សិក្សាពីការរំខានព្រៃឈើក្នុងដែនជម្រកសត្វព្រៃ ព្រៃឡង់ ដោយប្រើប្រាស់រូបភាពផ្កាយរណប

MAPPING FOREST DISTURBANCE IN PREY LANG WILDLIFE SANCTUARY USING SATELLITE IMAGES

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Introduction

From 2002 to 2018, forest area of Cambodia

fell from 61.15% to 46.86%

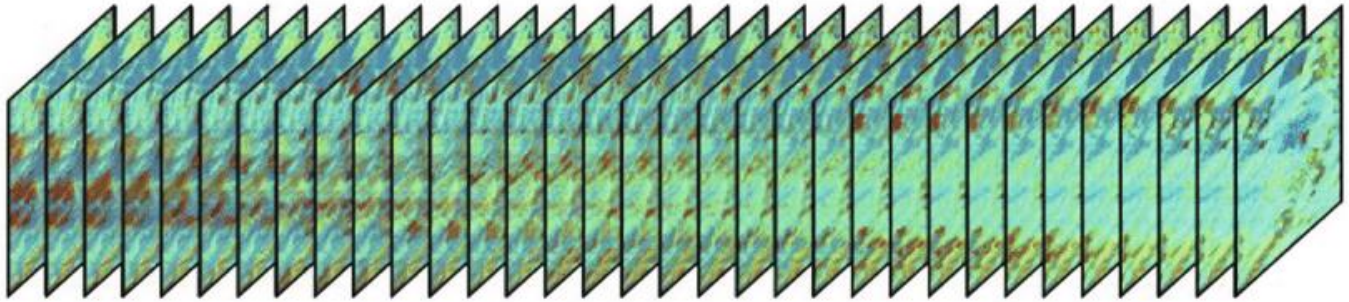
Introduction

Forest disturbances are events that disrupt the structure and functionality of a forest ecosystem, and can be caused by biotic or abiotic factors.

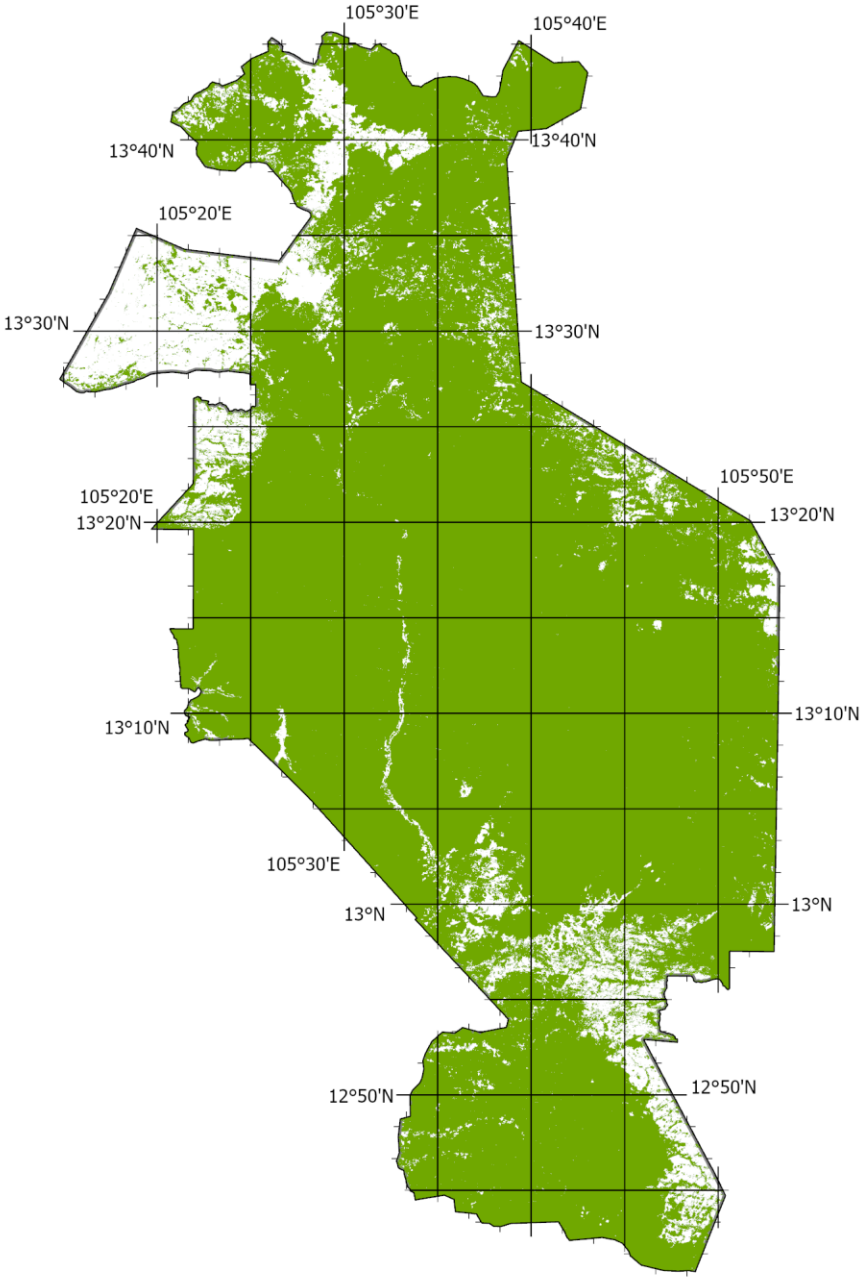
- Natural disasters: Fires, landslides, avalanches, wind, volcanic eruptions, and meteor impacts
- Animal-caused effects: Grazing and trampling
- Anthropogenic disturbances: Warfare, logging, pollution, land clearing, and invasive species

Introduction

- **Time Series Image** is a sequence of images recorded at uniform time intervals, with each image being a time frame
- **Dense Forest** is a forest with a tree canopy cover of more than 60%



