

Assessing the Extent and Drivers of Forest Plantation Establishment in Andhra Pradesh

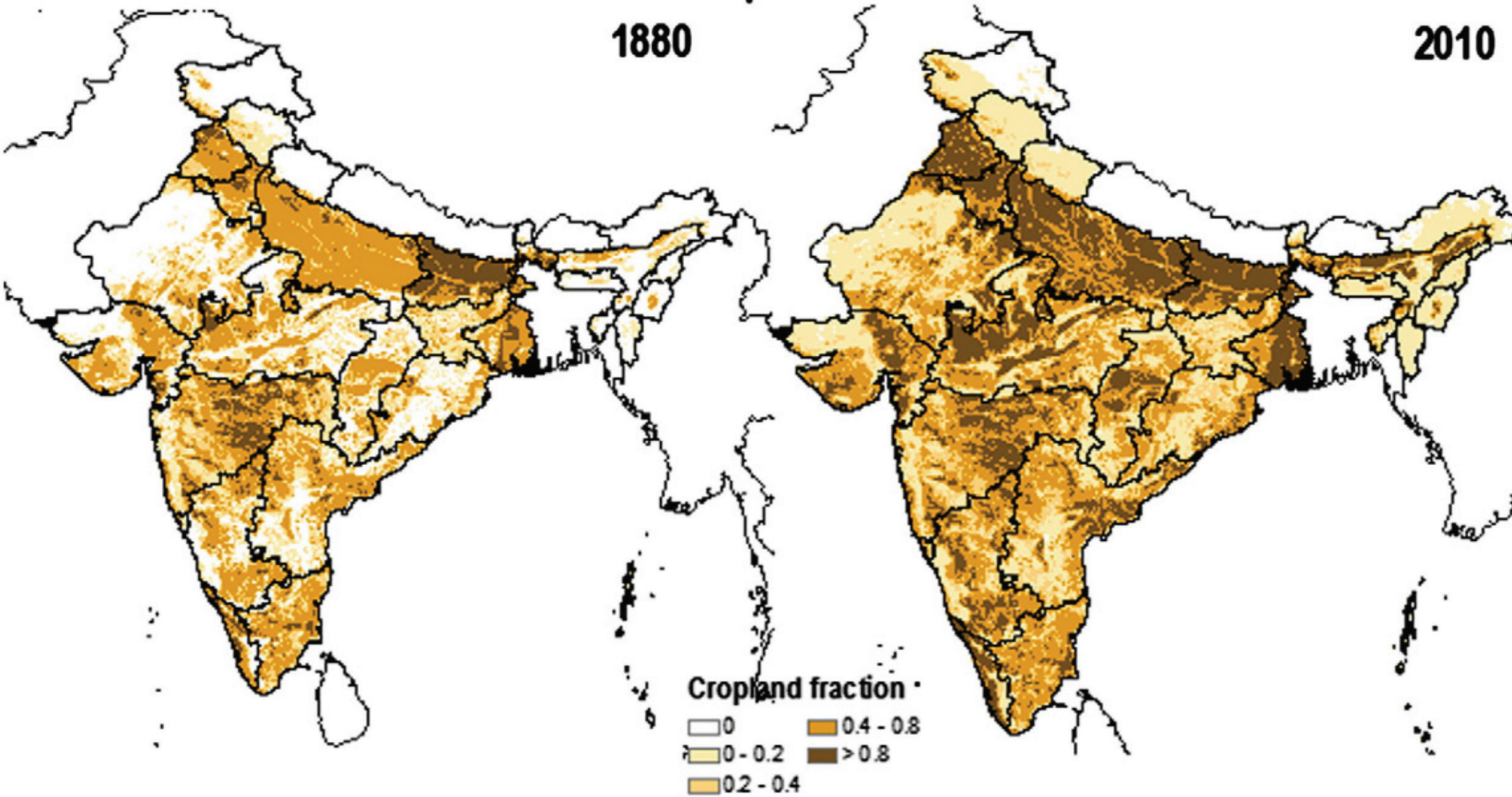
Randolph H. Wynne, Valerie A. Thomas, Haripriya Gundimeda,
Gregory S. Amacher, Kelly M. Cobourn, Gunnar Köhlin

