

LCLUC PROGRAM: UPDATE

Garik Gutman,
NASA Headquarters
Manager, LCLUC Program

October 2020





In Memoriam

Tony Janetos

(1954-2019)

NASA HQ->the World Resources Institute -> the Heinz Center for Science, Economics and Environment -> the Joint Global Change Research Institute at the U. Maryland ->Boston U.

In Memoriam : Tony Janetos , The First LCLUC Program Manager

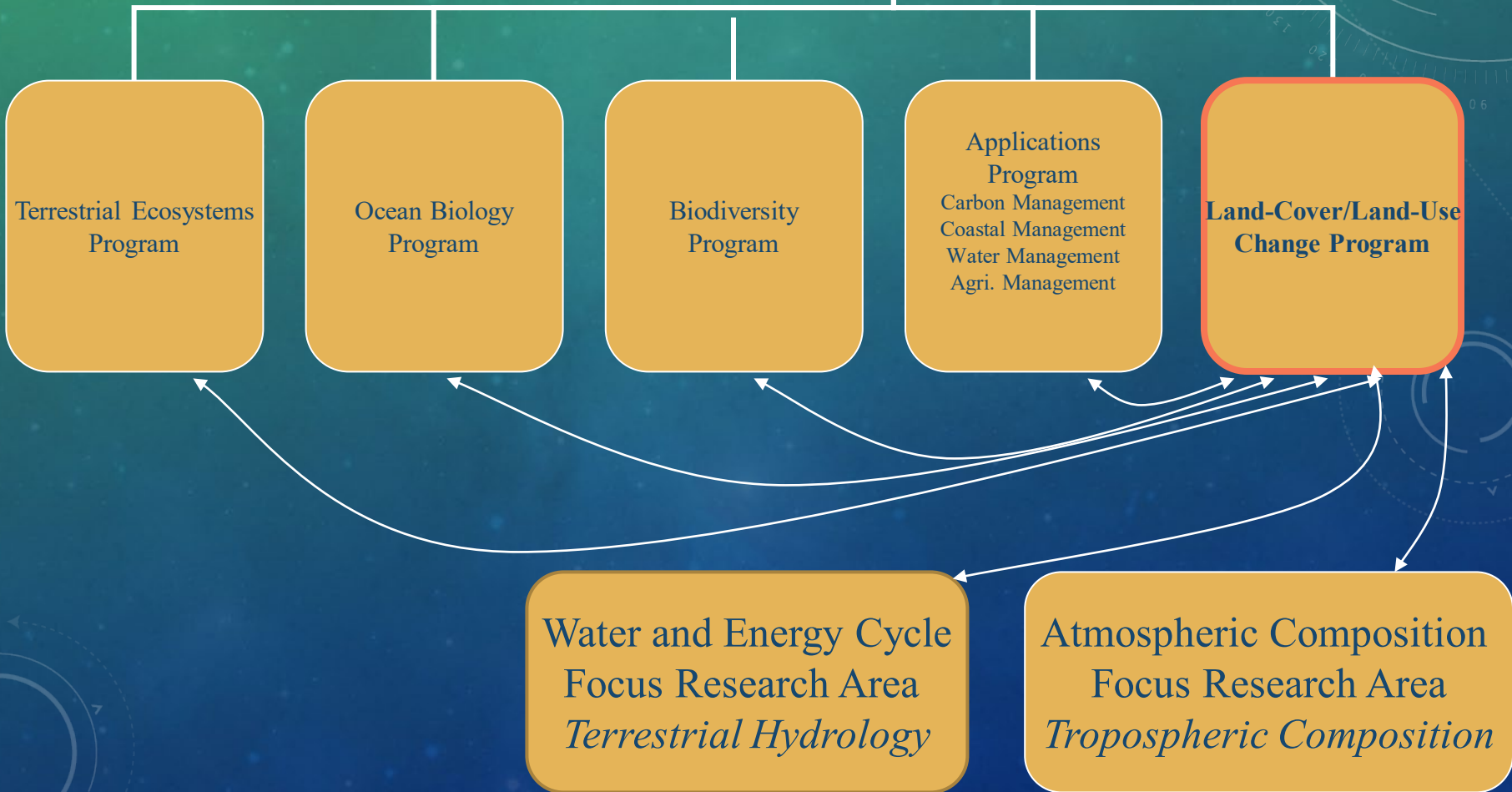
Important contributions to reports of the Intergovernmental Panel on Climate Change and the National Climate Assessment

2005: National Associate of the National Academy of Sciences—
for outstanding contributions to the work of the Academy