Map of Dense Forest in PreyLang



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PreyLang Area =4316.83 spkm

Dense Forest Area =3736 sqkm

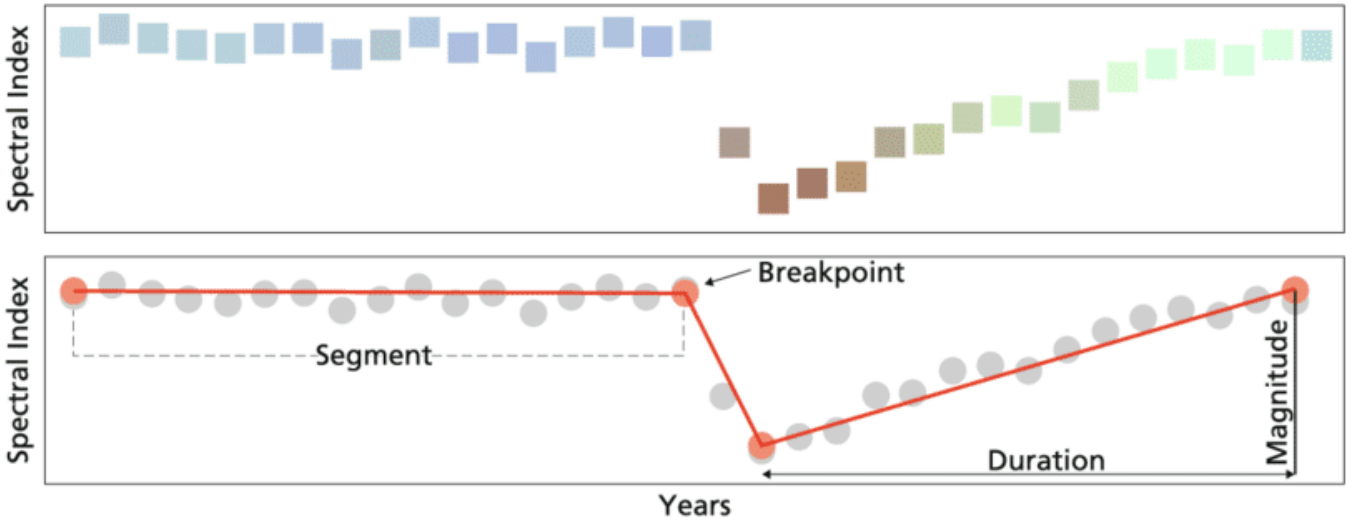
Tree Cover (Canopy>60%)
(GFW 2010)

Prey Lang Boundary

0 5 10 20 30
km

Methodology

- **Land Trendr** is a change detection algorithm which is mainly based on Landsat data.



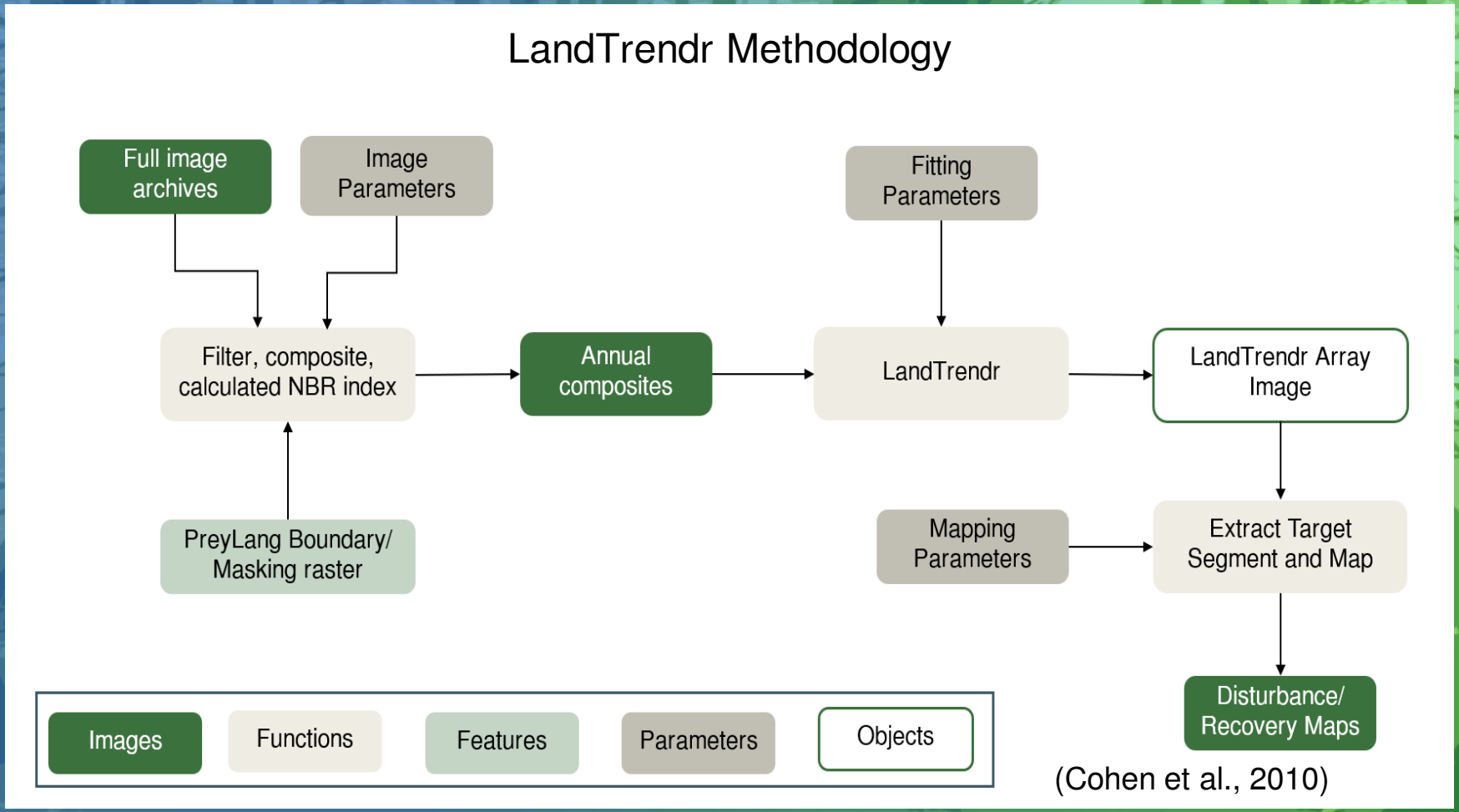
- **Change Indices** is a set of index value that used as a main indicator for Land Trendr to detect change.

