

Tree Health Outputs for Indian Agro-Climatic Zones

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[Scalable Monitoring of Tree Canopy Density and Height in India at High Spatial Resolutions](#). *The 13th International Conference on Information & Communication Technologies and Development (ICTD 2024)*.

Large and Small Tree Patches Transition Categories

Large Tree Patch (LTP)



Small Tree Patch (STP)



Tree Category (Year-1)	Tree Category (Year-2)	Tree Patch Change from Year-1 to Year-2
LTP	LTP	LTP Intact
LTP	STP	Fragmentation
STP	LTP	Defragmentation
STP	STP	STP Intact

Canopy Cover Density (CCD) & Canopy Height (CH) Distribution Based Tree Health Change Categories

Overall Tree Health Change Category	Description
Deforested	When trees are cut, and a site goes from having tree cover to no more tree cover
Afforested	When trees are planted, and a site goes from having no tree cover to trees
Improved	When there are trees between 2 years, and their CCD/CH improves over time
Degraded	When there are trees between 2 years, and their CCD/CH deteriorates over time
Partially Degraded	When there are trees between 2 years, and CCD improves but CH deteriorates over time, or vice versa

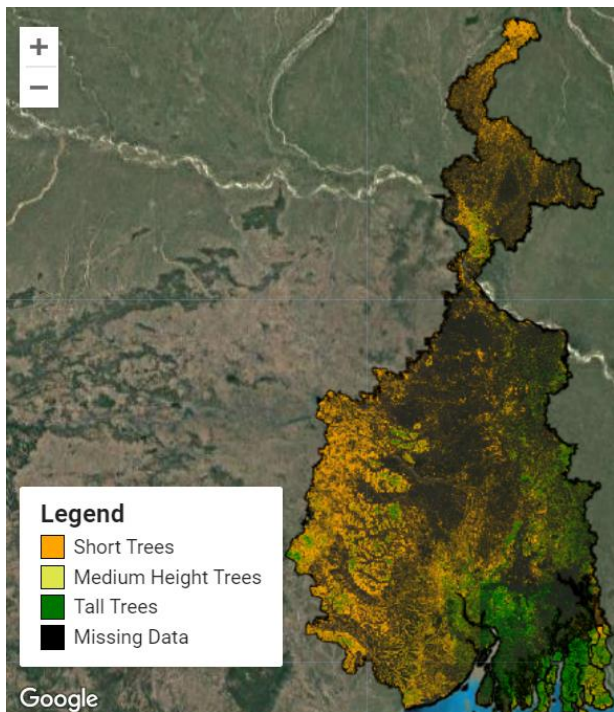
Note: Due to cloud cover or satellite errors, there is a varying amount of missing data in different ACZs. Shown in the following slides is the total missing data in hectares, across the years of 2016 to 2021.

Lower Gangetic Plain Region

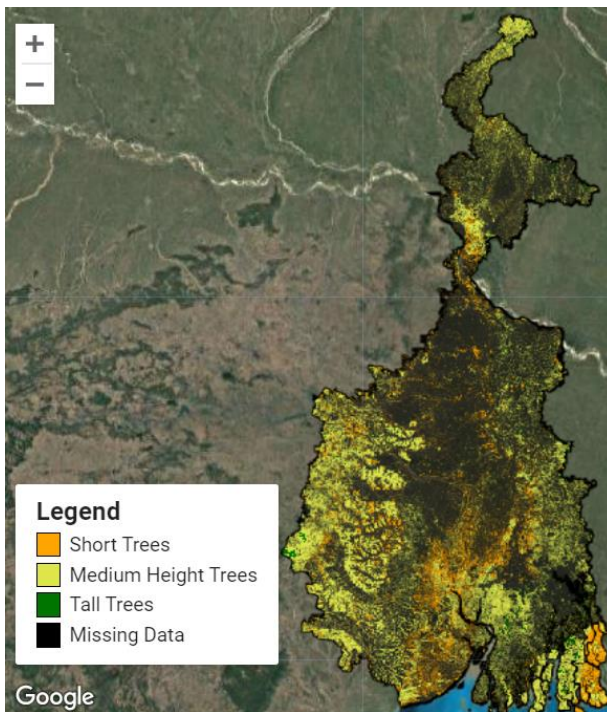
Thresholds for Classification (Low vs High)

Canopy Cover Density	48%
Median Canopy Height	9 m
75 th Percentile Canopy Height	12 m
Maximum Canopy Height	17 m

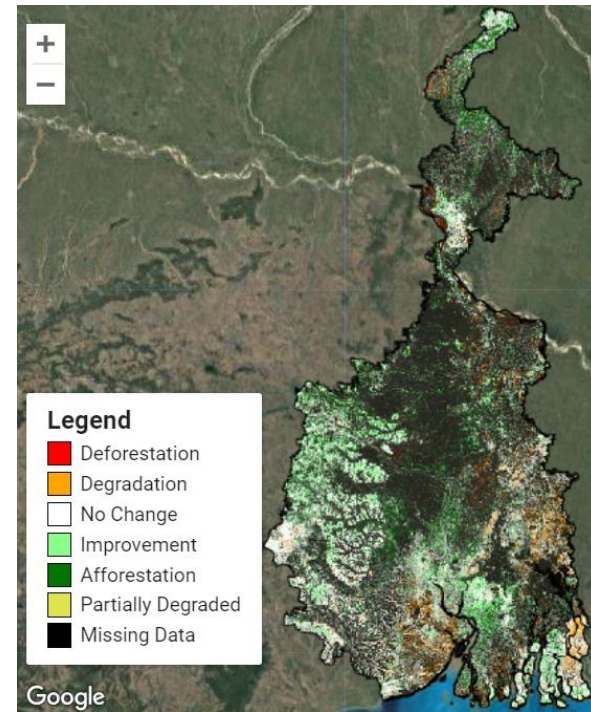
Canopy Cover Density (AY 2021)



Canopy Height (AY 2021)

