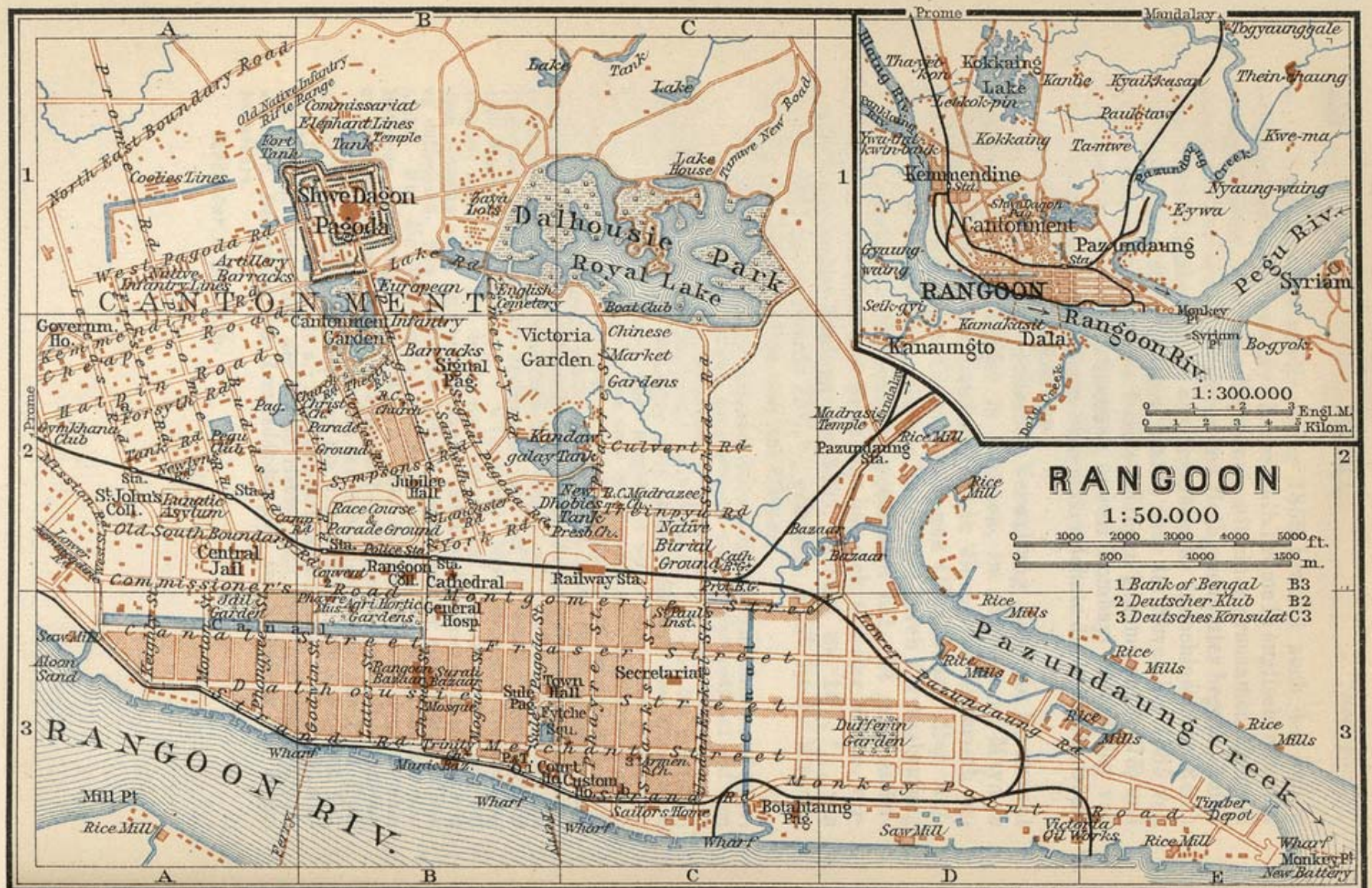
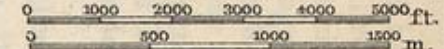


Welcome to Yangon (Rangoon)