Methodology

- **Normalized Burn Ratio (NBR)** is used to identify burned areas and provide a measure of burn severity. The value is ranged from -1 to 1, the higher NBR value indicates the healthier vegetation.

$$\mathrm{NBR} = \frac{NIR - SWIR}{NIR + SWIR}$$

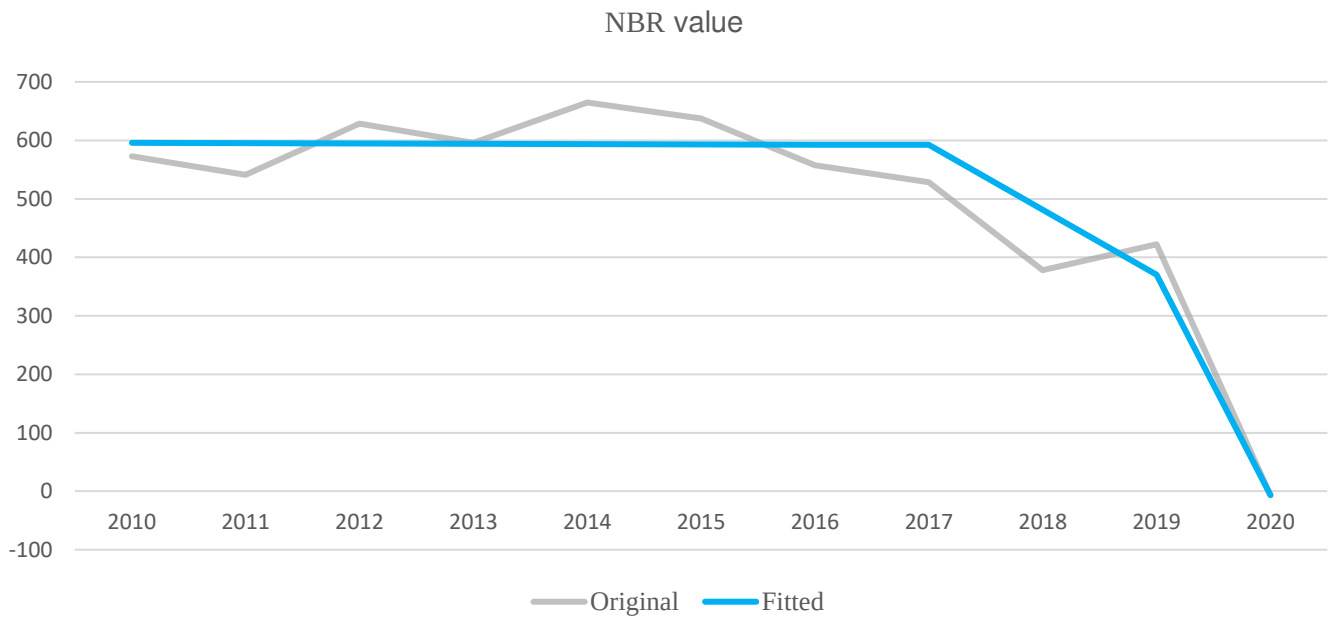
Methodology



(Cohen et al., 2010)

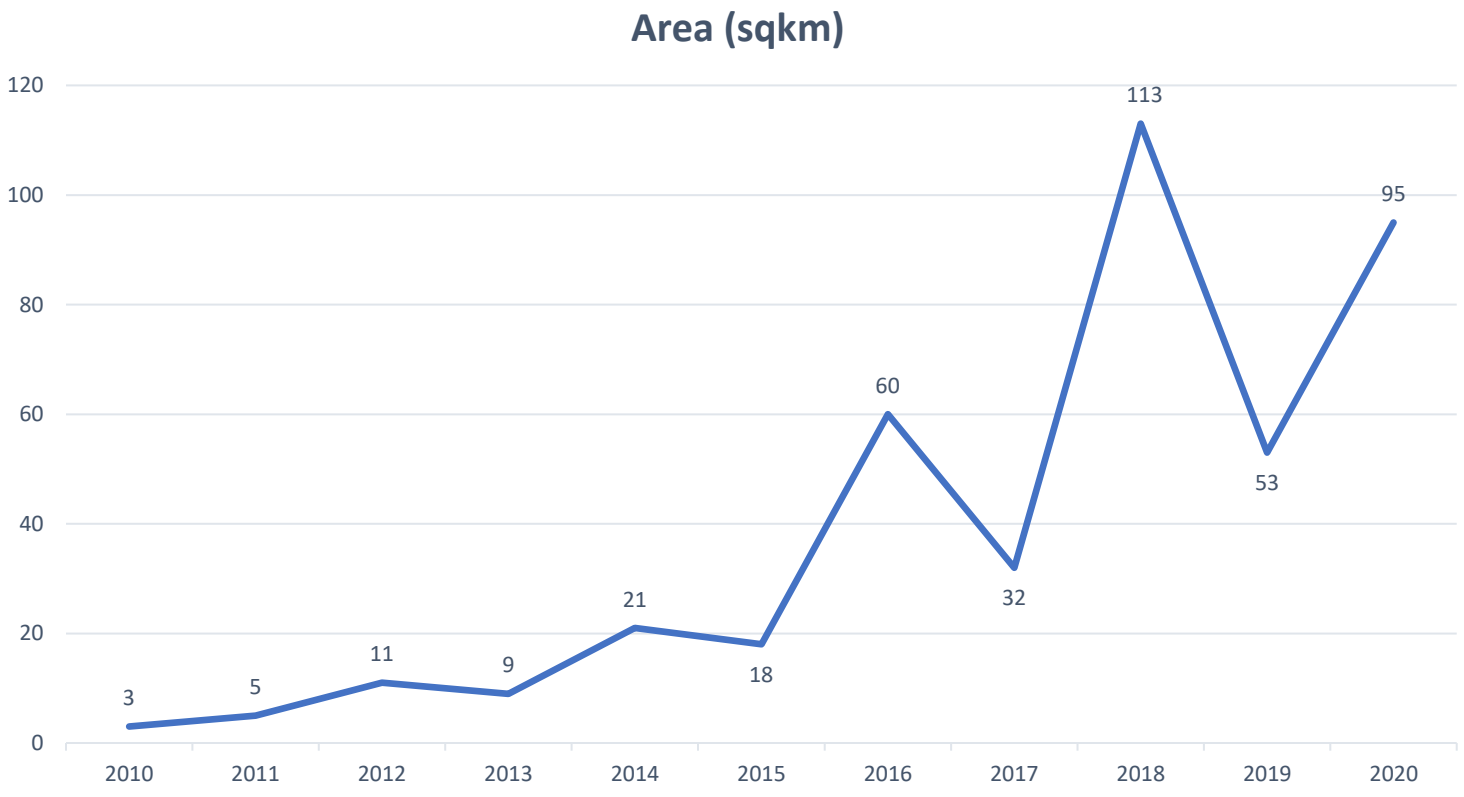
Methodology

- The images of Landsat 5 7 & 8 within 1 January to 1 April each year were chosen
- Noise (such as cloud, cloud shadow, water) was mask out by using QA product.
- Fitting Parameter used to simplify the change index value (NBR)