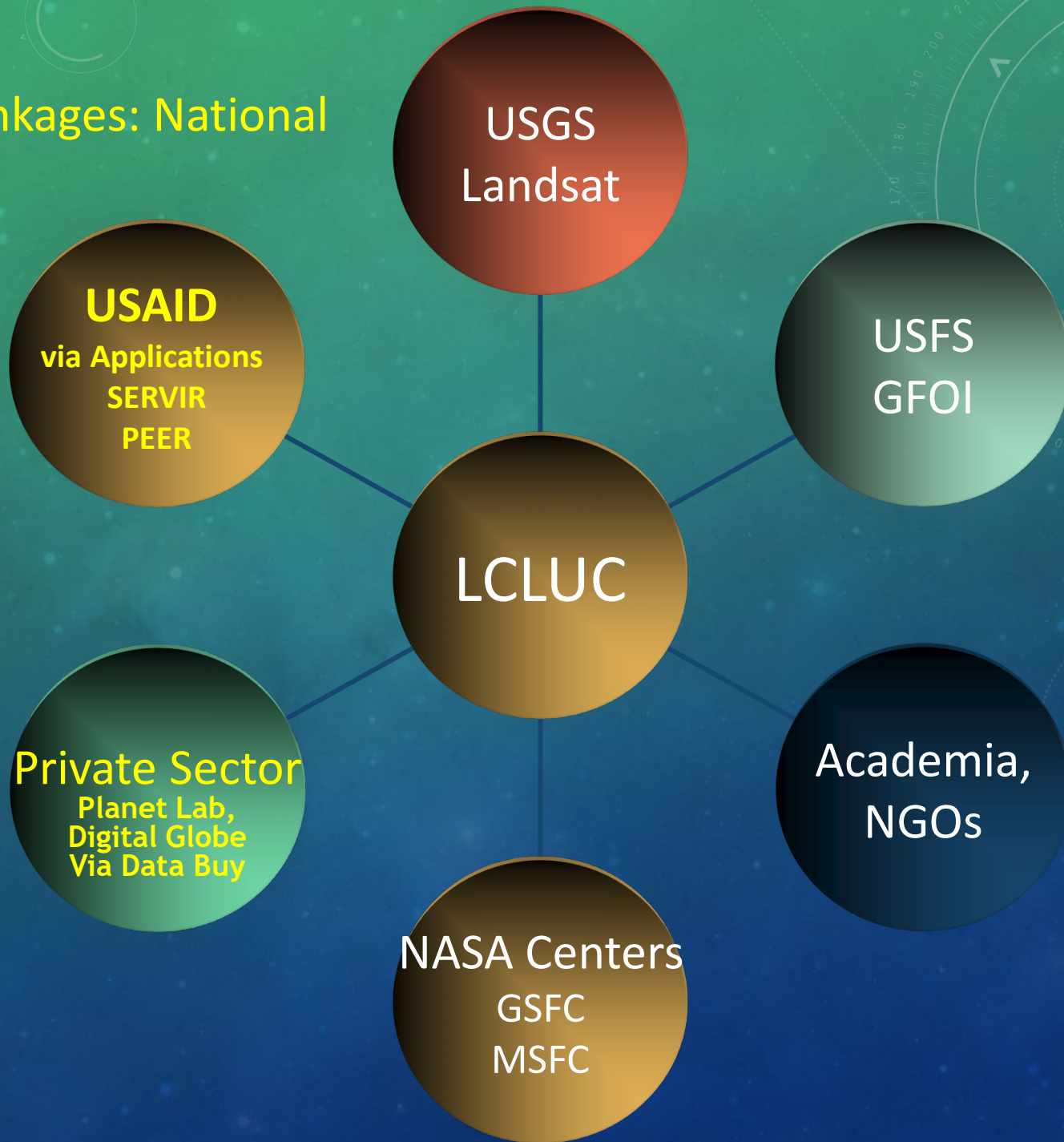
- Carbon Sources/Sinks and Land-Use
- Management of Ecosystems for Goods & Services
- Food Production and Distribution
- Forest studies in Russia

INTERNAL LINKAGES @ NASA

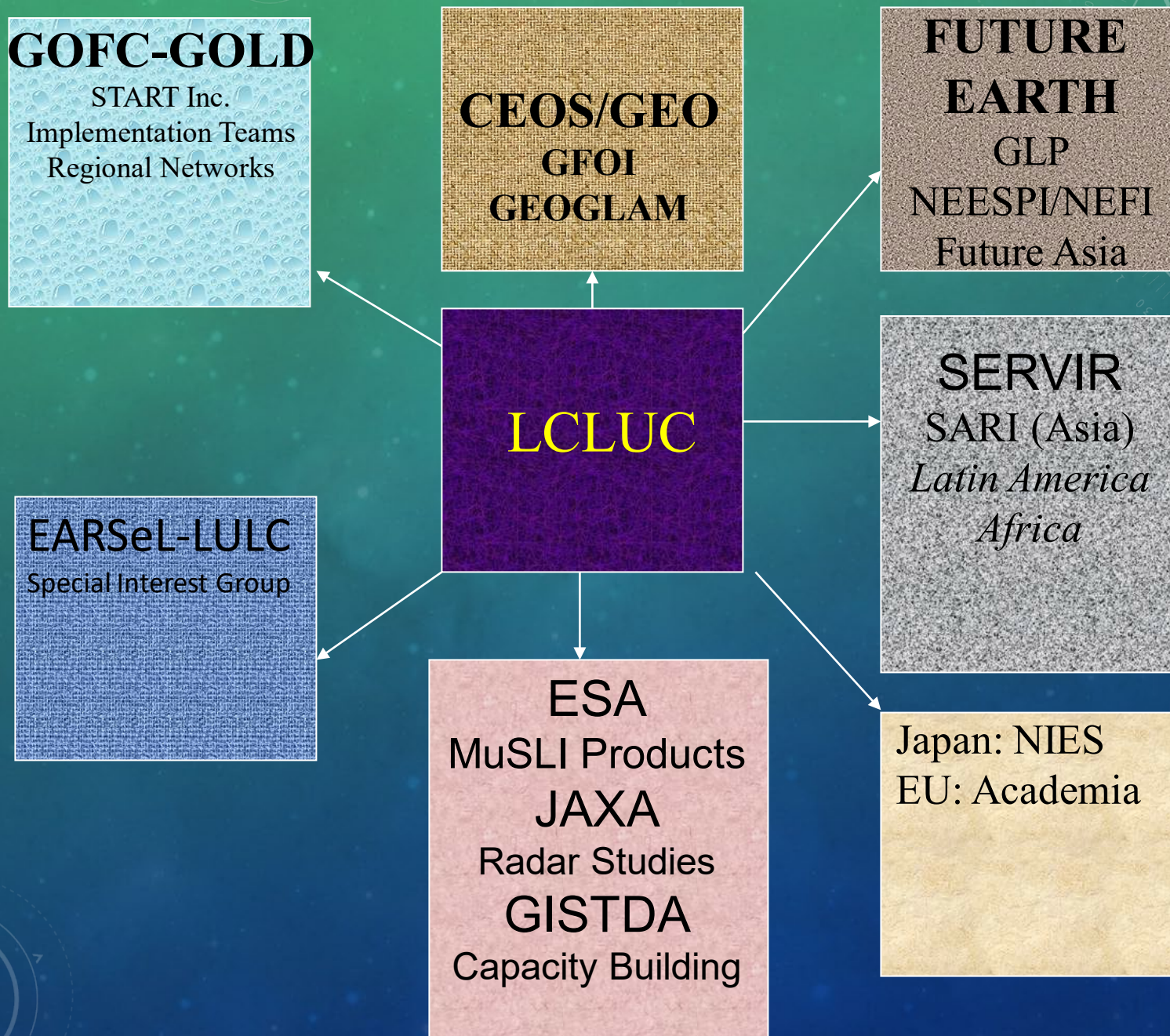
Carbon Cycle and Ecosystems Focus Research Area