RANGOON

1:50,000

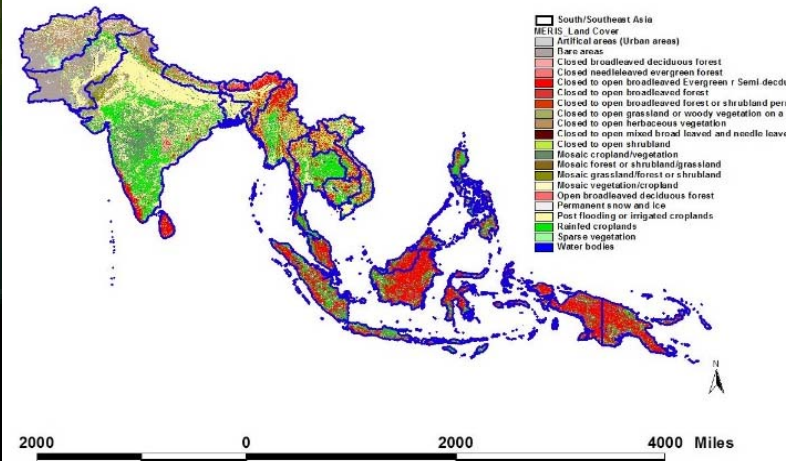


- 1 Bank of Bengal B3
- 2 Deutscher Klub B2
- 3 Deutsches Konsulat C3

The NASA Land-Cover/Land-Use Change (LCLUC) Science: Focus on South/Southeast Asia

Garik Gutman,
LCLUC Program Manager
NASA Headquarters
Washington, DC

South/Southeast Asia Research Initiative (SARI) Region



Pre-SARI Meetings

2013,
Japan



International Workshop on Air Quality in Asia, Hanoi, Vietnam
2014, Vietnam
June 24th-26th, 2014



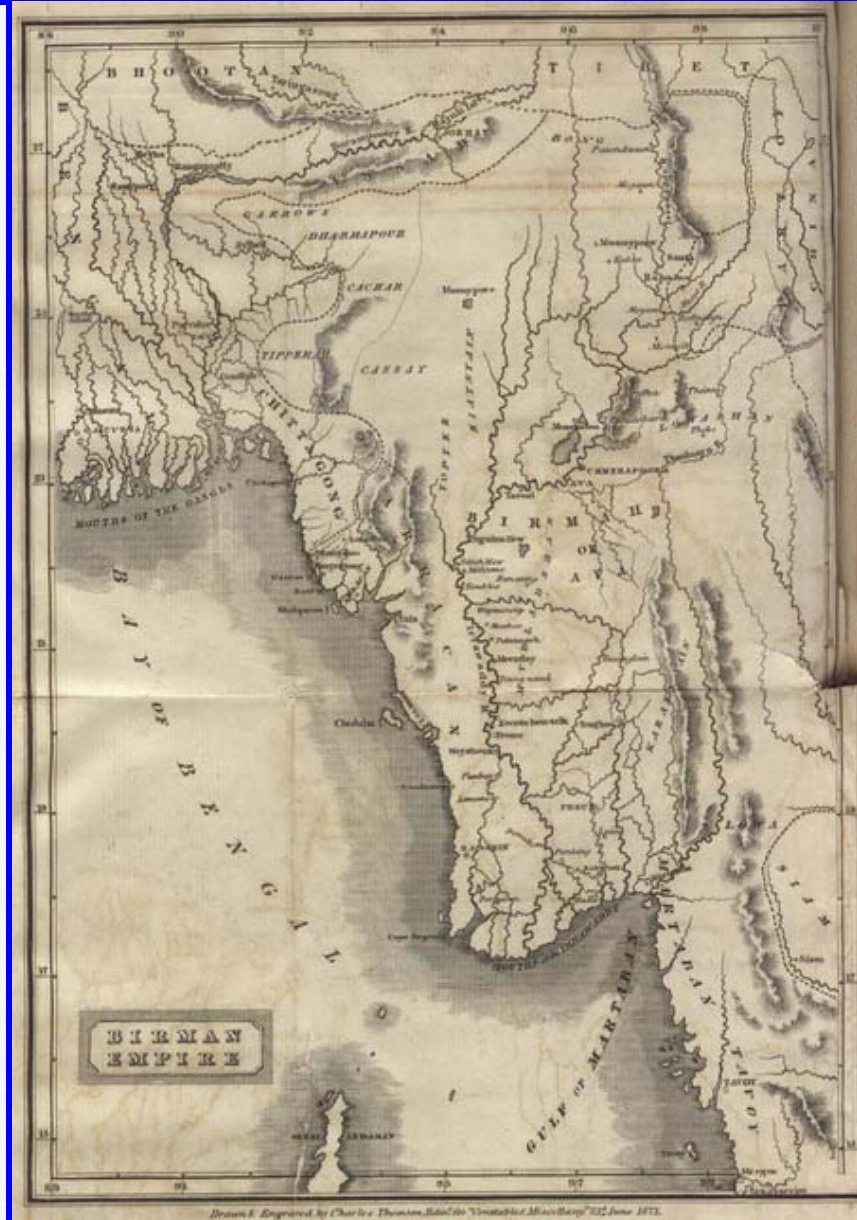
Pre-SARI LCLUC NASA
Science Team Meetings