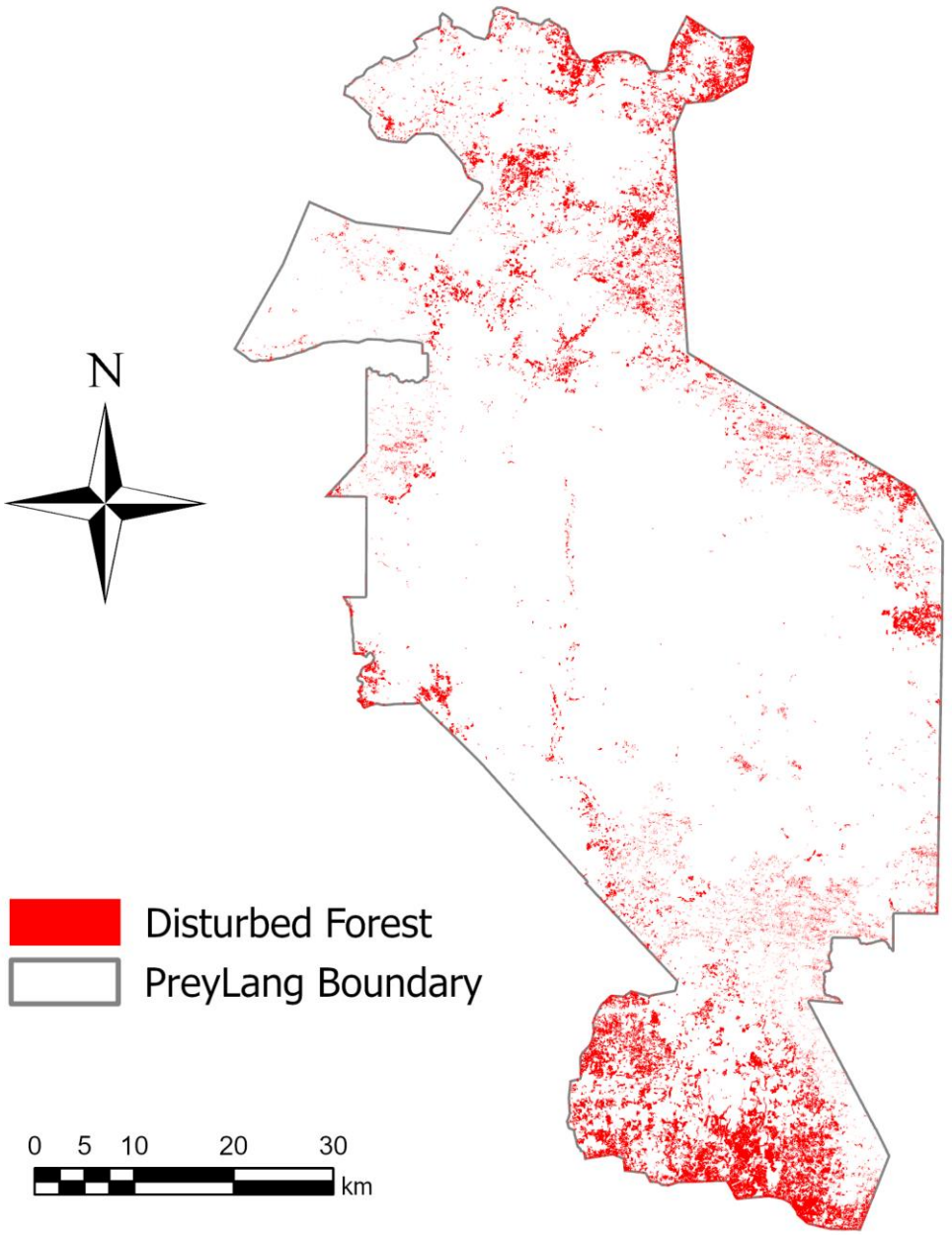


Result and Discussion

The line represent the disturbance area from 2010 to 2020 in square kilometer

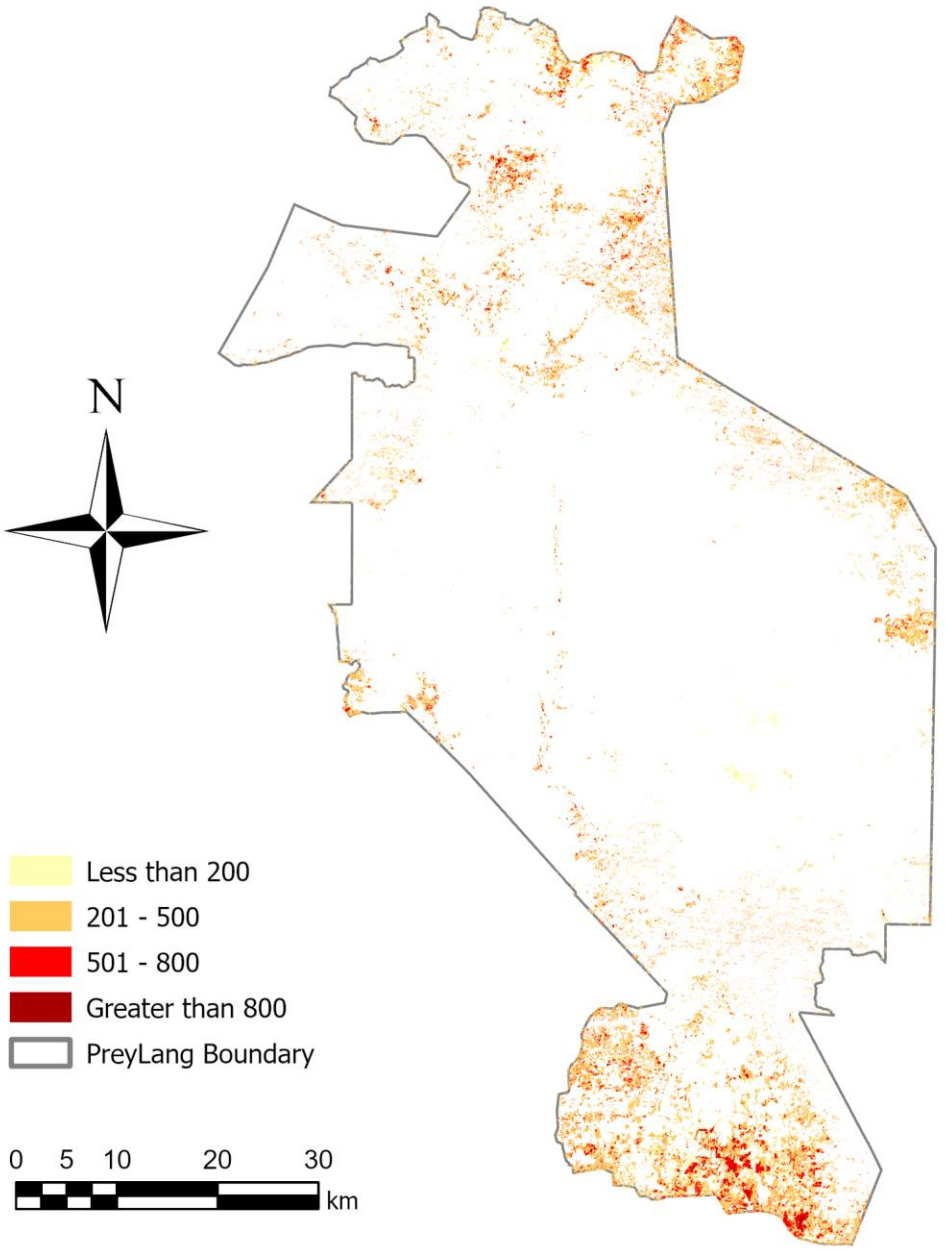