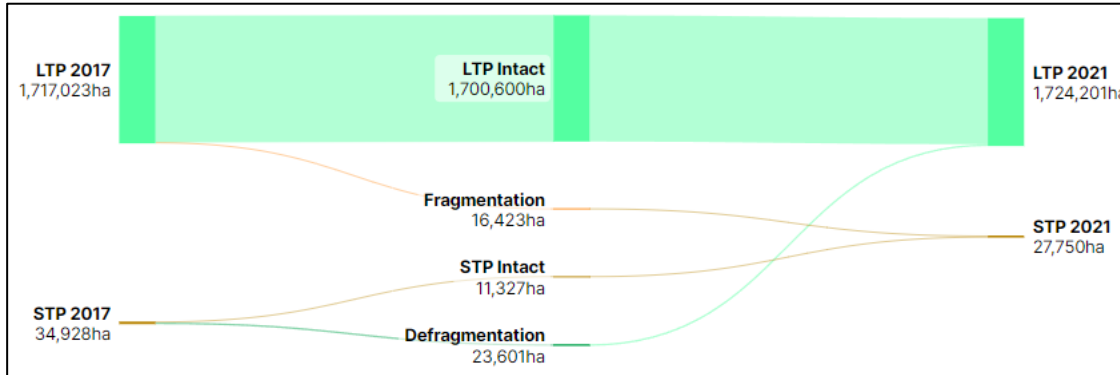


Tree Health Change (AY 2017-2021)



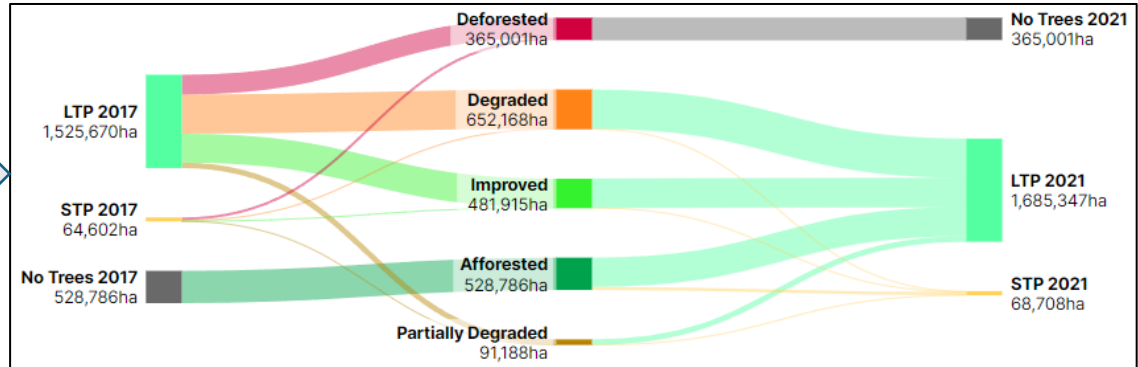
Lower Gangetic Plain Region

Tree Health Change (AY 2017 – 2021)



This graph characterizes the tree cover changes happening between large and small tree patches across the years. It shows both changed and unchanged areas

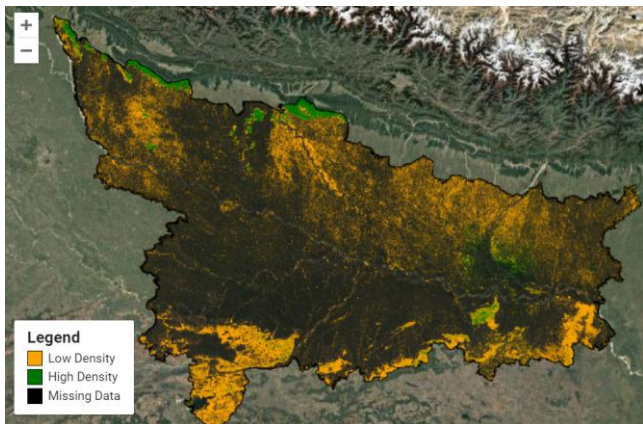
This graph characterizes tree canopy density and height based tree health changes between large and small tree patches, but doesn't show unchanged areas



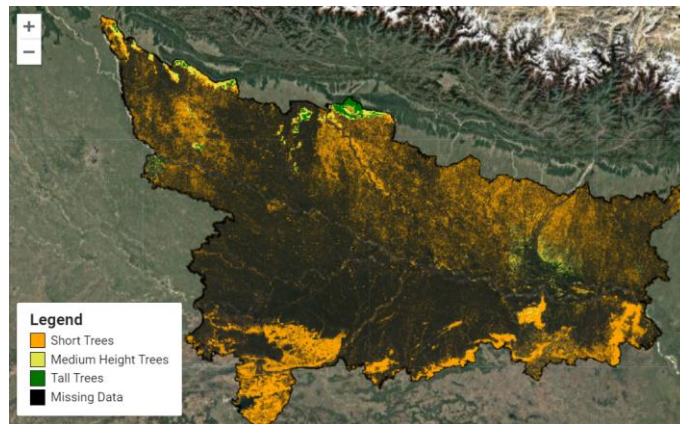
Middle Gangetic Plain Region

Thresholds for Classification (Low vs High)

Canopy Cover Density	50%
Median Canopy Height	12 m
75 th Percentile Canopy Height	17 m
Maximum Canopy Height	24 m