External Linkages: National



External Linkages: International



LCLUC Science Team Meetings

Washington: Spring Blossom

- 2007: Climate/Carbon
- 2008: Joint CC&E Focus Area meeting
- 2009: LCLUC impacts on climate
- 2010: GLS LCLUC products
- 2011: 15th Anniversary (review/update)
- 2011/9: Agriculture (Joint CC&E FA)
- 2012: Urban
- 2013: Wetlands
- 2014: Urban
- 2015: Early Career Scientists (Joint CC&E FA)
- 2016: 20th Anniversary/Industrial Forests
- 2017: Mountains & MuSLI
- 2018: SARI-1: South Asia
- 2019: SARI-2: SE Asia & Caucasus
- 2020: VIRTUAL: MuSLI, SARI , X-DAY

International Regional

- 2007/9: NEESPI/MAIRS Urumqi, China
- 2009/1: MAIRS KhoP1030033.JPGn Kaen, Thailand
- 2009/9: MAIRS/NEESPI Almaty, Kazakhstan
- 2010/8: NEESPI Tartu, Estonia
- 2011/11: MAIRS Hanoi, Vietnam
- 2013/1: MAIRS Coimbatore, India
- 2013/11: NEESPI/MAIRS Tashkent, Uzbekistan
- 2014/10: NEESPI: Sopron, Hungary
- 2016/1: SARI/MAIRS: Yangon, Burma/Myanmar
- 2017/7: SARI/MAIRS: Chiang Mai, Thailand
- 2018/5: SARI: Manila, Philippines
- 2019/7: SARI: Johor Bahru, Malaysia
- 2020: COVID-19



THE ROLE OF SOCIAL SCIENCE IN LCLUC PROGRAM

- **Social and economic science research includes**
 - **impacts of socio-economic changes on LCLUC**
 - **impacts of LCLUC on society**
 - **adaptation to climate/environmental change of land-use systems**
- **During the last 15 years, the Social/Economics Science component has been a mandatory part of all LCLUC proposals, unless otherwise stated in the solicitation (e.g. MuSLI)**