Disturbed Forest (2010-2020)



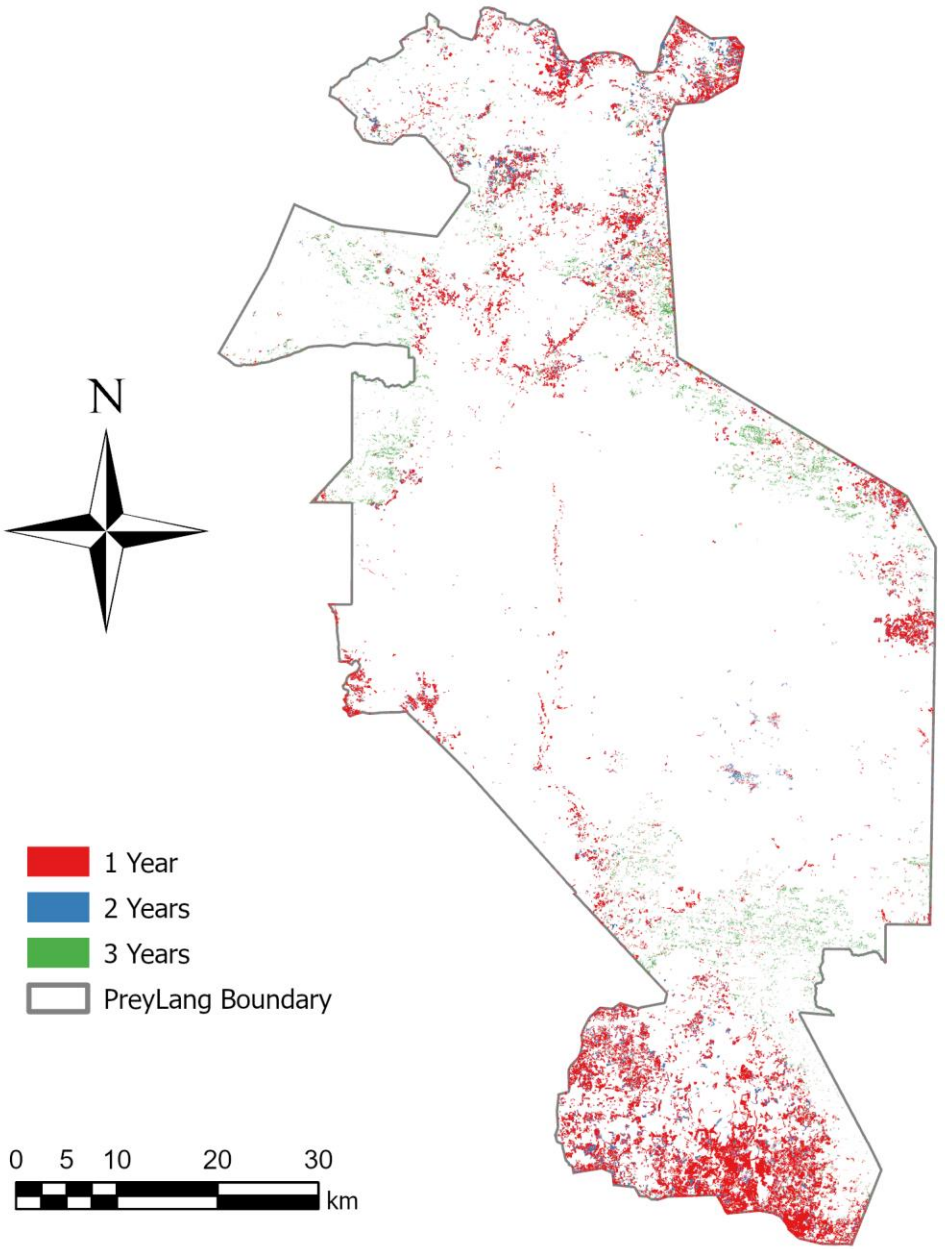
From 2010 to 2020 the disturbed area is equivalent to 420 sqkm or 11.24% of dense forest area

Disturbance Severity (Magnitude)