2009/1: Kohn Kaen, Thailand
2011/11: Hanoi, Vietnam
2013/1: Coimbatore, India
2016/1: Yangon, Myanmar

2015, Indonesia



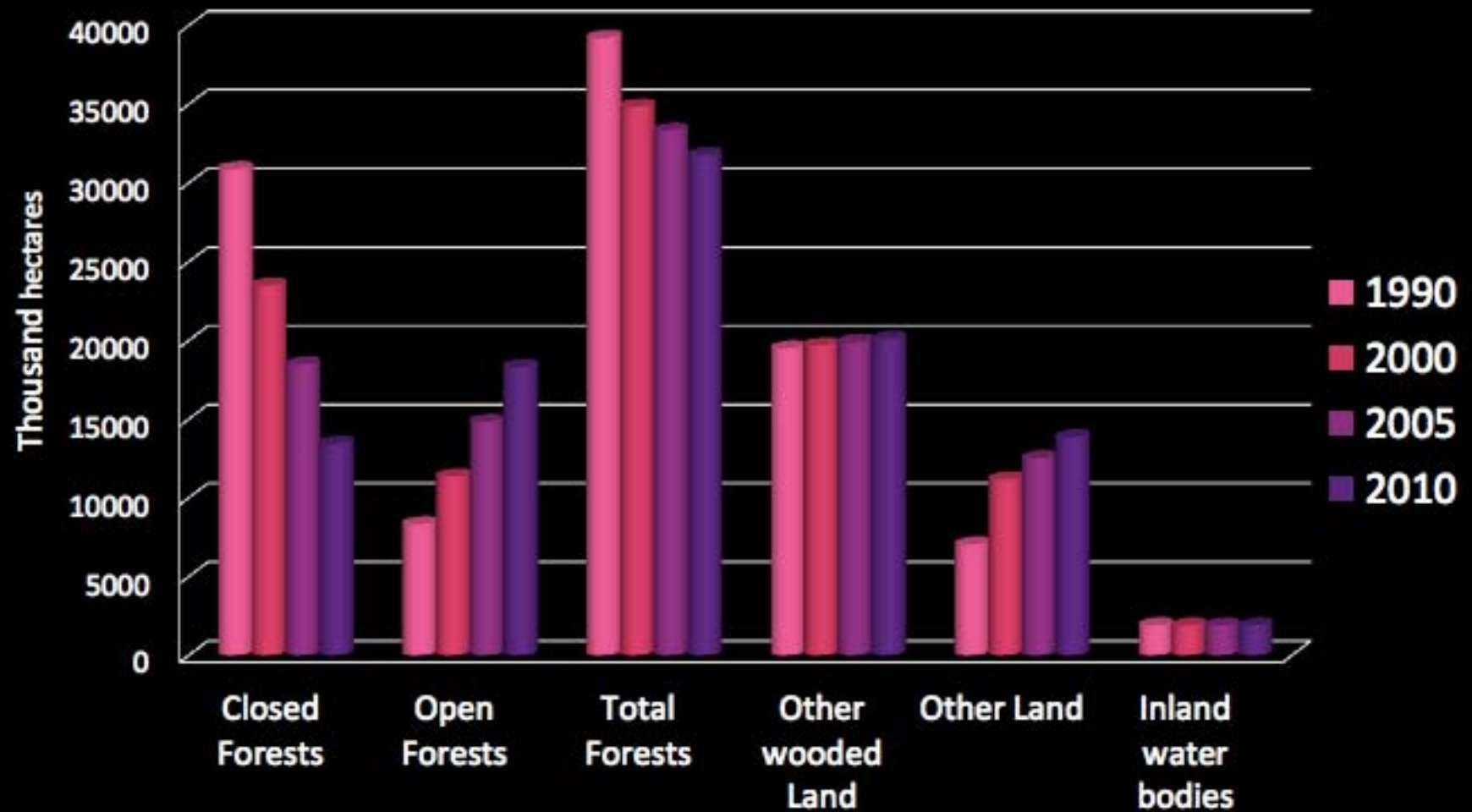
SARI Yangon Workshop: East Meeting West



Issues in SARI region

- Rapid pace of economic development
- Cross-border trade and regionalization
- Poverty alleviation and alternative livelihoods
- Biofuel from energy security perspective
- Alternate land uses in the context of climate mitigation
- Emissions/Pollution from Deforestation and Fires
- Industrial pollution

Forest Cover Status of Myanmar (FRA 2010)



Changes of Lake Inle

- 1935-2000: the net open water area of Inle Lake decreased from 69 to 47 km² (~ 32%)
- Ongoing agricultural practices within the wetlands and margins of the lake are the main sources of sedimentation, eutrophication, and pollution and loss of open water area



Inle fishermen return from gathering sediment from the lake to be used as fertilizer, using the traditional Intha leg-paddling technique.