a

Croplands

1880

2010

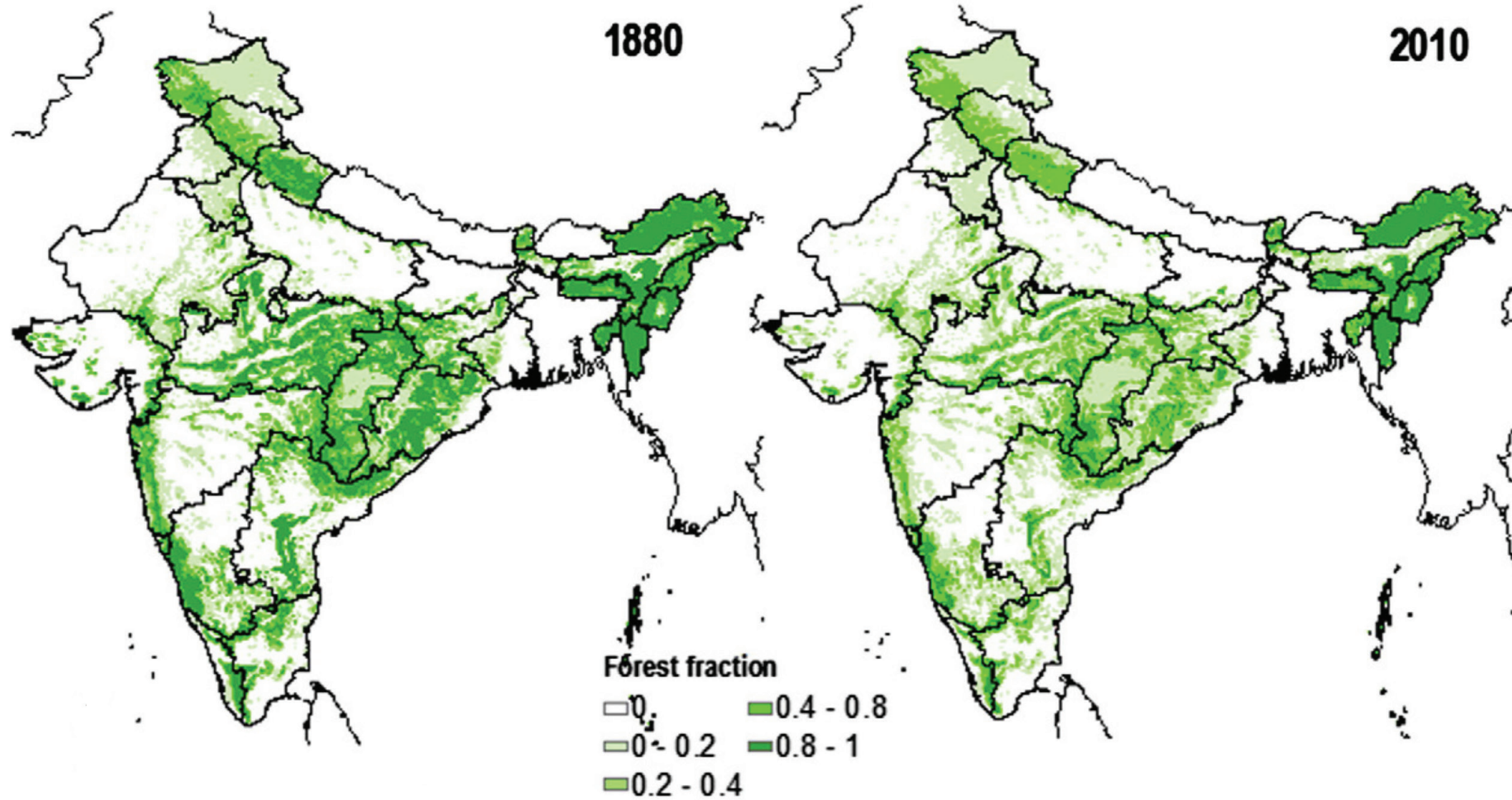


Tian et al. 2014 Global and Planetary Change 121: 78–88

Forest

1880

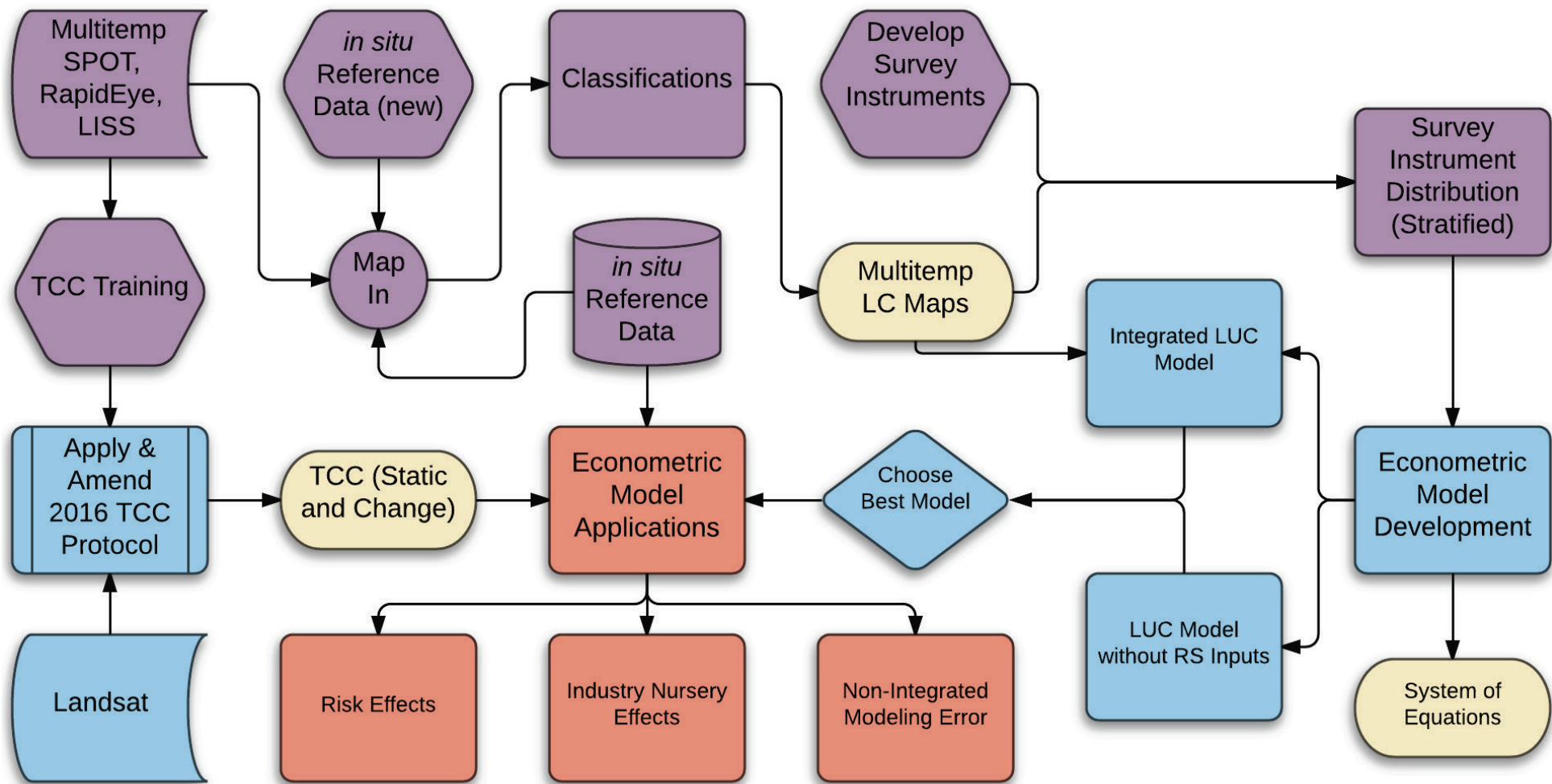
2010



Tian et al. 2014 Global and Planetary Change 121: 78–88



Conversion from rice to typical clonal hybrid Casuarina plantation. The Forest Survey of India notes tree cover > 11,100 km² was added during the period 2001 to 2015.



What might be causing this conversion to forest plantations from agriculture?

- Productive pest-resistant clones of Eucalyptus, Subabul and Casuarina
- Reduced human inputs compared to crops
- Absentee landlords
- Marginal agricultural lands
- Policies (National Forest Policy of 1988, state-specific)

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PROJECT

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ABSTRACT*

The report discusses how this project will finance a 6-year program to support: (a) forestry works on about 355,000 ha. This will consist of regenerating or afforesting degraded forest areas on about 173,000 ha with multi-tier coverage under

India BSE 314.50 NSE 313.95

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No.3A/86-FP
Ministry of Environment and Forests
(Department of Environment, Forests & Wildlife)

Paryavaran Bhavan, CGO Complex,
Lodi Road, New Delhi - 110 003.
Dated the 7th December, 1988.