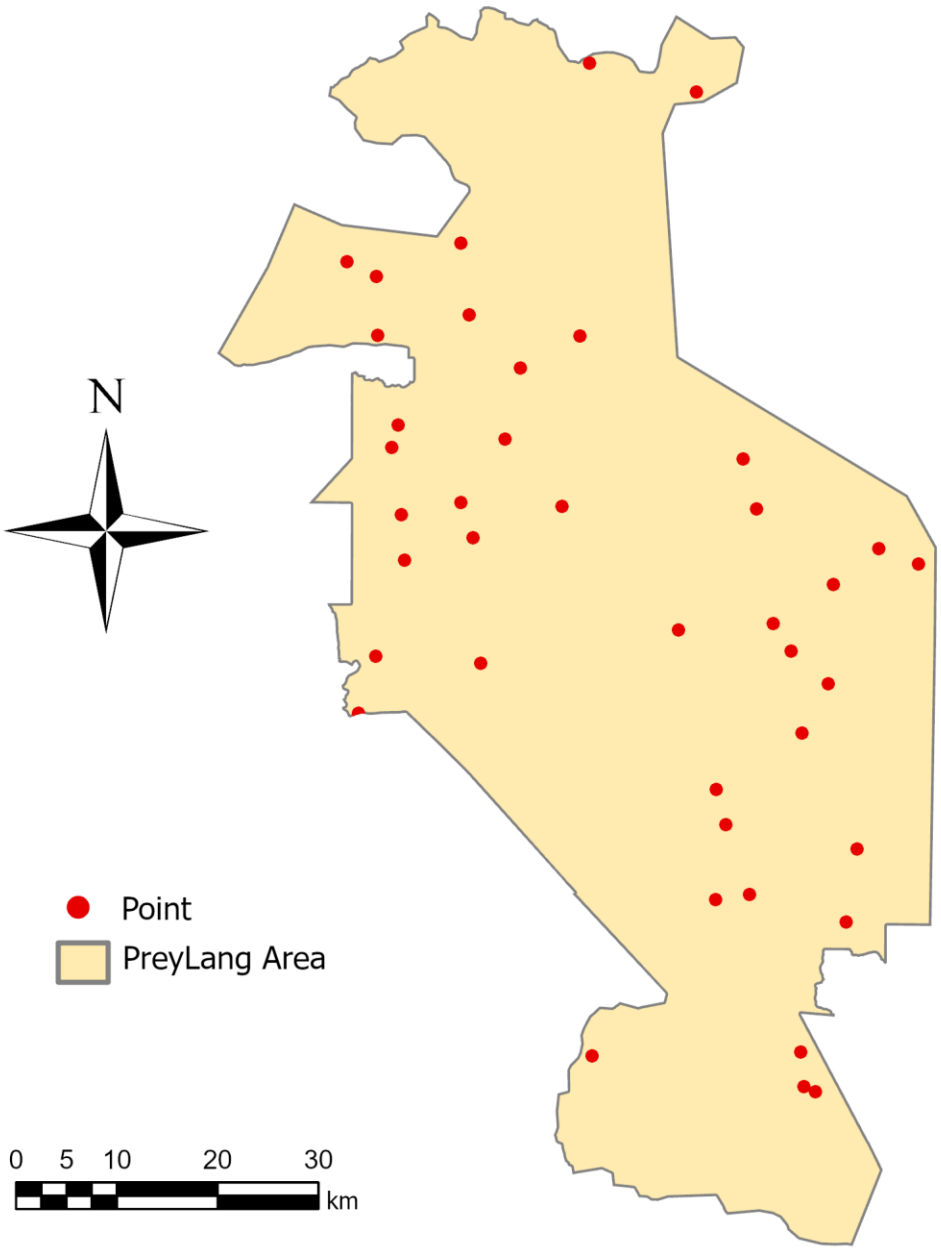
The disturbed area that met a severe disturbance (more than 500) is about 18.70% While 67% is for medium disturbance (201-500)

Disturbance Duration (Year)



72% of disturbed area happened less than 1 year

40 Ground Truth points



40 Random points, 13 are disturbed area while 27 are undisturbed area

Accuracy Assessment

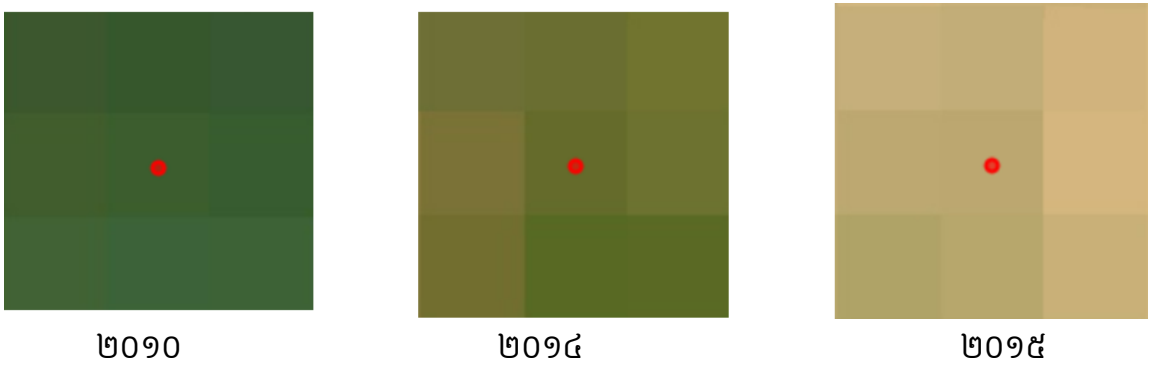
Overall accuracy = 92.5%

Kappa Coefficient = 0.83

		Reference Data			
		Disturbed	Undisturbed	Row Total	User's accuracy
LandTrendr	Disturbed	13	3	16	81.25
	Undisturbed	0	24	24	100
	Colum Total	13	27	40	
	Producer's accuracy	100	88.88		
	Overall accuracy = 95, Kappa coefficient = 0.8387				

Result and Discussion

Landsat Image (3pixels X 3pixels)