Land-Cover/Land-Use Change Program

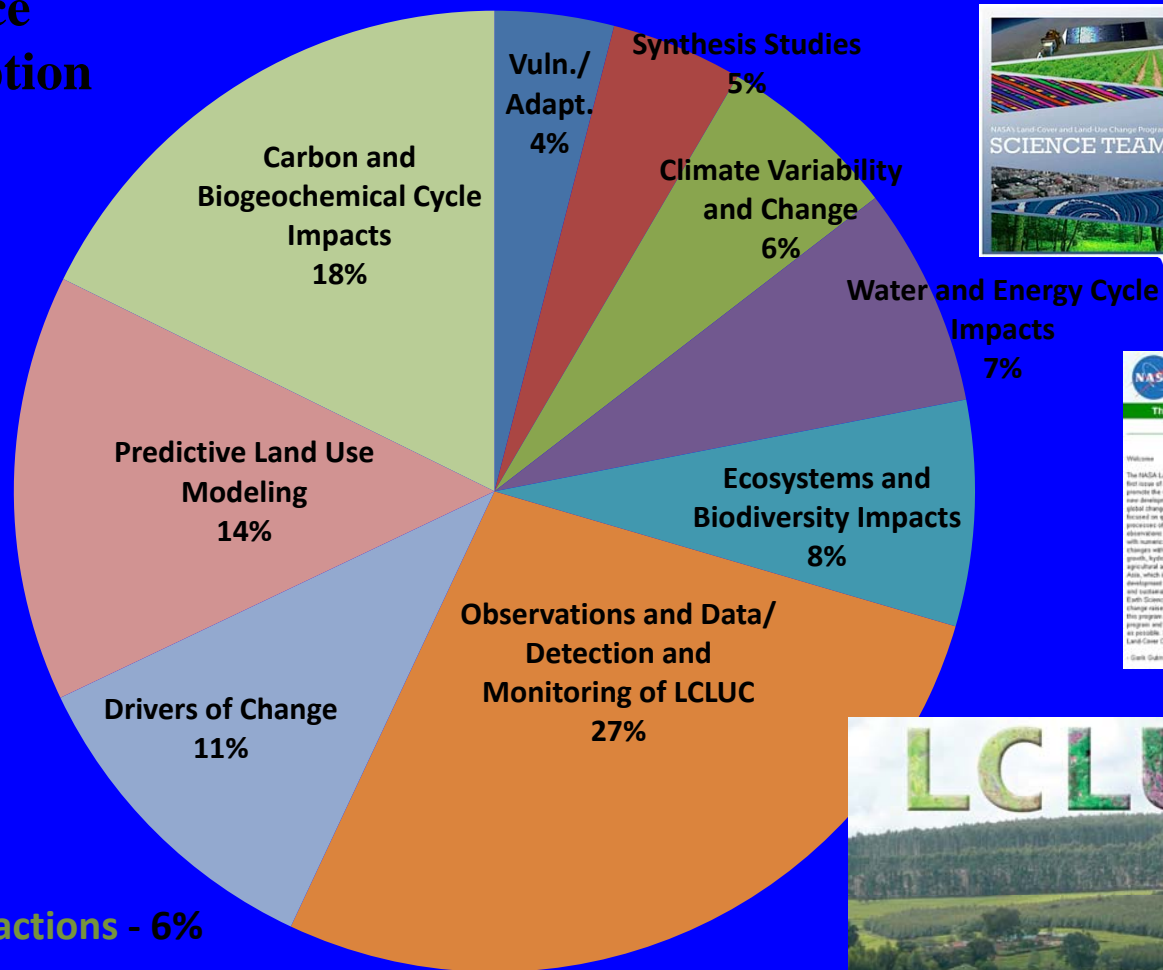


- LCLUC is an interdisciplinary scientific theme within NASA's Earth Science program. The ultimate vision of this program is *to develop the capability for periodic global inventories of land use and land cover from space, to develop the scientific understanding and models necessary to simulate the processes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

LCLUC Program Content

200 projects since Program's inception
 Each year ~40
 3-yr projects
 Total in the Program >200
 researchers

Impacts - 33%
 (Carbon+Water+Eco)
 Monitoring - 27%
 LU Modeling - 14%
 Drivers - 11%
 LCLUC- Climate interactions - 6%
 Synthesis - 5%
 Vulnerability/Adaptation - 4%