RESOLUTION

National Forest Policy, 1988



A.P. Forest Development Corporation Ltd.,

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Eucalyptus Plantations

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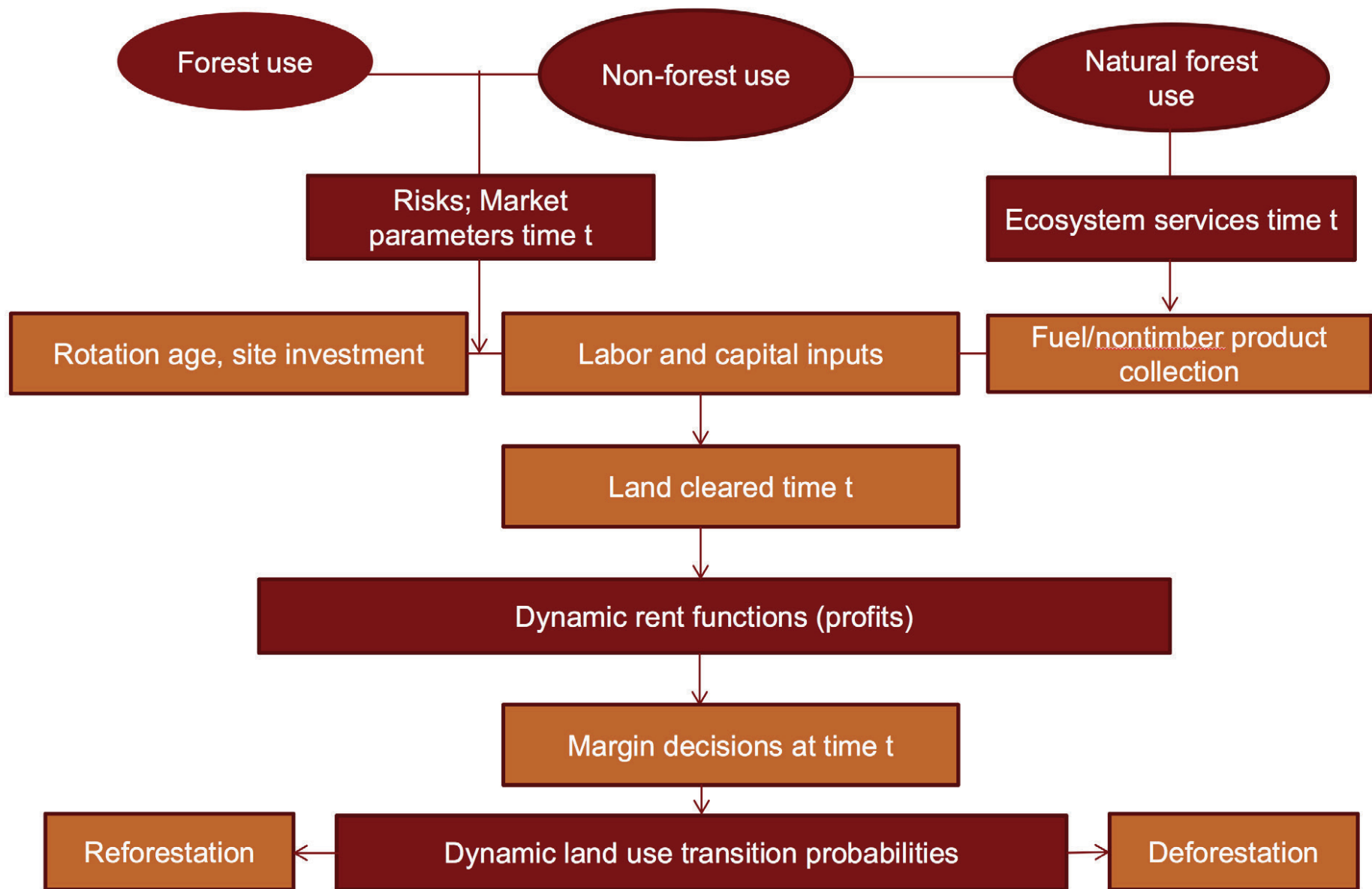
ANDHRA PRADESH