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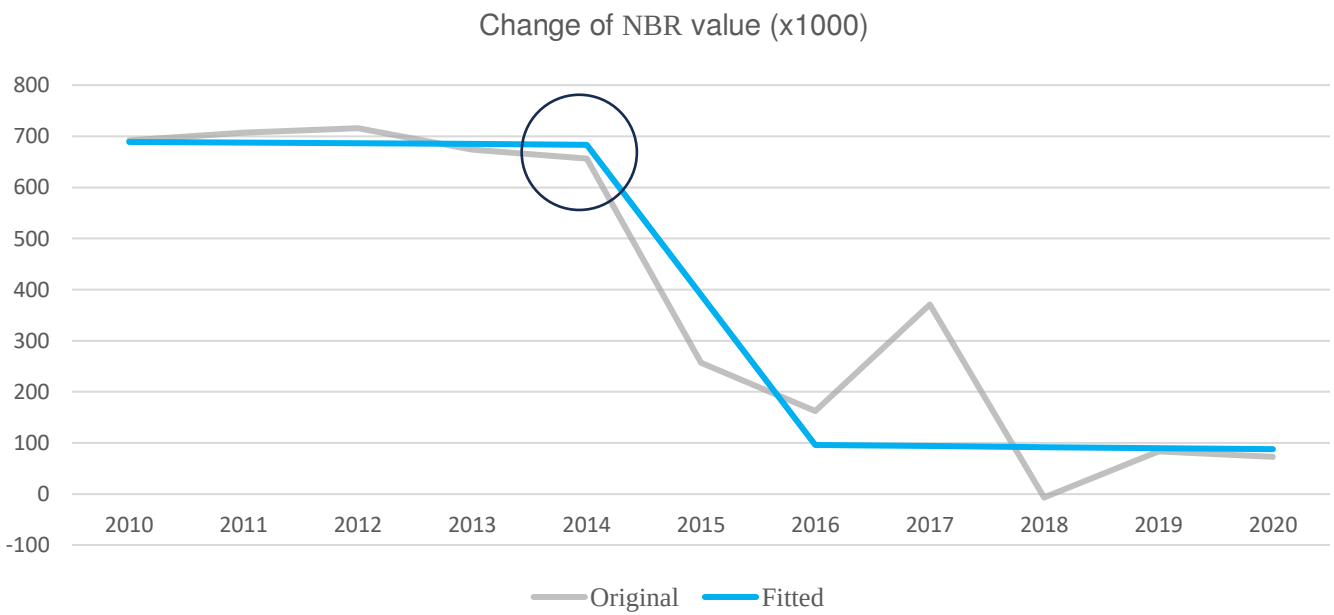

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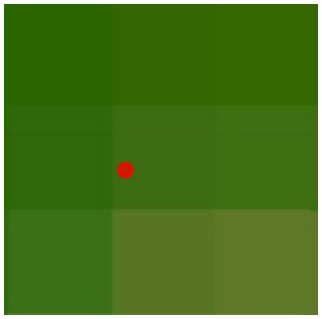

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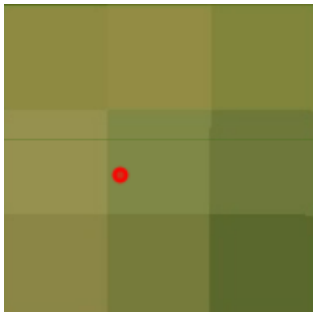

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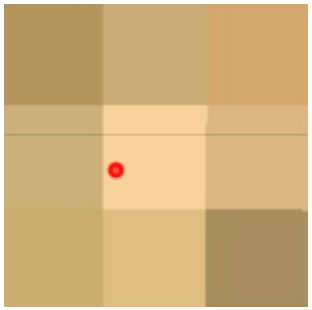

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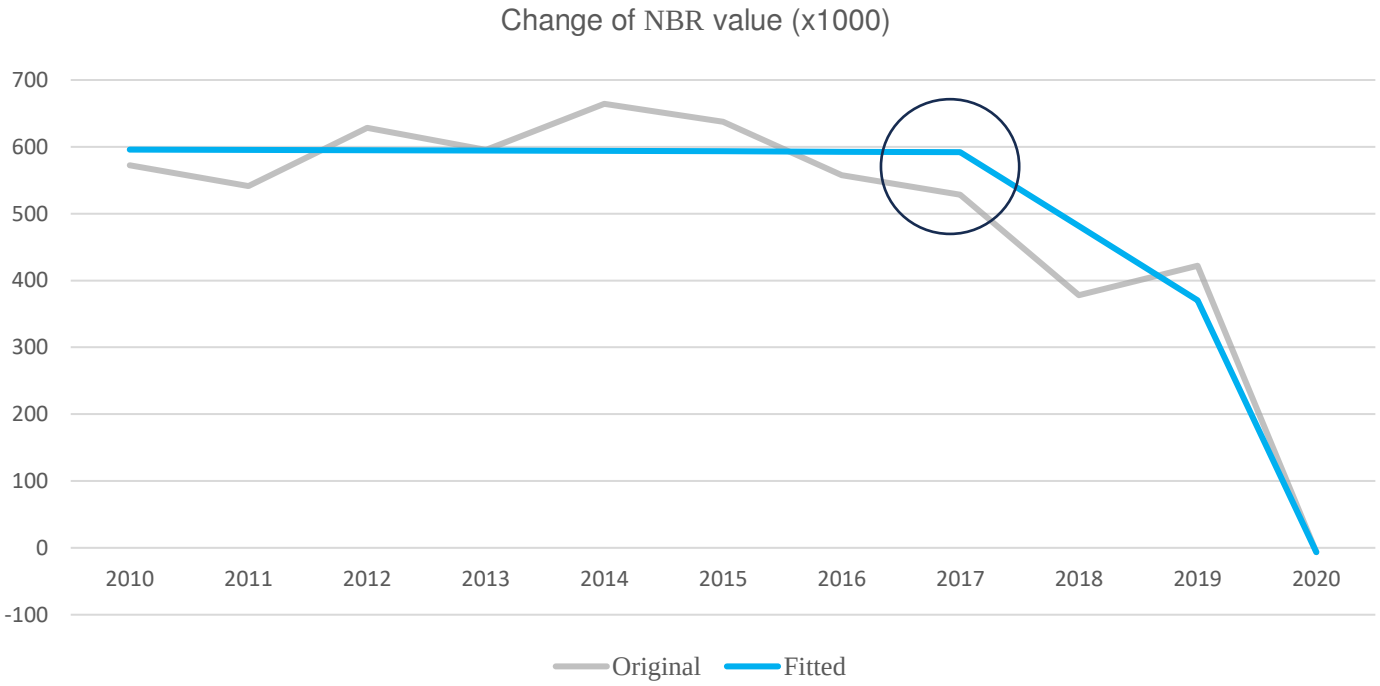
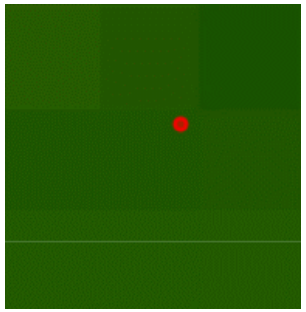