INTERNATIONAL REGIONAL INITIATIVES

- **Northern Eurasia's Future Initiative (NEFI, formerly NEESPI)**



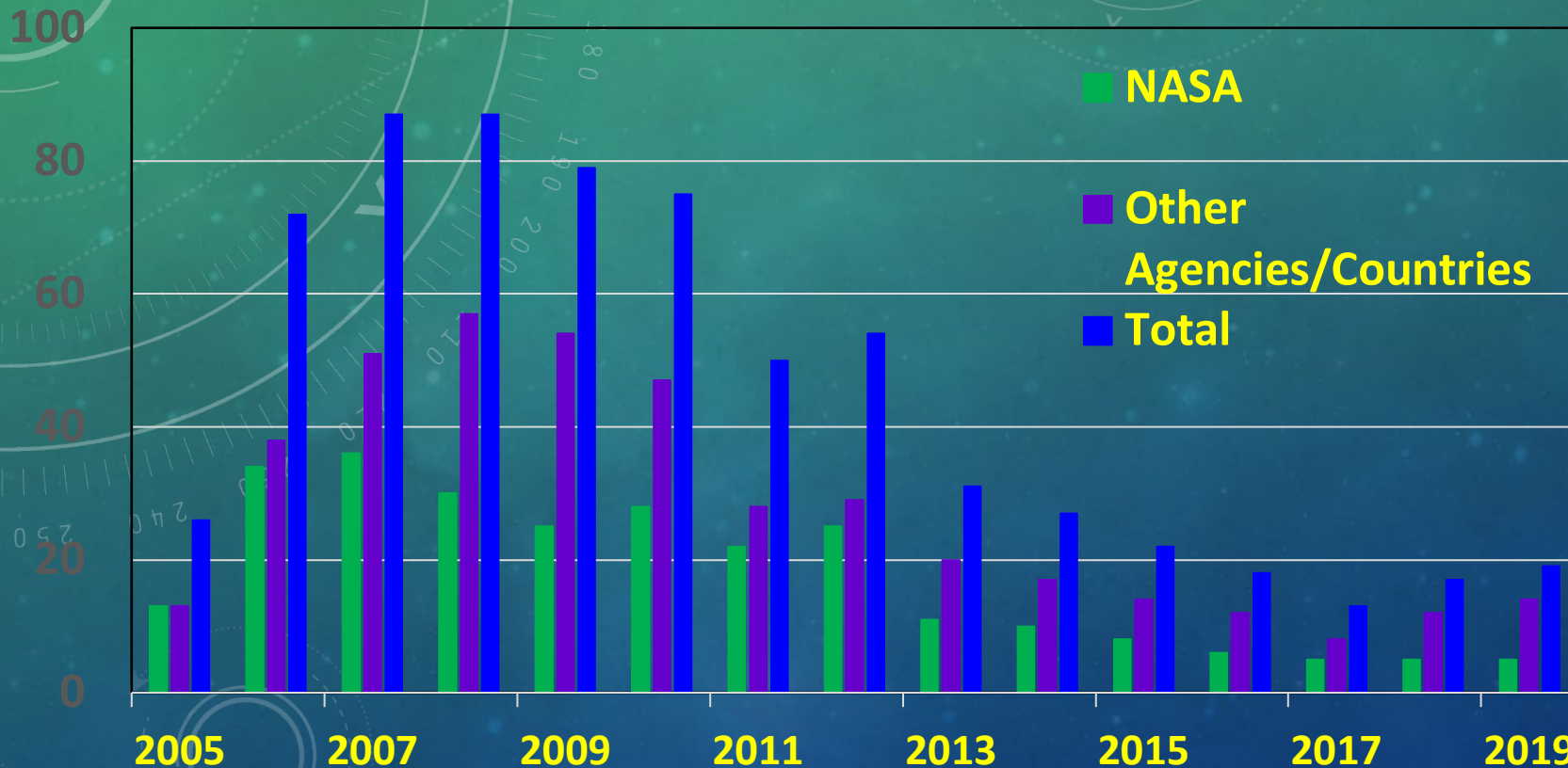
Project Scientist
NEFI
Pasha Groisman,
NOAA/UCAR