<http://lcluc.hq.nasa.gov>



Webinar series



E-newsletter

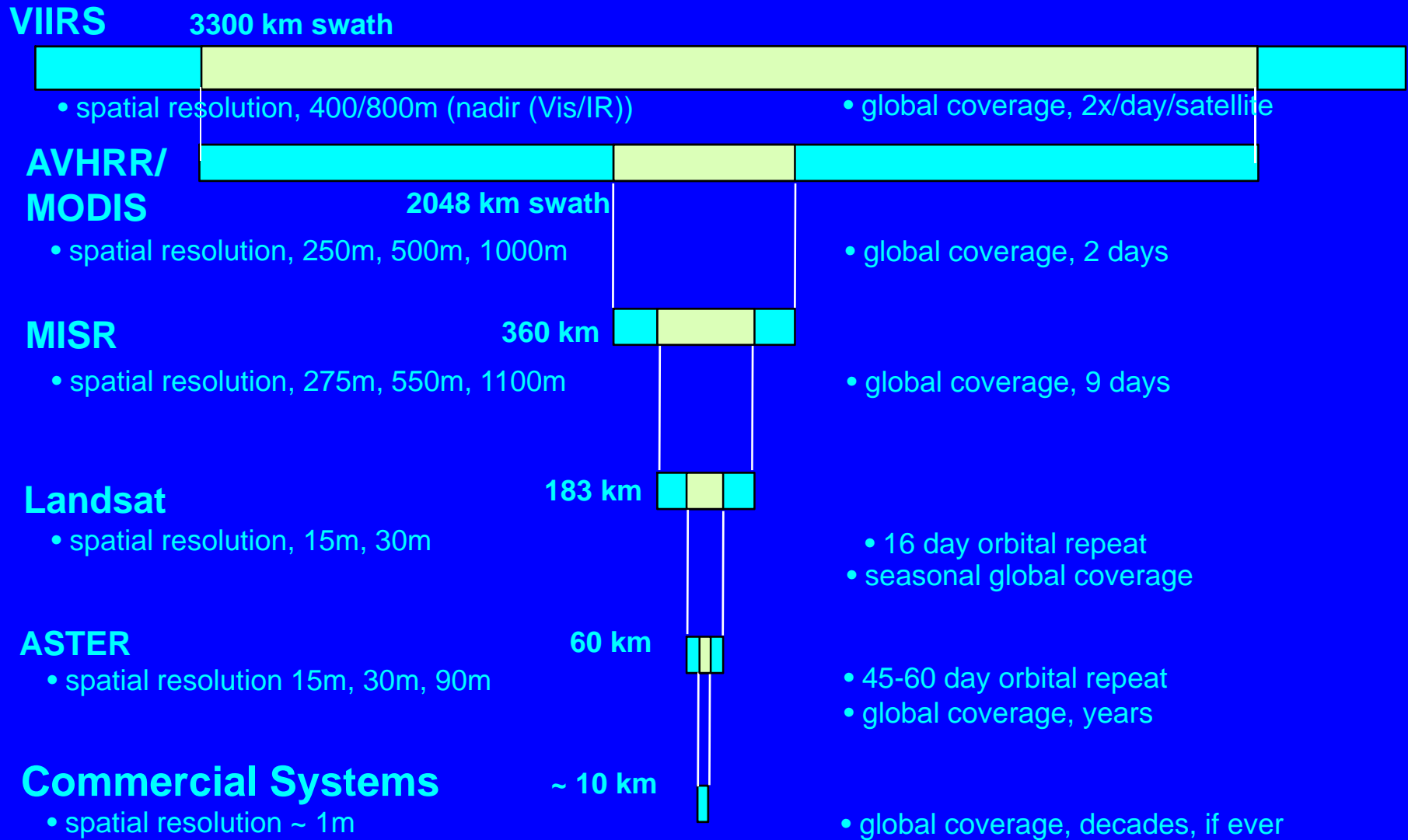


Brochure

Tools

- Remote sensing observations (satellite and airborne)
 - Optical
 - Hyper-spatial resolution multispectral (e.g. IKONOS, Orbview)
 - High resolution multispectral (e.g. Landsat, SPOT)
 - Moderate resolution multispectral (e.g. AVHRR, MODIS, MERIS)
 - Lidars