Casuarina plantations offer multiple benefits



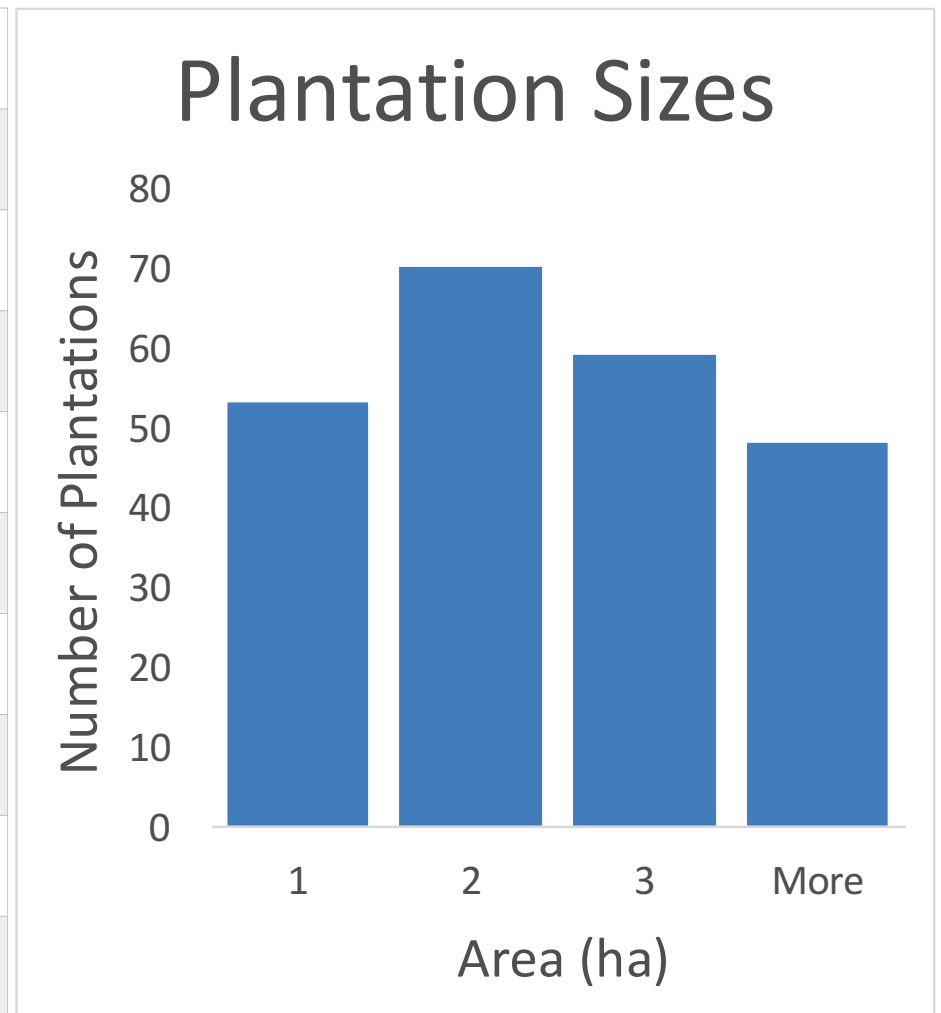
Ravi P. Benjamin

VISAKHAPATNAM:,MAY 11, 2012 00:00 IST
UPDATED: JULY 11, 2016 16:04 IST



Small!

n	230
Min	0.4
Max	9.7
Mean	2.1
First Quartile	1.0
Median	1.8
Third Quartile	2.6
Standard Deviation	1.4
Variance	2.1
Standard Error	0.1





High resolution Google Earth image (from SPOT) on left; Hansen et al. (2013) forest change product for the same area shown on right with blue showing forest gain and green prior forest extent. Note that most small plantations are not identified (2.5 ha plantation within circled area was identified by field crews as a plantation established during the period of the Hansen study).