- **South/Southeast Asia Research Initiative (SARI)**



Project Scientist
SARI
Krishna Vadrevu,
NASA MSFC

NEESPI: 15 YEARS OF SCIENCE



over 1500 papers

>750 scientists

>200 institutions >170 projects

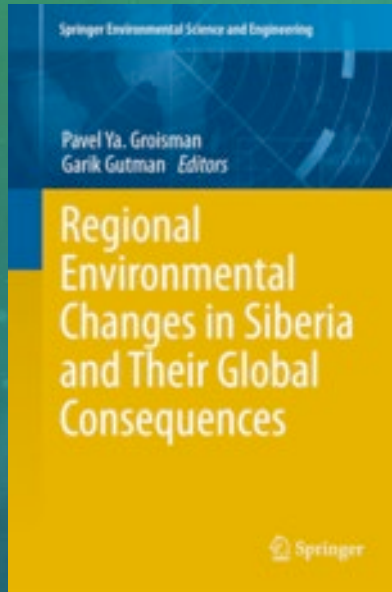
30 countries; >80 Ph.D. students

NEESPI → NEFI

NEESPI-LCLUC BOOKS



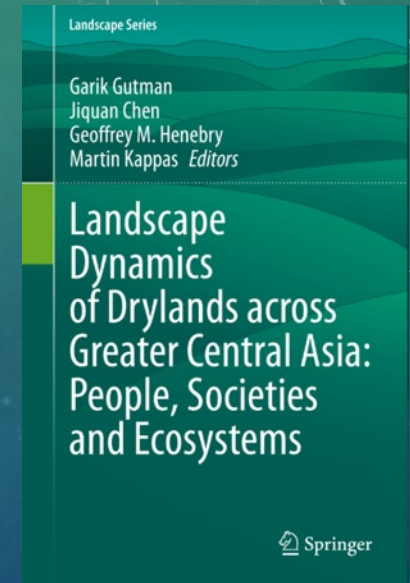
Springer 2010
Arctic



Springer 2012
Siberia



Springer 2017
Eastern Europe



Springer 2020
Central Asia

Chapter Downloads

12414

7207

6200

928

Citations

40

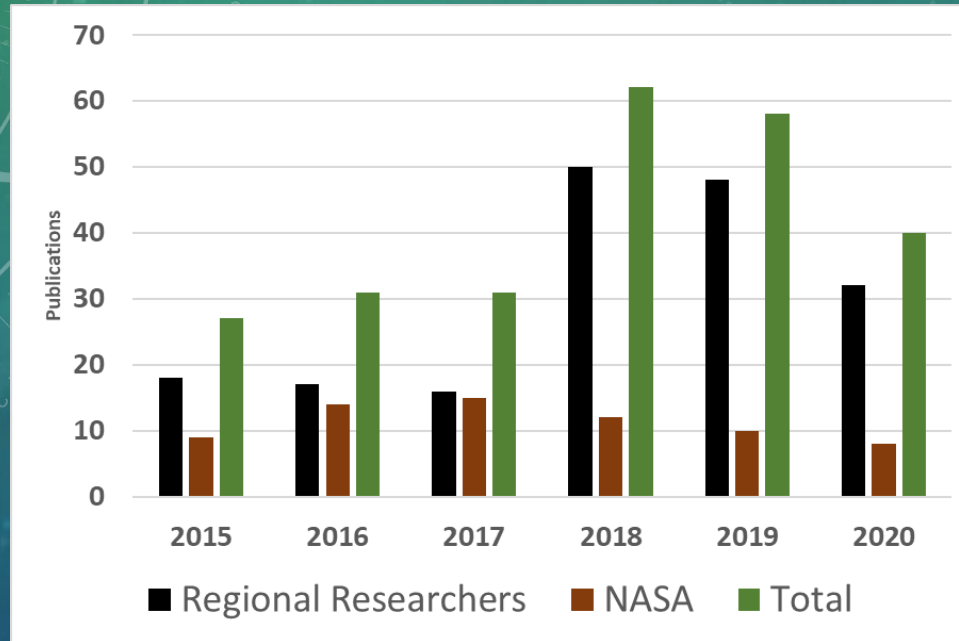
88

36

SARI SCIENCE

-22 projects
>250 scientists
>150 institutions

12-different
Special
Issues in
Journals



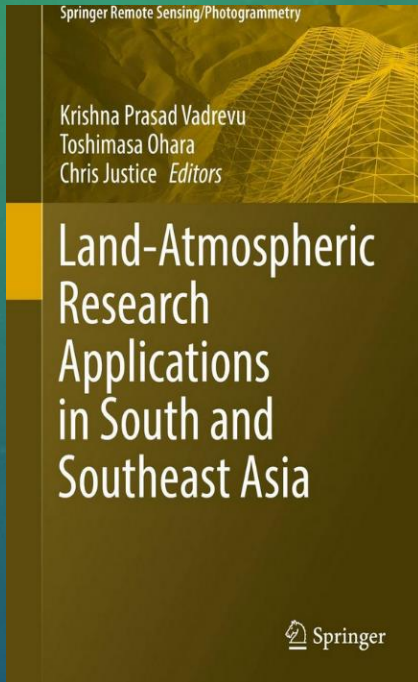
Nearly 250
publications
in Peer
reviewed
journals and
Books

South-Southeast Asia

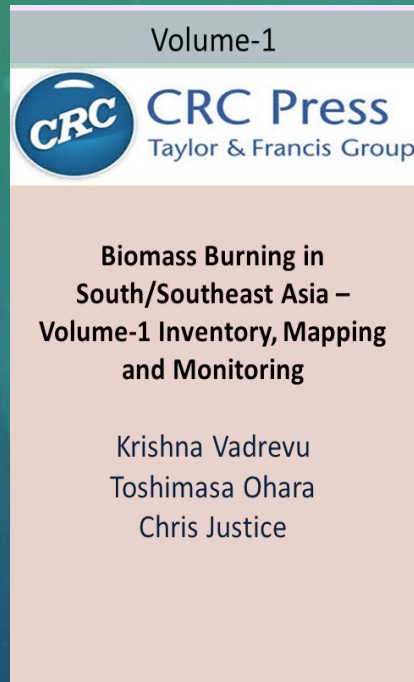
*Oct-2013 – India Meeting – SARI idea proposed
2015-SARI First SARI Solicitation*