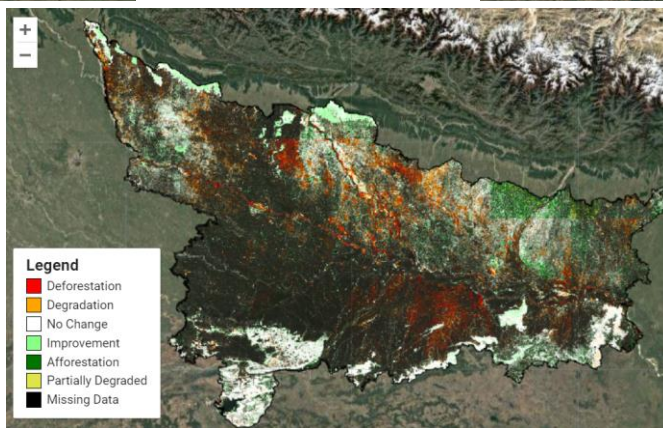


**Canopy Cover Density
(AY 2021)**



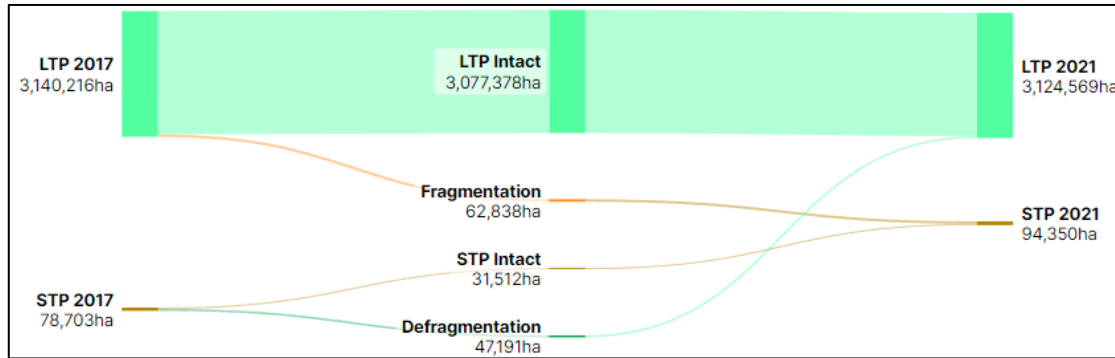
**Canopy Height
(AY 2021)**

**Tree Health Change
(AY 2017-2021)**



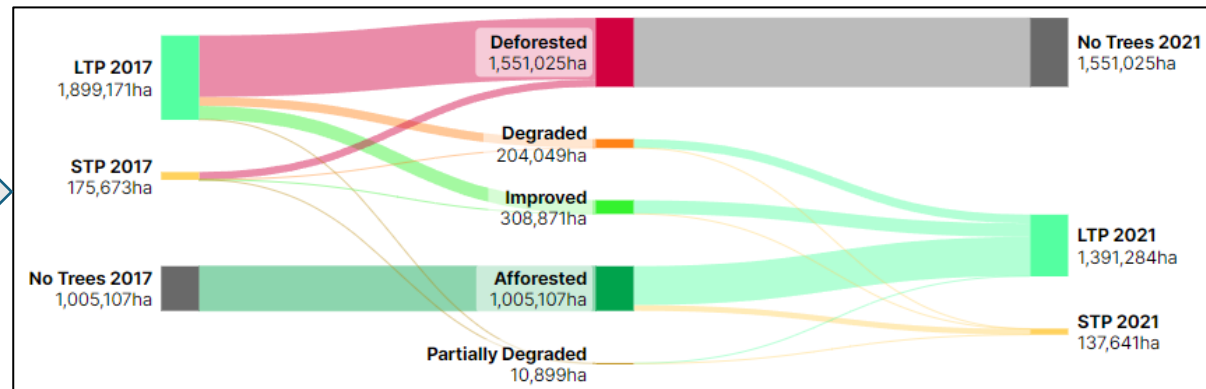
Middle Gangetic Plain Region

Tree Health Change (AY 2017 – 2021)



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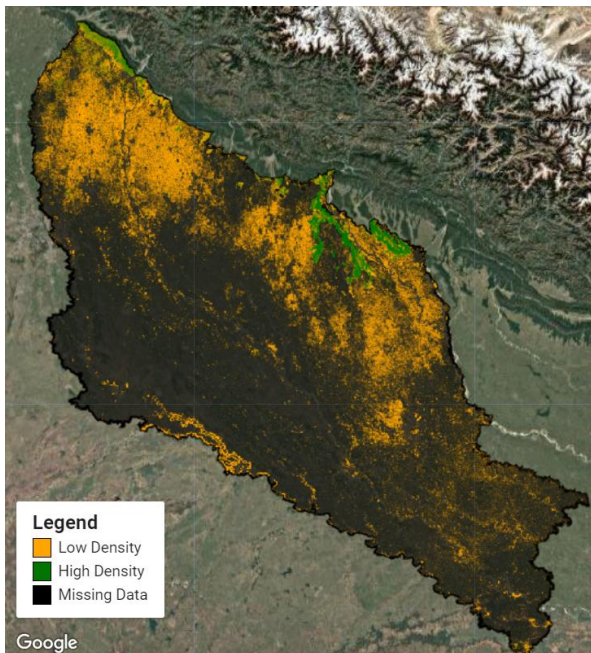


Upper Gangetic Plain Region

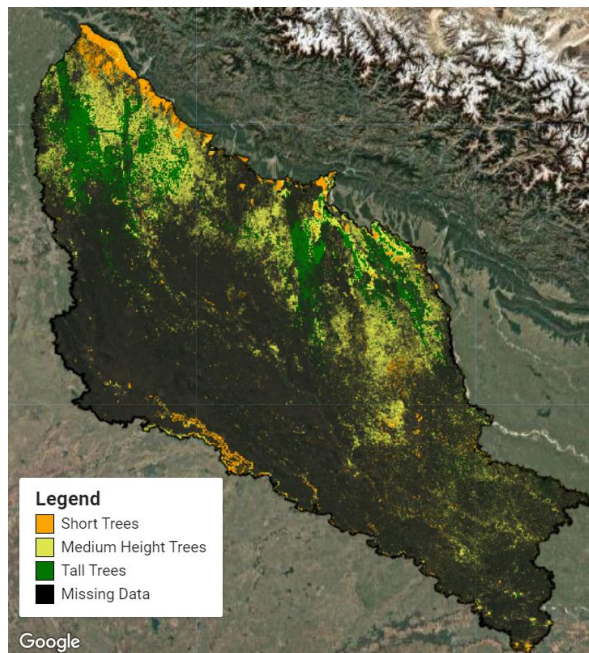
Thresholds for Classification (Low vs High)

Canopy Cover Density	67%
Median Canopy Height	17 m
75 th Percentile Canopy Height	22 m
Maximum Canopy Height	29 m

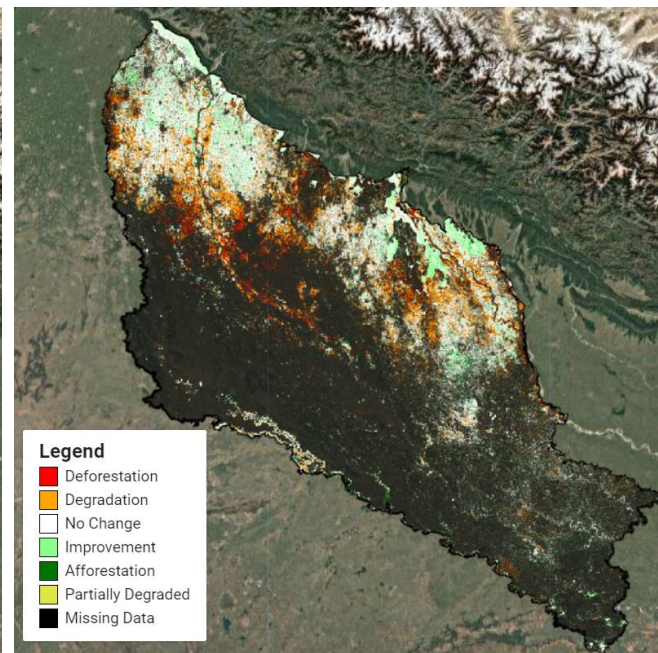
Canopy Cover Density (AY 2021)



Canopy Height (AY 2021)