 - Microwave
 - Passive
 - Radars
- In situ observations and intensive field campaigns
- Modeling and integrative data analysis
- Data and information systems

Synergistic Use of Optical Remote Sensing



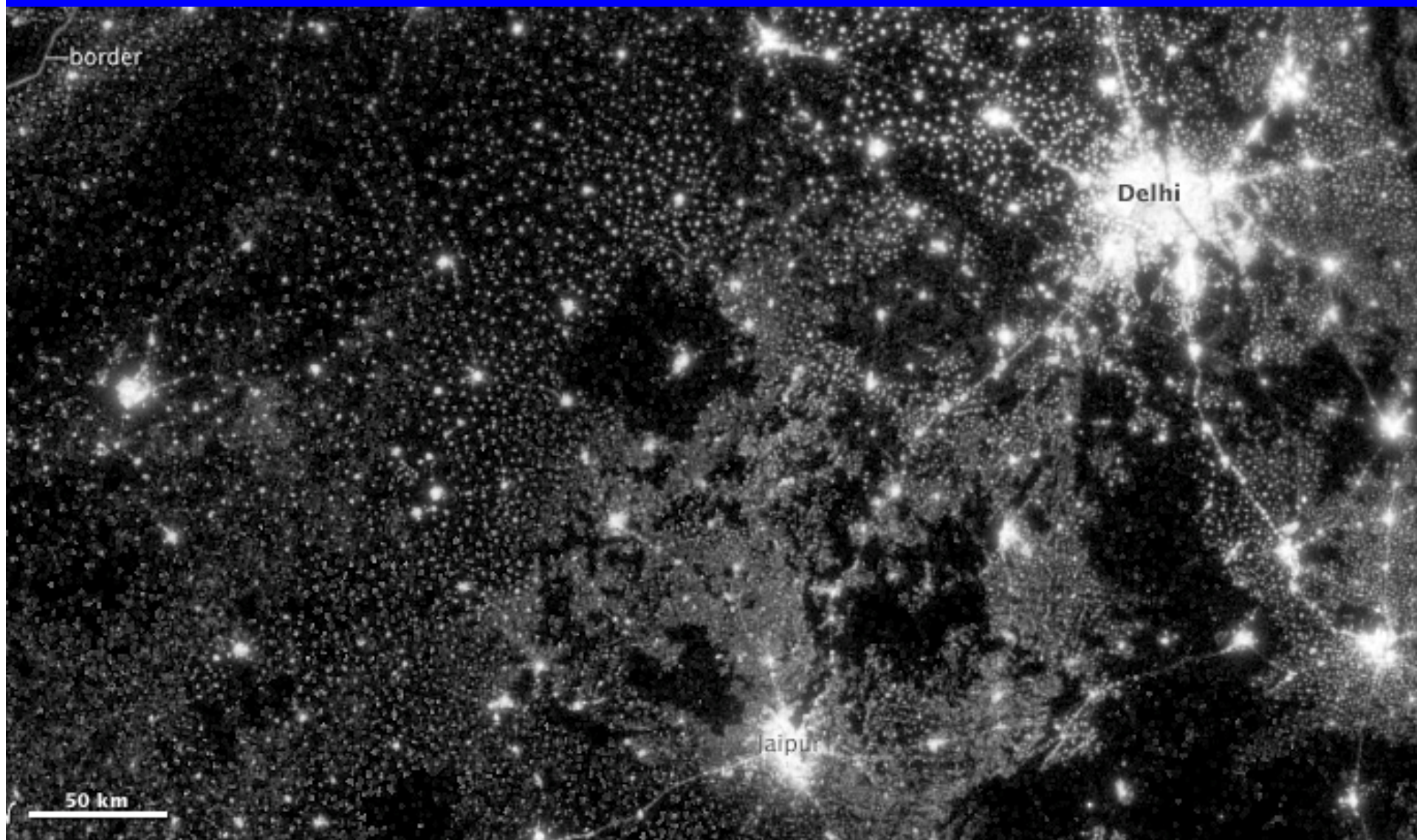
Earth Night Lights: A 2012 composite from data acquired by the Suomi National Polar-orbiting Partnership (Suomi-NPP) satellite