SARI-LCLUC BOOKS



Springer 2018



CRC Press, 2020

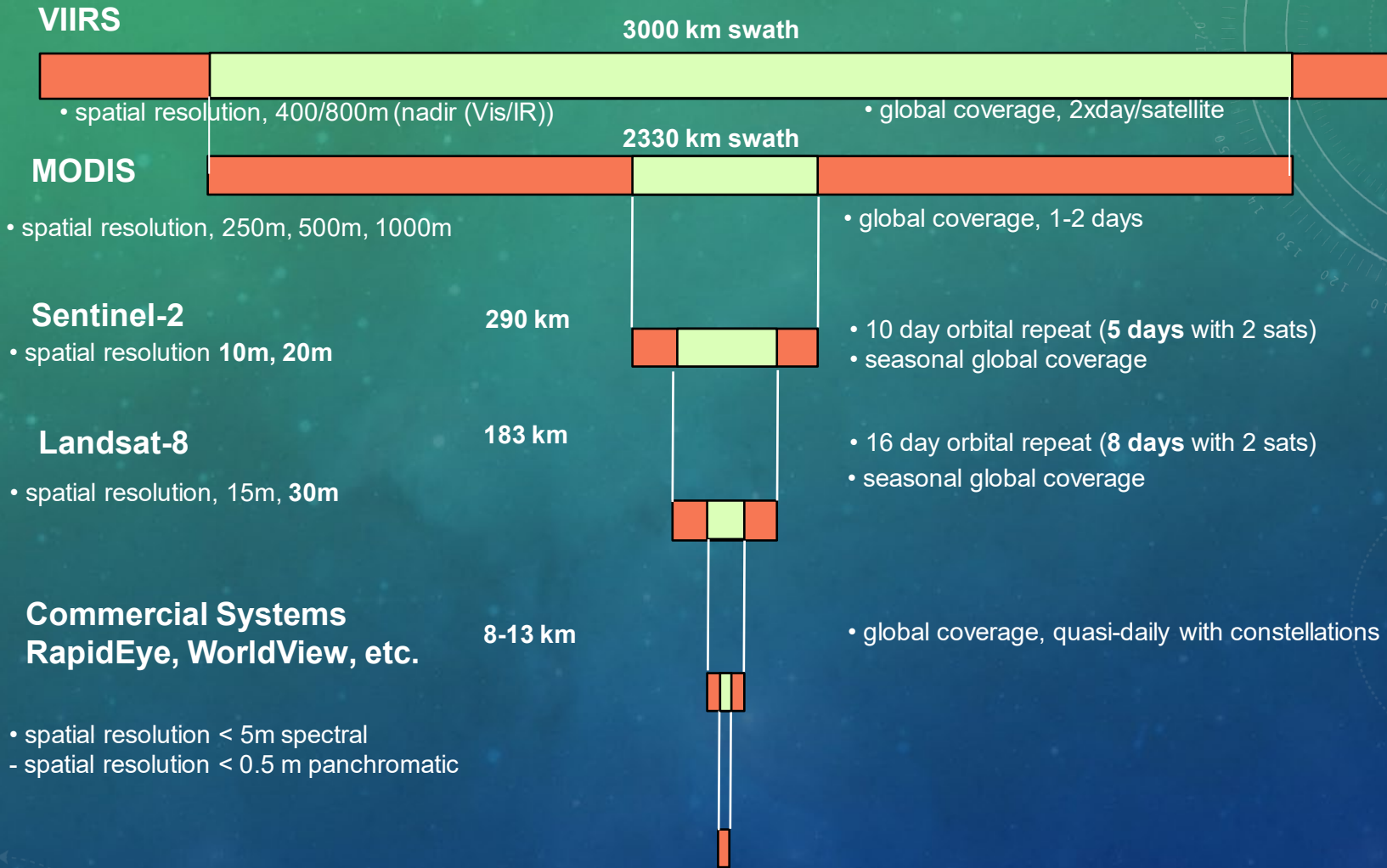


CRC Press, 2020



Springer, 2021

Synergistic Use of Optical Remote Sensing

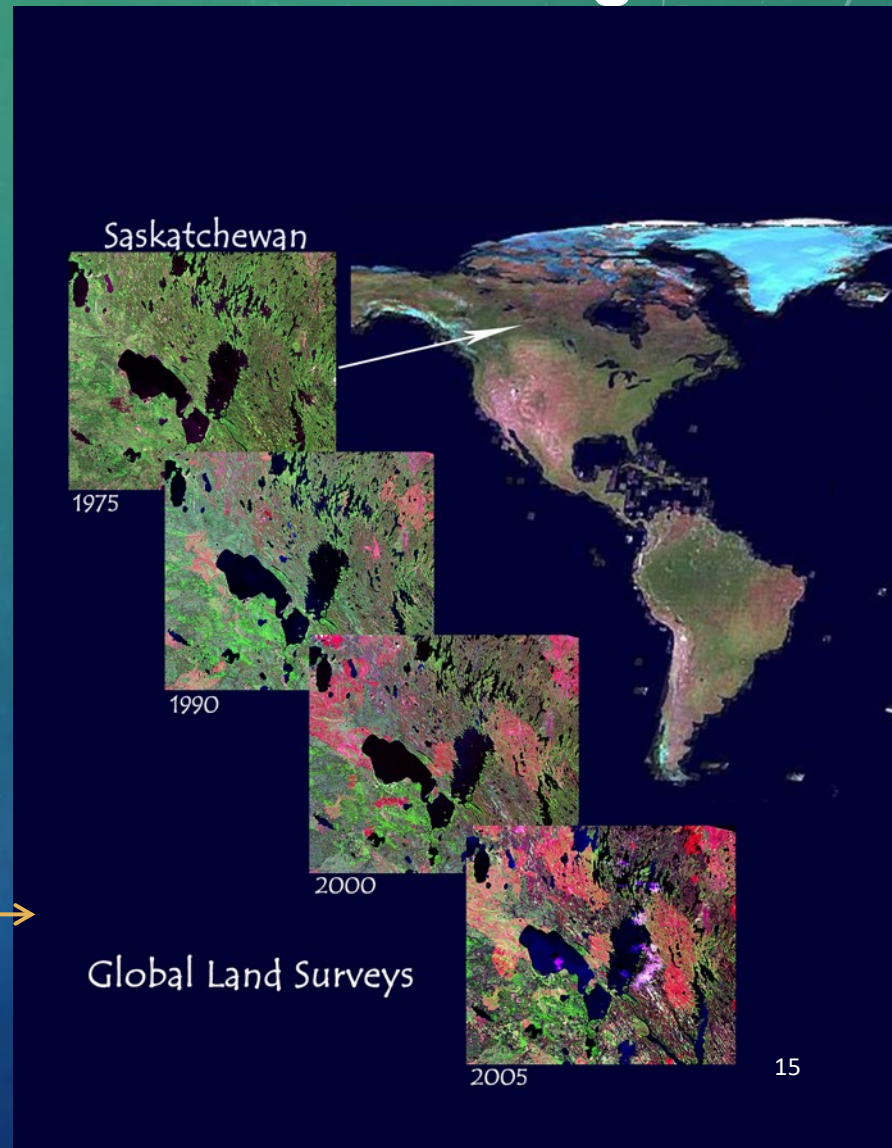


PRE-MUSLI WORK IN THE LCLUC PROGRAM: GLOBAL PRODUCTS WITH MULTI-SOURCE LAND IMAGING APPROACH

- **NASA-USGS Landsat Global Land Surveys**
 - GLS-2005 (Mid-decadal dataset)
 - GLS -2010 (Decadal dataset)
- **WELD mosaics**
- **Site-specific phenology based on mid-resolution multi-sensor approach**