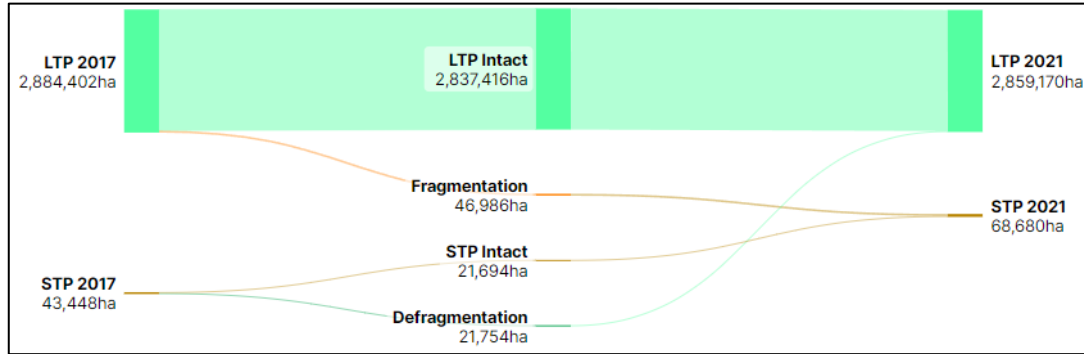


Tree Health Change (AY 2017-2021)



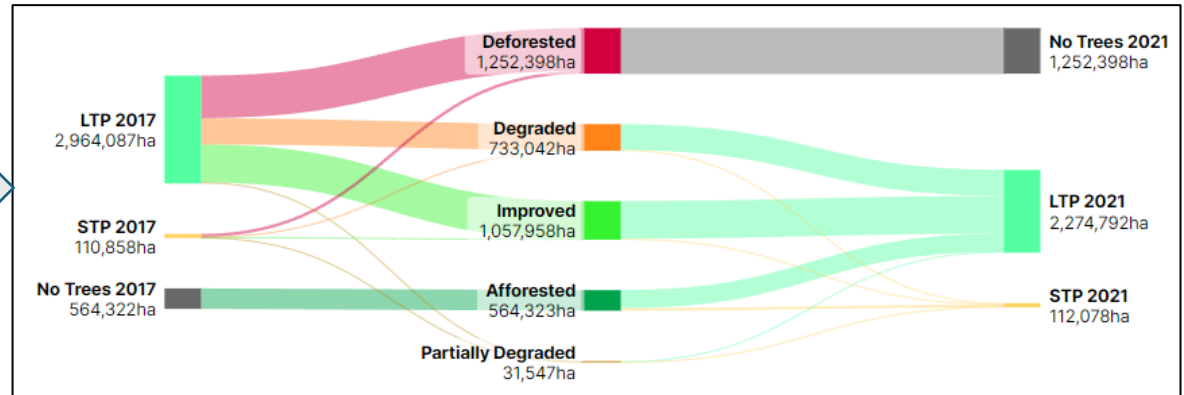
Upper Gangetic Plain Region

Tree Health Change (AY 2017 – 2021)



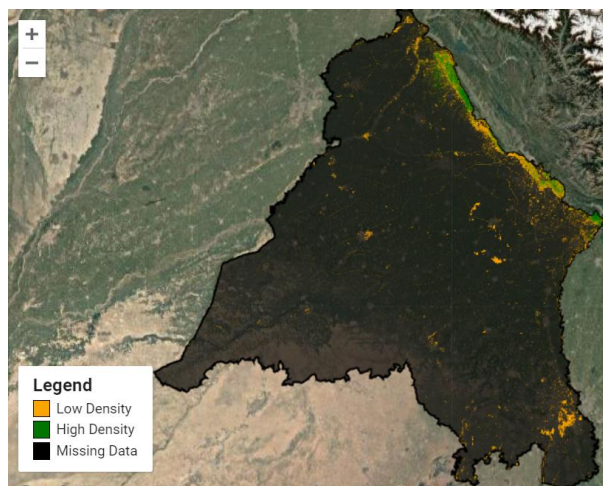
This graph characterizes the tree cover changes happening between large and small tree patches across the years. It shows both changed and unchanged areas

This graph characterizes tree canopy density and height based tree health changes between large and small tree patches, but doesn't show unchanged areas

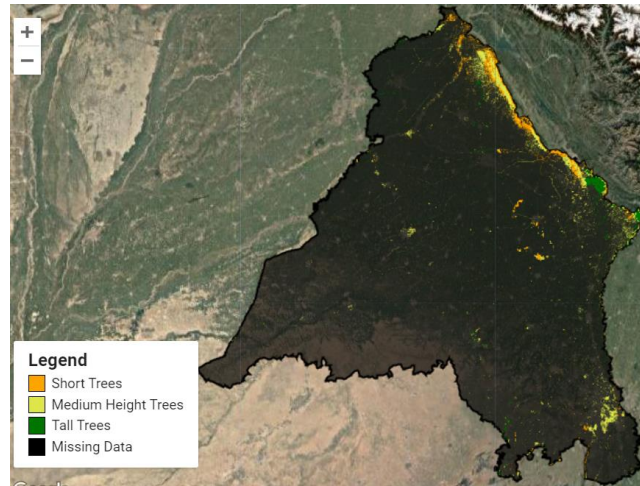


Trans Gangetic Plain Region

Canopy Cover Density
(AY 2021)

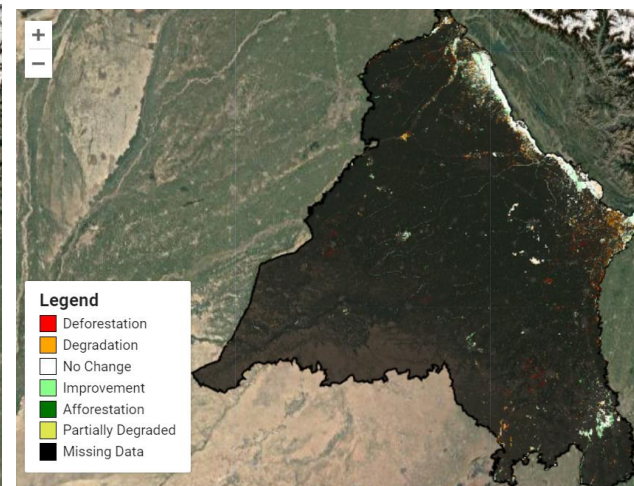


Canopy Height
(AY 2021)