Casuarina



**Casuarina in
East Godavari**

2 landowners

31 Dec 2006

27 Feb 2011



18 Nov 2013



20 Dec 2014

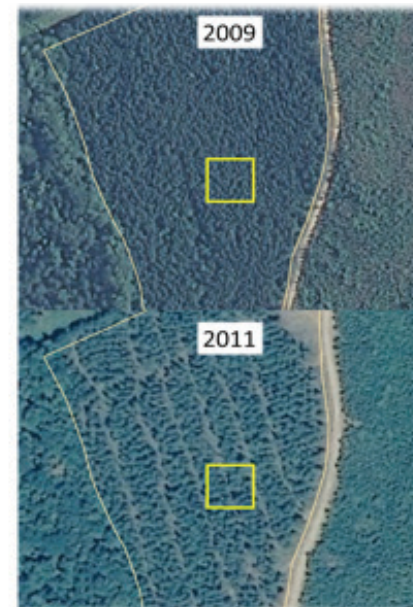
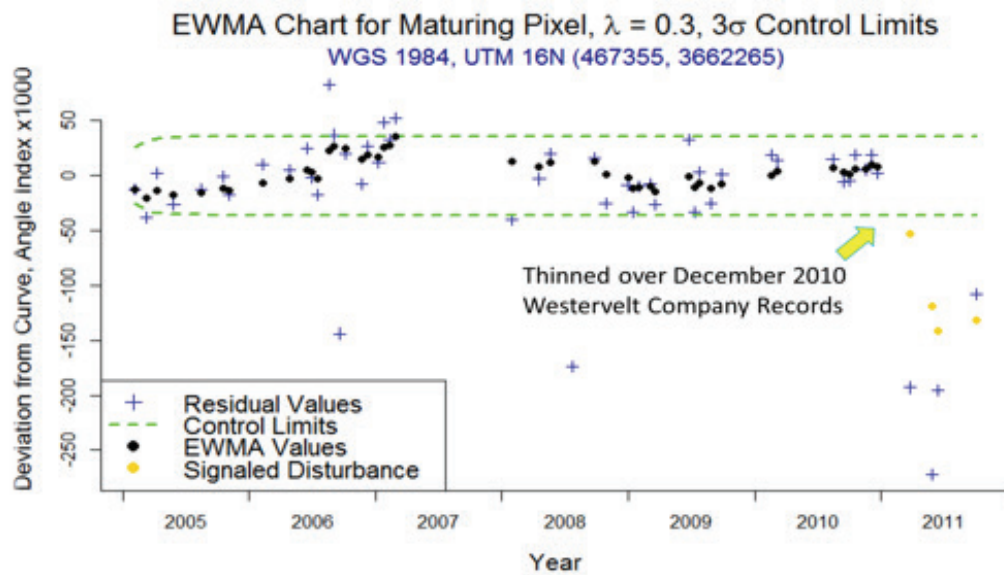
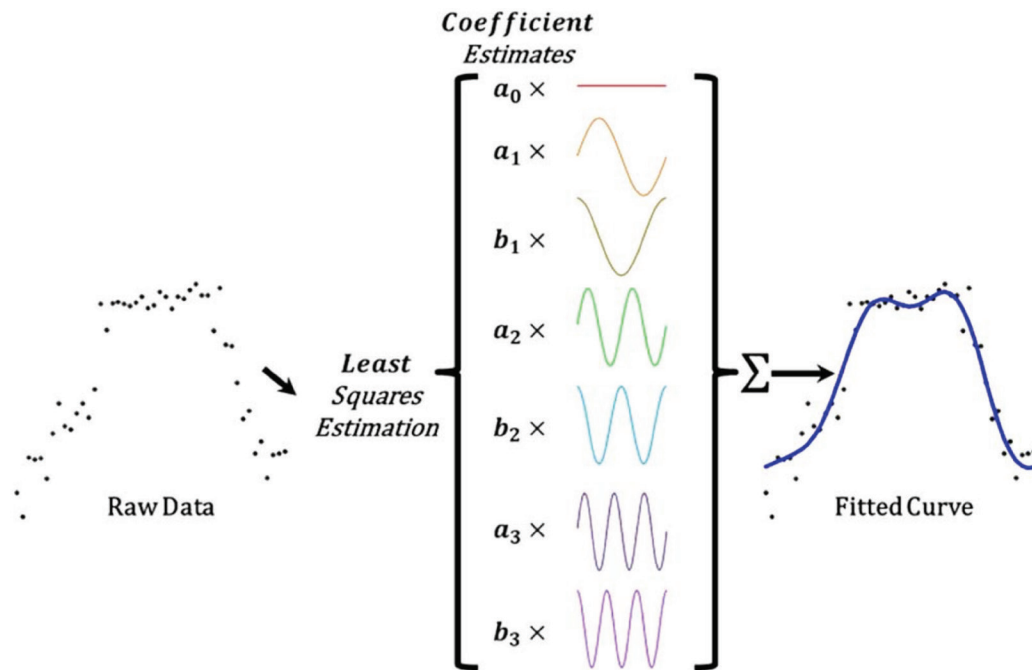