NASA-USGS Global Land Survey Data Sets: With Landsat Data Prior to Becoming Free

- GLS datasets available at USGS for download
- GLOVIS/EarthExplorer at USGS free of charge
- Cloud-free, geo-corrected Landsat-based 30-m global mosaic datasets centered on 1975, 1990, 2000, 2005, and 2010 (1 scene per epoch at the peak of vegetation) –good for global assessments of land-cover long-term changes
- Joint NASA-USGS project in 2008-2011
- GLS-2005 and -2010 based on Landsat-5 and -7 plus EO-1 ALI data used over small islands
- Paper describing GLS-2005 published in P&RS
Gutman, G., Byrnes, R., Masek, J., Covington, S., Justice, C., Franks, S., and R. Headley, Towards monitoring land cover and land-use changes at a global scale, *Photogrammetric Engineering & Remote Sensing*, 74, 6-10, 2008
- Paper with an assessment of the NASA-USGS Global Land Survey datasets published in RSE
Gutman, G., C. Huang, G. Chander, P. Noojipady, J. Masek, 2013: *Remote Sensing of Environment*, 134, 249-265.



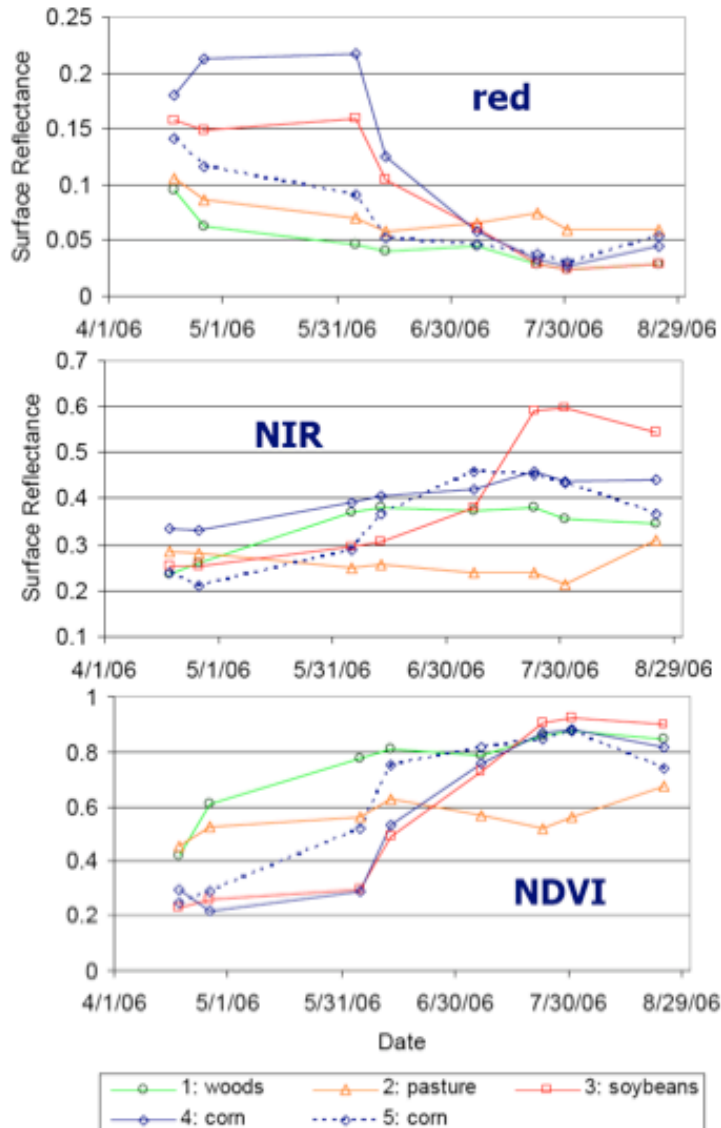
Progression of fires scars in central Canada: 1975-2005

GLOBAL COMPOSITE USING LANDSAT-5 AND -7: WELD MOSAICS



David Roy, Michigan State U. (produced while at South Dakota State U.)

PRE-SENTINEL WORK ON 30-M PHENOLOGY: MERGING DATA FROM LANDSAT-LIKE MID-RESOLUTION SENSORS



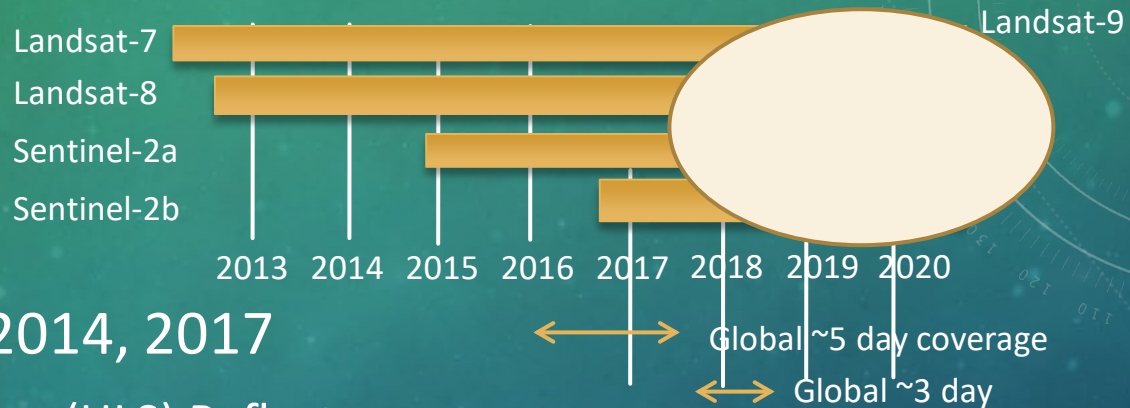
- Red reflectance, near-infrared (NIR) reflectance, and NDVI values for individual fields from central Illinois during the first half of the 2006 growing season