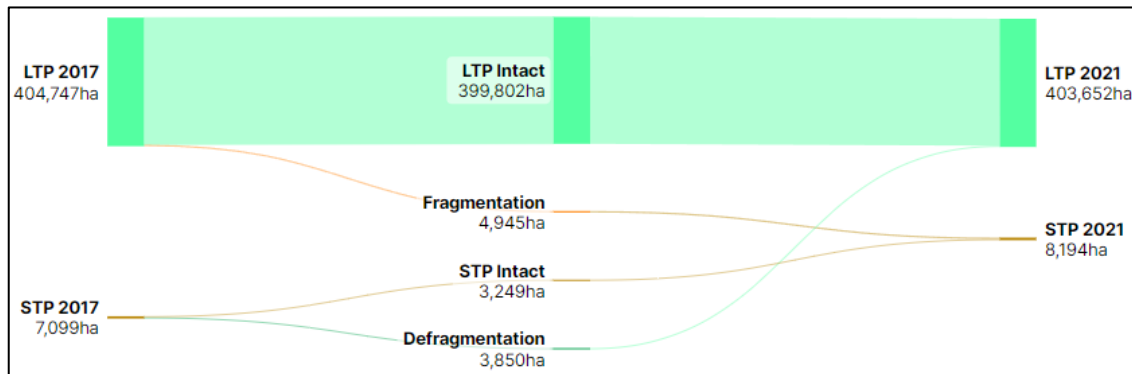
Thresholds for Classification (Low vs High)	
Canopy Cover Density	55%
Median Canopy Height	11 m
75 th Percentile Canopy Height	15 m
Maximum Canopy Height	21 m

Tree Health Change
(AY 2017-2021)



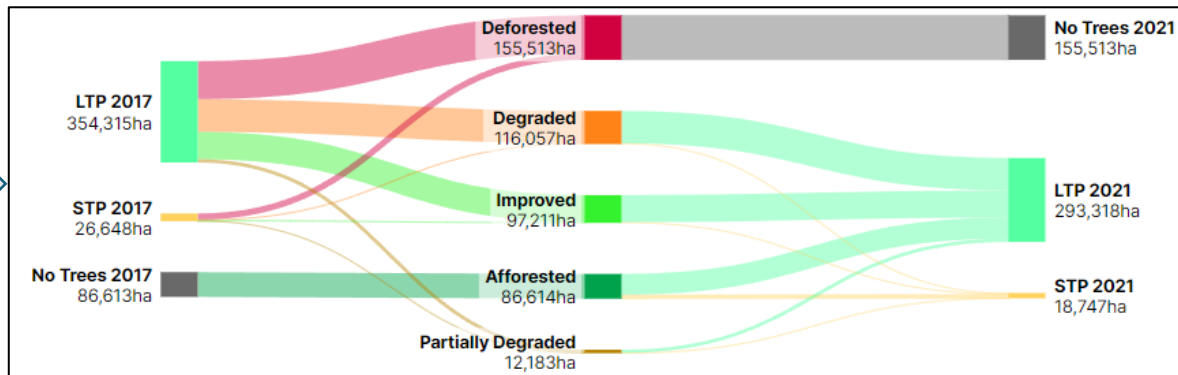
Trans Gangetic Plain Region

Tree Health Change (AY 2017 – 2021)



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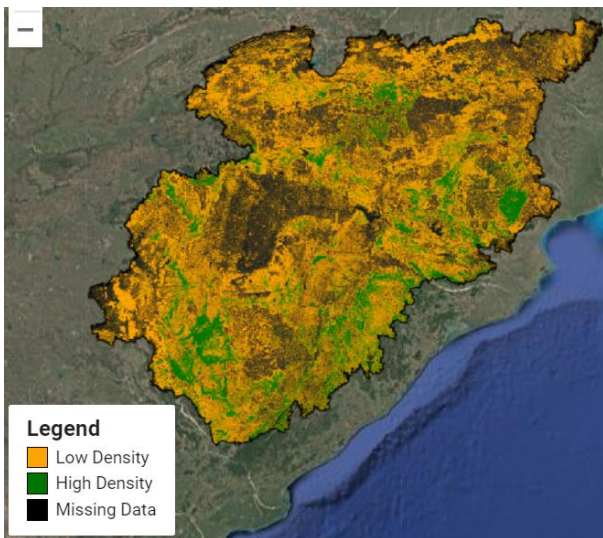


Eastern Plateau and Hills Region

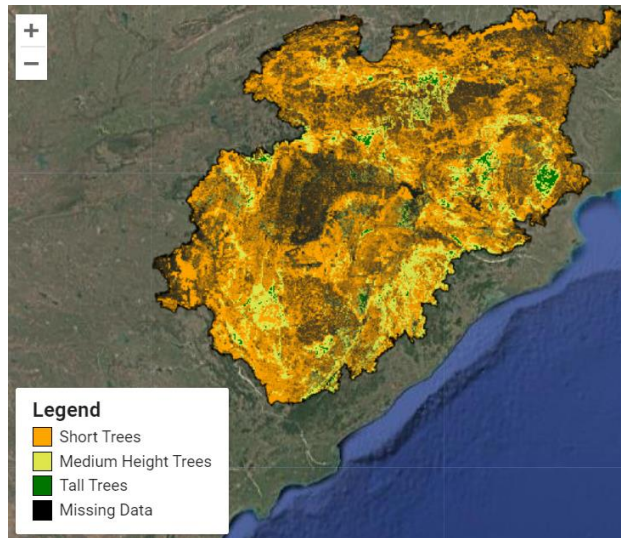
Thresholds for Classification (Low vs High)

Canopy Cover Density	60%
Median Canopy Height	12 m
75 th Percentile Canopy Height	17 m
Maximum Canopy Height	24 m

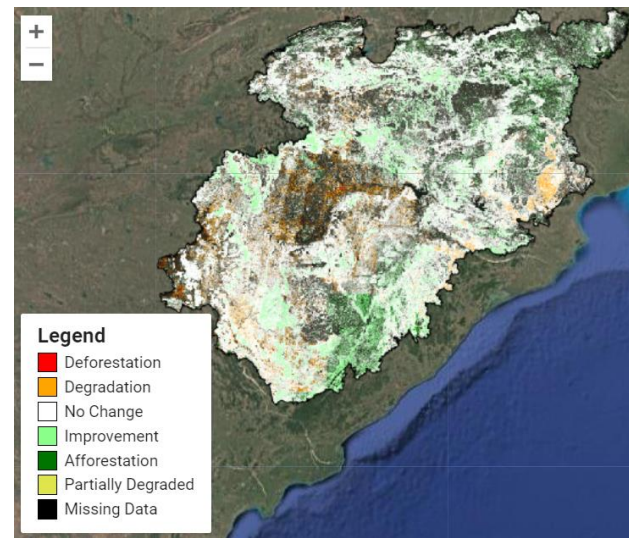
Canopy Cover Density (AY 2021)