DMSP/OLS (5km²/ 6 bits) to...



NPP/VIIRS (742 m² /14 bit)



NASA Pre-SARI Projects

- Jefferson Fox/East-West Center: The Expansion Of Rubber And Its Implications For Water And Carbon Dynamics In Montane Mainland Southeast Asia
- Chandra Giri/ SAIC/USGS EROS Center: Tropical Mangrove Forests: Global Distributions And Dynamics (1990-2005)
- Atul Jain/University of Illinois: Land Cover And Land Use Change And Its Effects On Carbon Dynamics In Monsoon Asian Region
- Xiangming Xiao/ University of Oklahoma: Quantifying changes in agricultural intensification and expansion in monsoon Asia during 2000-2010
- Hanqin Tian/Auburn University: Land Use-Ecosystem-Climate Interactions In Monsoon Asia
-
- David Skole/Michigan State University: Enhancing Global Observations And Information On Tropical Forest Change Using Landsat Global Data
- Ruth DeFries/Columbia University: Multi-sensor Fusion to Determine Climate Sensitivity of Agricultural Intensification in South Asia
- Steve, Leisz/Colorado State University: Increased Accessibility, Landscape Changes, Rural Transformations, and Urbanization: Impacts of the East-West Economic Corridor from Da Nang, Vietnam, to Khon Kaen, Thailand

NASA LCLUC Synthesis Projects in SARI Region

- Atul Jain/U. of Illinois
 - Land Cover and Land Use Changes and Their Effects on Carbon Dynamics in South and South East Asia: A Synthesis Study
- Peilei Fan, Michigan State U.
 - Urbanization and Sustainability Under Global Change and Transitional Economies: Synthesis from Southeast, East and North Asia
- Jeff Fox, East-West Center, Hawaii
 - Forest, Agricultural, and Urban Transitions in Mainland Southeast Asia: Synthesizing Knowledge and Developing Theory
- Seto, Karen, Yale U.
 - Synthesis of LCLUC studies on Urbanization: State of the Art, Gaps in Knowledge, and New Directions for Remote Sensing Science

What We Have Learned by Now: for the SARI Region

- Population growth =>
rapid urban expansion on rural and agricultural lands =>
further deforestation
- Prevalent commodity crops (rubber and palm) prices increase =>
reduced food production and increased food costs
- Large-scale land-cover conversion for agriculture =>
changes in carbon cycle and air quality degradation
- Economic development initiatives =>
regional landscape fragmentation

NASA-SARI Science

- Will be based on the pre-SARI projects and
 - selections (for South Asia) from the current LCLUC-2015 solicitations
 - complemented by future selections (for Southeast Asia) from the new solicitation LCLUC-2016 (will be announced in Feb)
 - possibly also by some selections from Carbon Cycle-2016 and IDS-2016

SARI-SERVIR Relationship

- SERVIR Himalaya at ICIMOD will advance free and open information sharing and develop innovative, analyses, decision-support products, and trainings that advance scientific understanding and deliver information to those who need it
- Recent SERVIR's expansion with SERVIR-Mekong, implemented by the Asian Disaster Preparedness Center (ADPC)
- SERVIR-Mekong promotes the use of publicly available satellite imagery and related geospatial decision-support tools/products for key stakeholders and decision makers



Activities of SARI's two GOFC-GOLD regional networks (SEARRIN and SARIN) will be coordinated with SERVIR-Himalaya and -Mekong activities

Thank you