- Data are combined from Landsat-5, -7, ASTER, and IRS

Courtesy: Feng Gao, USDA

THE NASA MUSLI PROGRAM

- launched in Apr 1999
- launched in Feb 2013
- launched in Jun 2015
- launched in Mar 2017



MuSLI solicitations 2014, 2017

- Harmonized Land Surface (HLS) Reflectance
 - Harmonized Landsat8 + Sentinel2 (HLS)
 - global HLS products generated at MSFC and distributed via LP-DAAC
 - GSFC+USGS algorithm development
- Combining optical and radar (Sentinel-1) observations
- Prototyping → Generating continental products

New stage: HLS+VHR (Very High-Resolution Data)

- MuSLI 2020 → 13 projects
 - Planet Lab (Flock Cubsats >150 Doves; SkySat (11-sat constellation); RapidEye 5-sat constellation)
 - Digital Globe (GeoEye-1; World View 1,2,3; WorldView Legion 6-sat constellation in 2021)



- LCLUC website
- E-newsletters
- Facebook

OUTREACH

Kudos to Meghavi!

LCLUC Webinars series

- During 2014-2020 presentations on Urban, Urban-Ag transitions, Ag, last two years focus on SARI

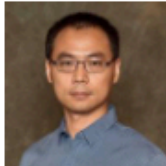


Presenter: Mark Cochrane, University of Maryland

[Land-Use Transitions in Indonesian Peatlands](#)

October 09, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

[Registration link](#)



Presenter: Lin Yan, Michigan State University

[Forced and Truncated Agrarian Transitions in Asia Through the Lens of Field Size Change](#)

October 02, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

[Registration link](#)

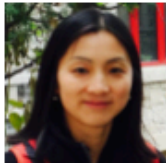


Presenter: Peter Potapov, University of Maryland

[Shifting Cultivation at a Crossroad: Drivers and Outcomes of Recent Land-Use Changes in Laos PDR](#)

September 17, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

[Webinar Recording](#)



Presenter: Pellei Fan, Michigan State University

[Divergent Local Responses to Globalization: Urbanization, Land Transition, and Environmental Changes in Southeast Asia](#)

September 4, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

[Webinar Recording](#)



Presenter: David Skole, Michigan State University

[New Transitions in Smallholder Agricultural Systems that Promote Increased Tree Cover Outside of Forests](#)

August 6, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

[Webinar Recording](#)



Presenter: Josh Gray, North Carolina State University

July 31st, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

[Sowtime: Climate Adaptive Agriculture in the Eastern Gangetic Plains](#)

[Webinar Recording](#)



Presenter: Naiara Pinto, NASA Jet Propulsion Laboratory

June 25th, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

Registration is closed. This event has already been held.

[Webinar Recording](#)



Presenter: Jessica McCarty, Miami University

[Land-Cover/Land-Use Change in Southern Vietnam Through the Lenses of Conflict, Religion, and Politics, 1980s to Present](#)

June 4th, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

Registration is closed. This event has already been held.

[Webinar Recording](#)



Presenter: Son Nghiem, NASA Jet Propulsion Laboratory

[Land Use Status, Change and Impacts in Vietnam, Cambodia and Laos](#)

May 28th, 2020, 11:00 AM Eastern Standard Time (New York, GMT-05:00)

Registration is closed. This event has already been held.

[Webinar Recording](#)



Presenter: Jeff Vincent, Nicholas School of the Environment Duke University

[Consequences of Changing Mangrove Forests in South Asia on the Provision of Global Ecosystem Goods and Services](#)

May 18th, 2020, 03:00 PM Eastern Standard Time (New York, GMT-05:00)

Registration is closed. This event has already been held.

[Webinar Recording](#)



Presenter: Marc Simard, NASA Jet Propulsion Laboratory

[Mapping and Monitoring Mangrove Forests in Southeast Asia](#)

April 16th, 2020, 03:00 PM Eastern Standard Time (New York, GMT-05:00)

Registration is closed. This event has already been held.

[Webinar Recording](#)

LCLUC Awardees: 2019-2020

Karen Seto (Yale U.)
received the 2019 AAG
Award for Outstanding
Contributions to Remote



Jiquan Chen (Michigan State U.)
received Williams J Beal
Outstanding Faculty Award -
MSU (2020)



Son Nghiem (JPL)
elected AGU Fellow



Catherine Nakalembe (UMD)
has been named as a 2020
Africa Food Prize Laureate



CHRIS JUSTICE RECEIVES NASA'S
DISTINGUISHED PUBLIC SERVICE MEDAL



Important Meetings in 2020



I caught Corona... in the bottle



February 2020: Saigon, Vietnam



Enjoy Fall Colors
(even virtually)