Canopy Height (AY 2021)

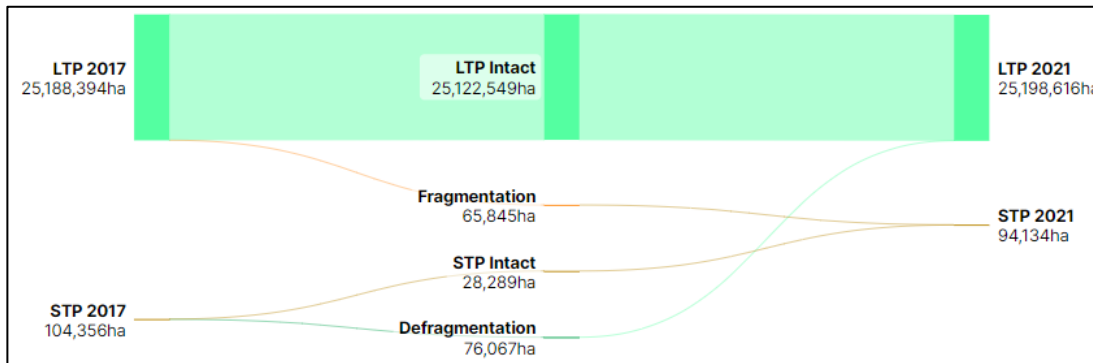


Tree Health Change (AY 2017-2021)



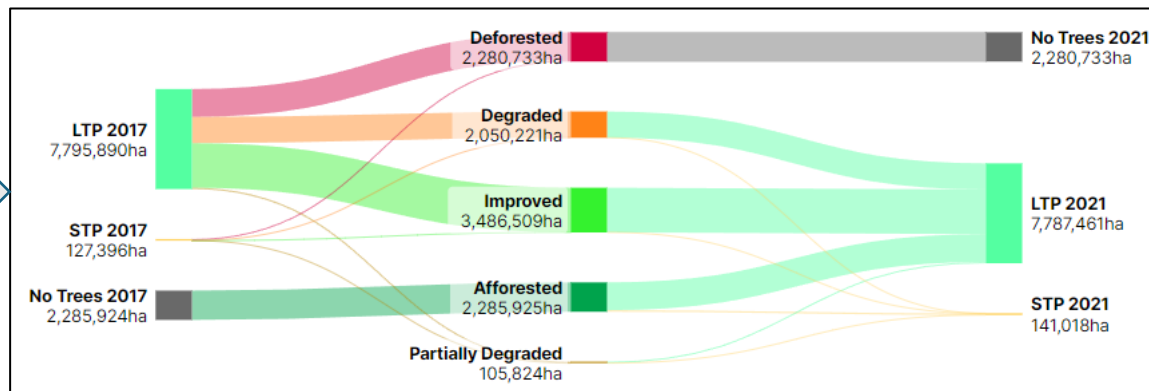
Eastern Plateau and Hills Region

Tree Health Change (AY 2017 – 2021)



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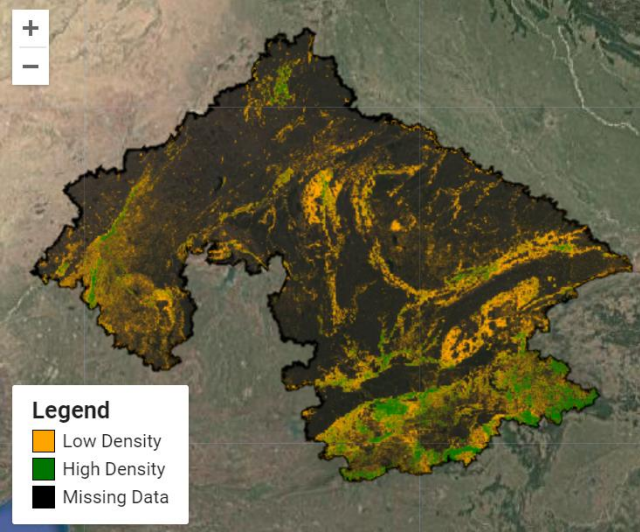
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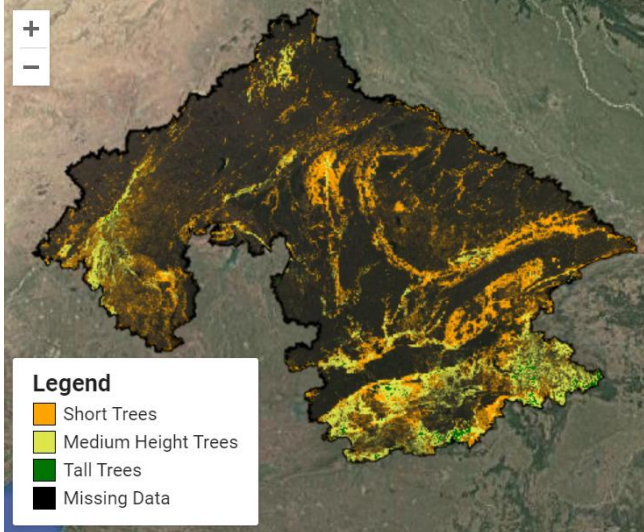
Central Plateau and Hills Region

Thresholds for Classification (Low vs High)	
Canopy Cover Density	51%
Median Canopy Height	11 m
75 th Percentile Canopy Height	16 m
Maximum Canopy Height	23 m