Result and Discussion

Landsat Image (3pixels X 3pixels)



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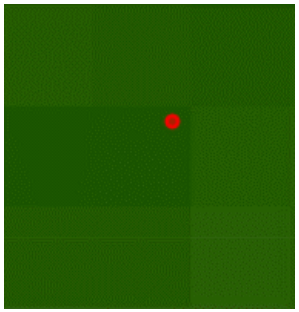

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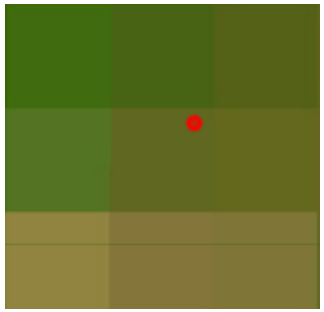

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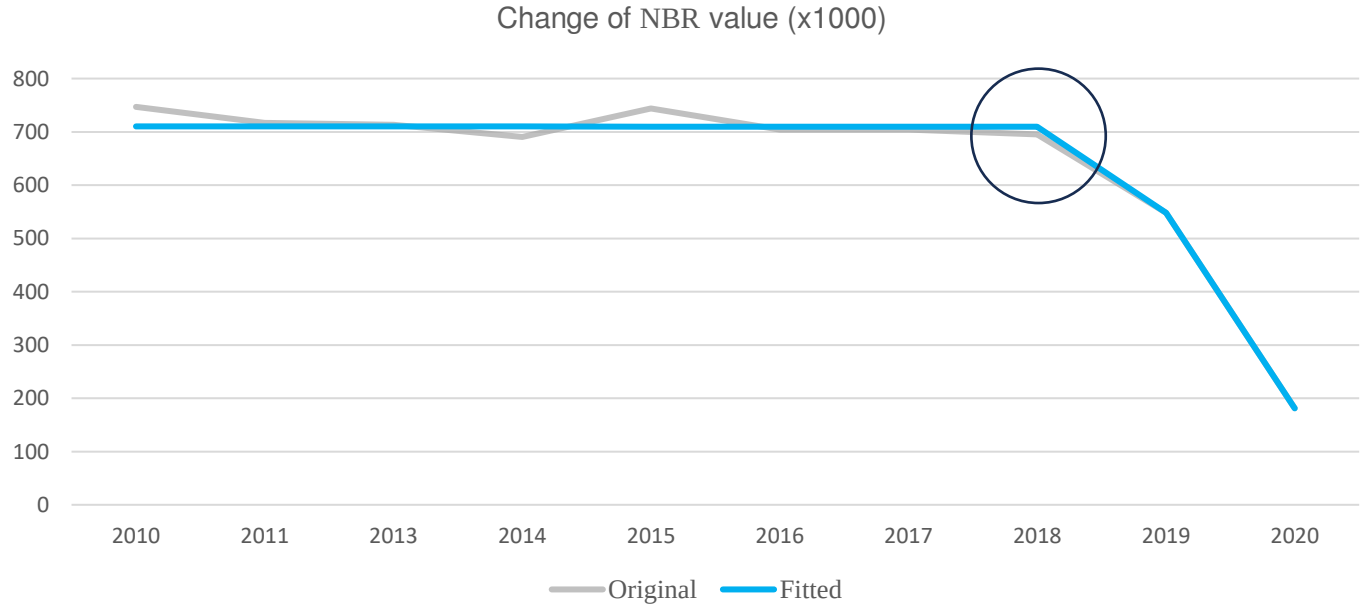
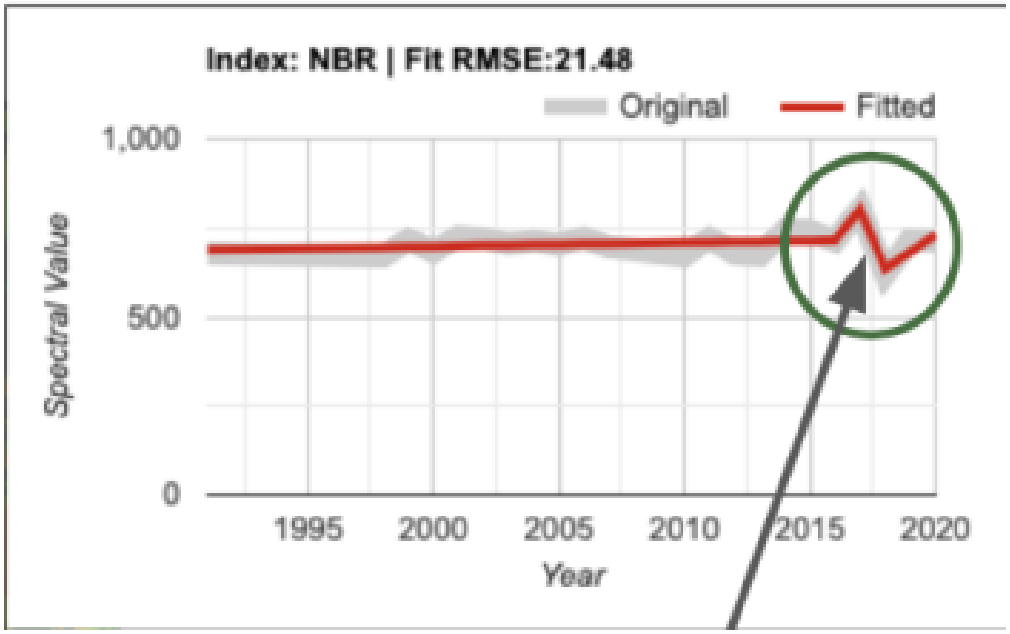


Conclusion

Factors result in bad accuracy of LandTrendr Algorithm

- Selective logging is not captured
- Fast recovery of the tropical forest
- Noises such as cloud, cloud shadow



Conclusion

Why LandTrendr

- Good for studying in large scale
- 1 year frequency
- Forest Monitoring

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Thank You