12 Mar 2015

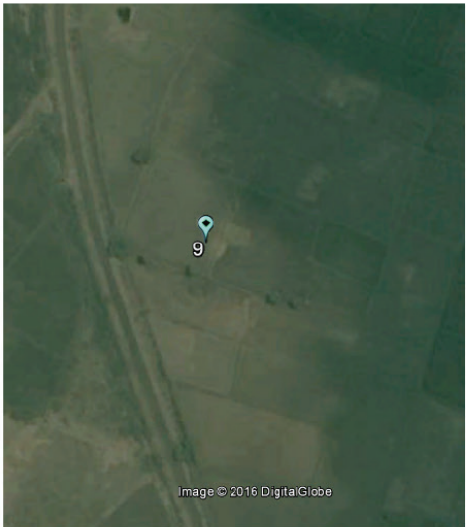
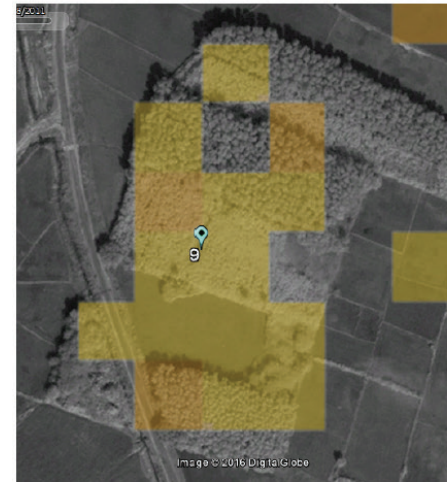
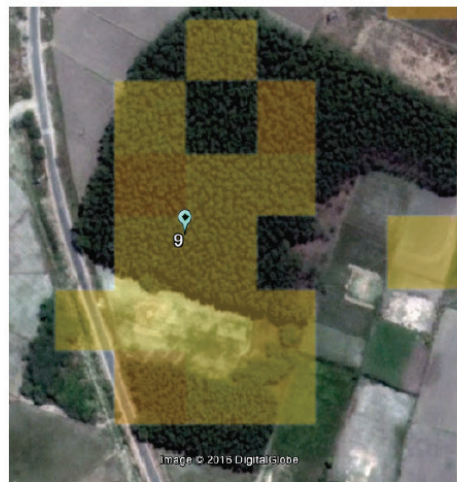
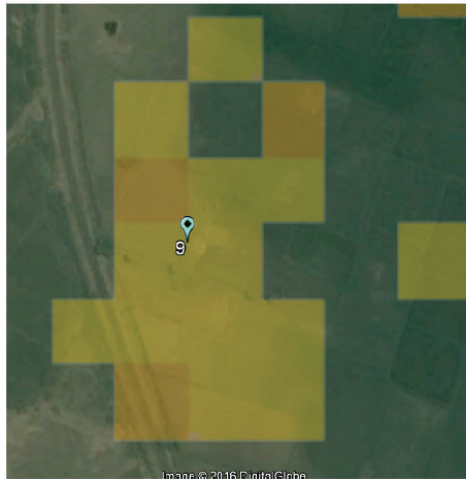


19 Feb 2016

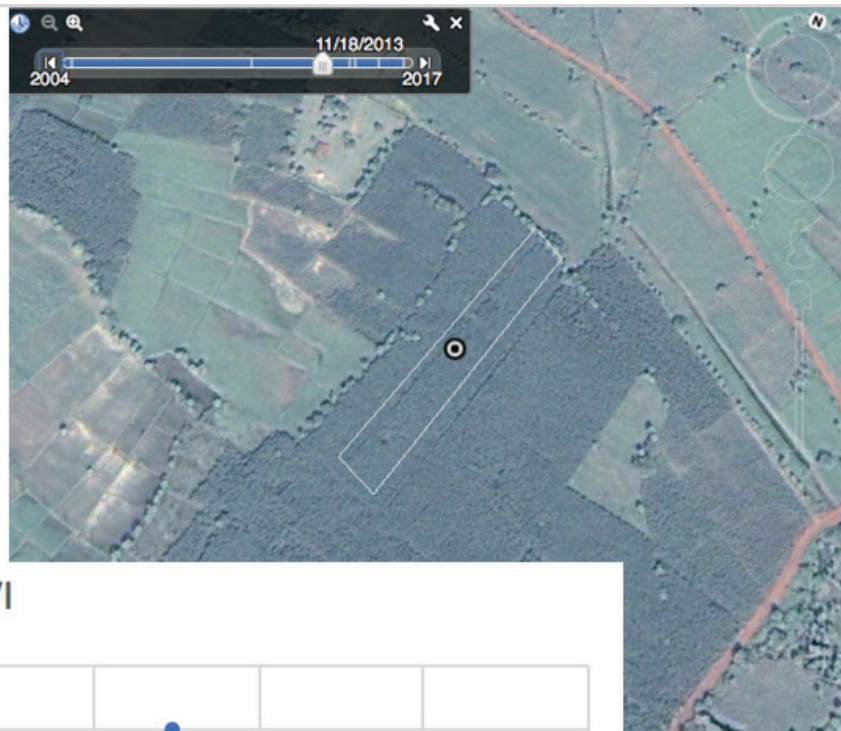
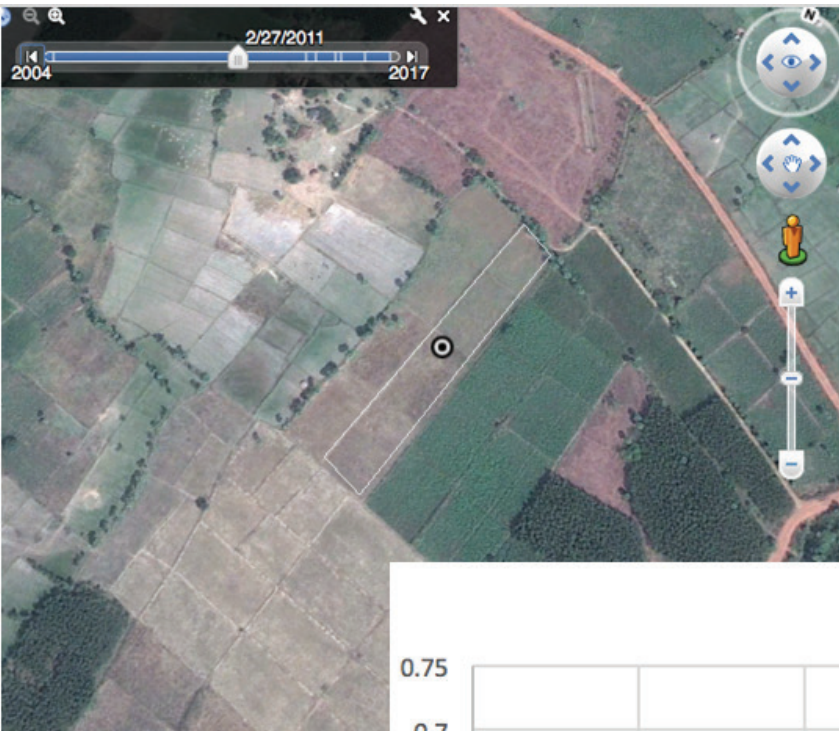