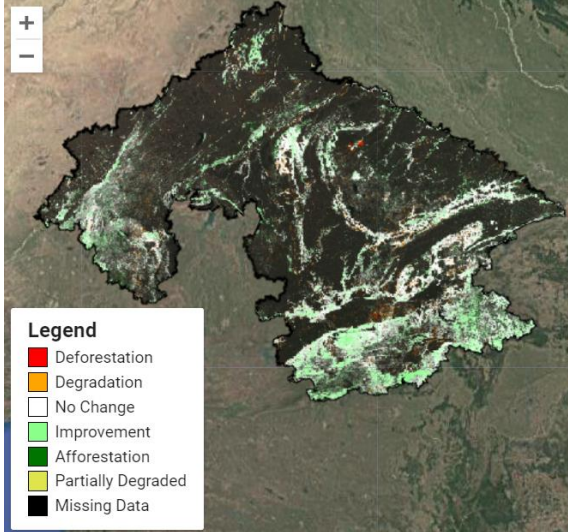
**Canopy Cover Density
(AY 2021)**



**Canopy Height
(AY 2021)**

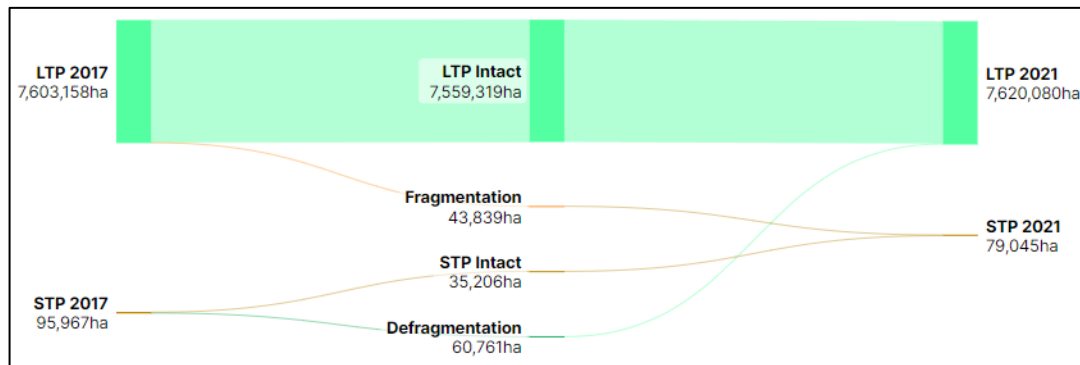


**Tree Health Change
(AY 2017-2021)**



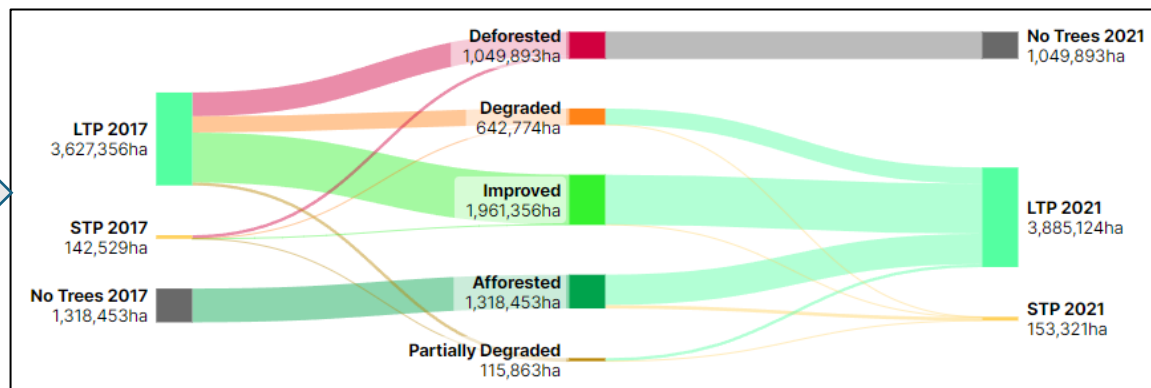
Central Plateau and Hills Region

Tree Health Change (AY 2017 – 2021)



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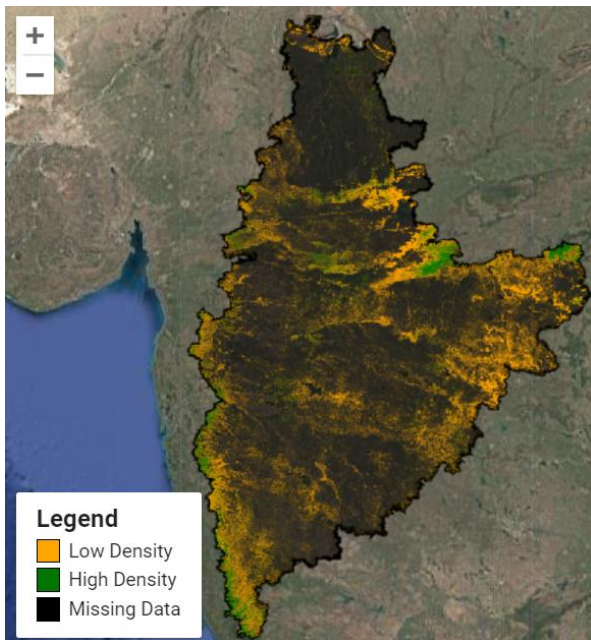


Western Plateau and Hills Region

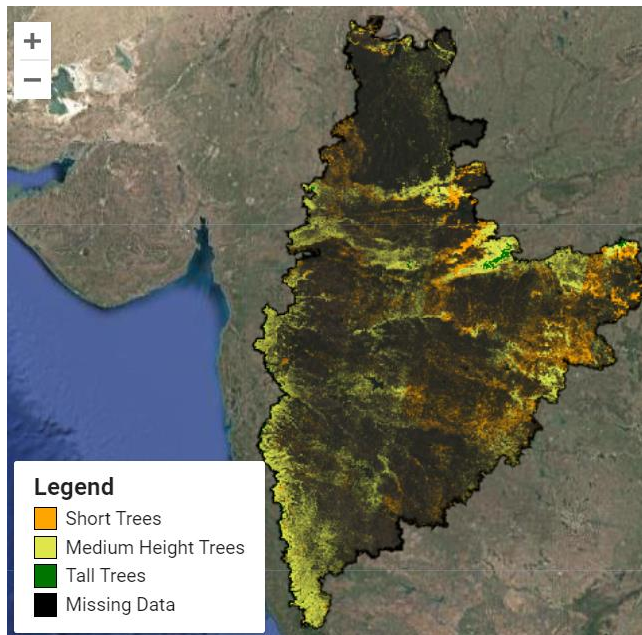
Thresholds for Classification (Low vs High)

Canopy Cover Density	57%
Median Canopy Height	12 m
75 th Percentile Canopy Height	17 m
Maximum Canopy Height	24 m

