasis to the midland

- Salinity Propagation and Mixing Characteristics of Kuppam - Valapattanam River

- Management action plan for Sasthamkotta and Ashtamudi wetlands.