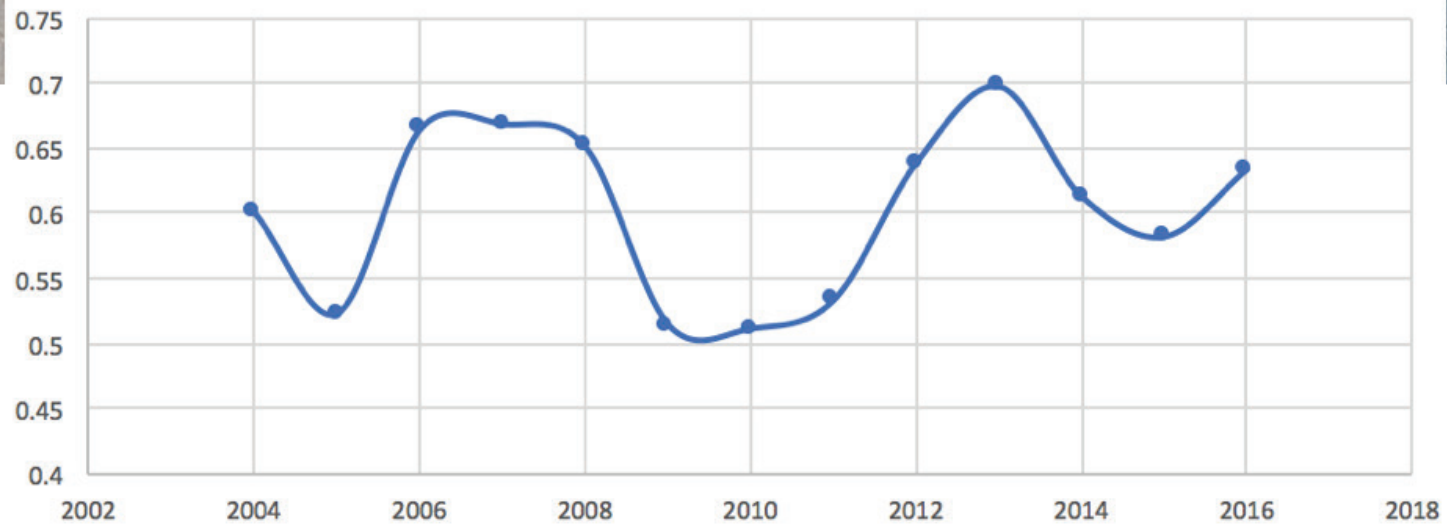




Example of harmonic coefficient-based classification of a forest plantation in Andhra Pradesh. 166 Landsat 7 and 8 images from path 143 row 49 spanning from 2000 to 2016 were used in this analysis. Results shown used SWIR2. Note that while the plantation is identified that there are remnant issues with both omission and commission errors.



Yearly NDVI



Downsides

- Food security?
- Water use (trees and mills) and water quality (mills)
- Even-aged monocultures

Upsides

- Carbon accounting slightly positive (preliminarily)
- Potential decrease in radiative forcing
- Improved local and national economies
- Uptick in other forest-based ecosystem services
- Smallholder land tenure

Conclusions

- Plantation forestry rapidly expanding in Asia
- Small spatial extent and rapid harvest-regeneration cycle present interesting — but resolvable — remote sensing challenges
- Understanding the drivers and ramifications of these new trees outside forests vital