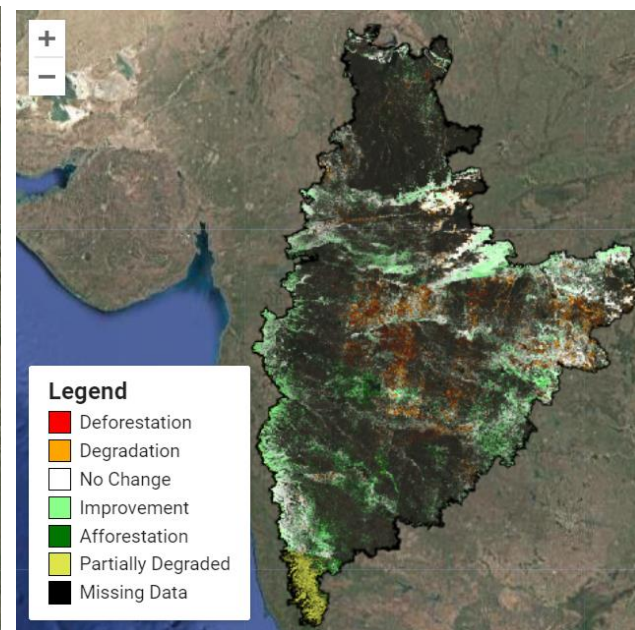
Canopy Cover Density (AY 2021)



Canopy Height (AY 2021)

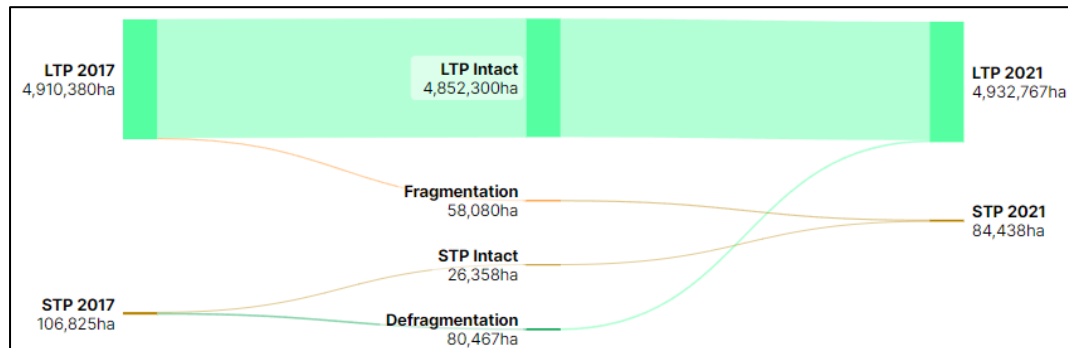


Tree Health Change (AY 2017-2021)



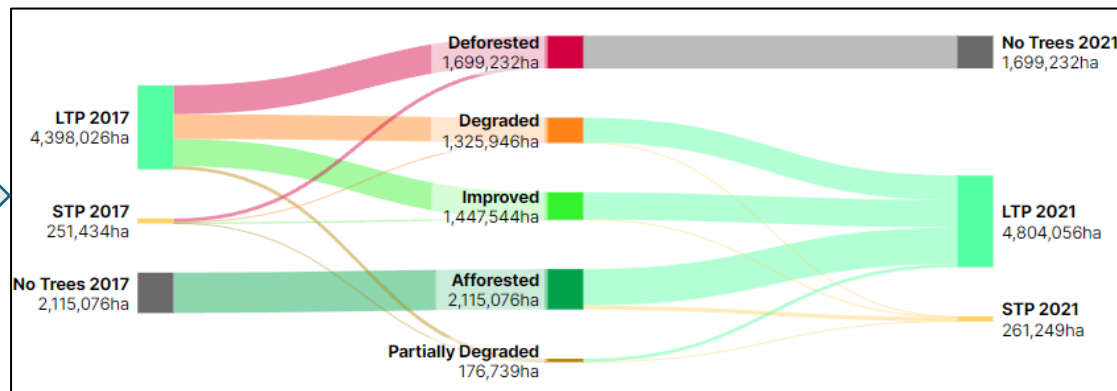
Western Plateau and Hills Region

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Southern Plateau and Hills Region

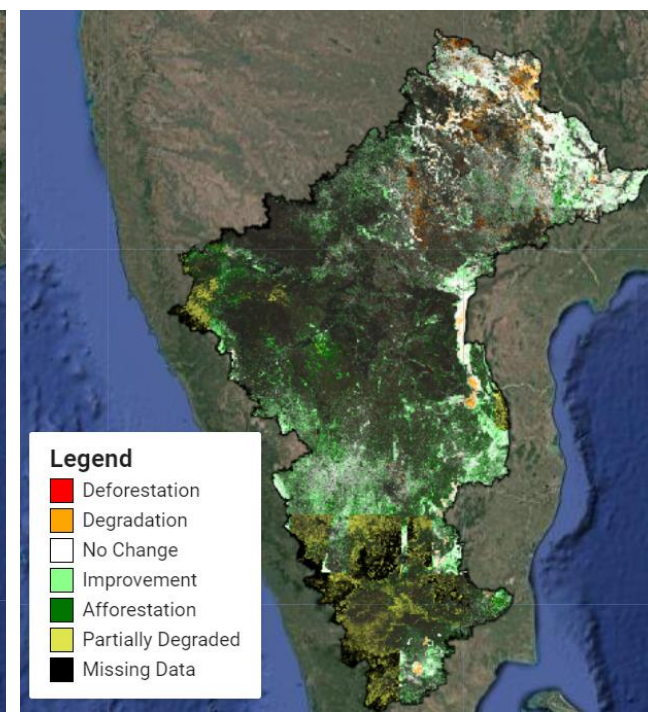
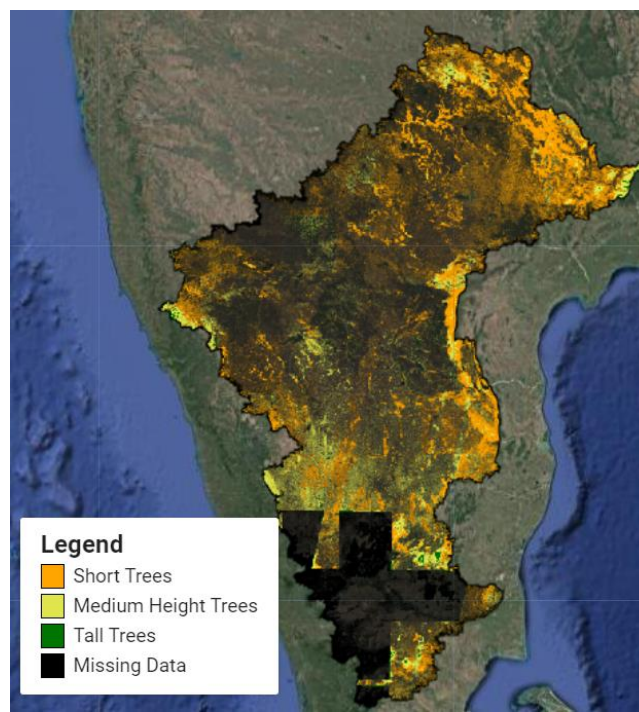
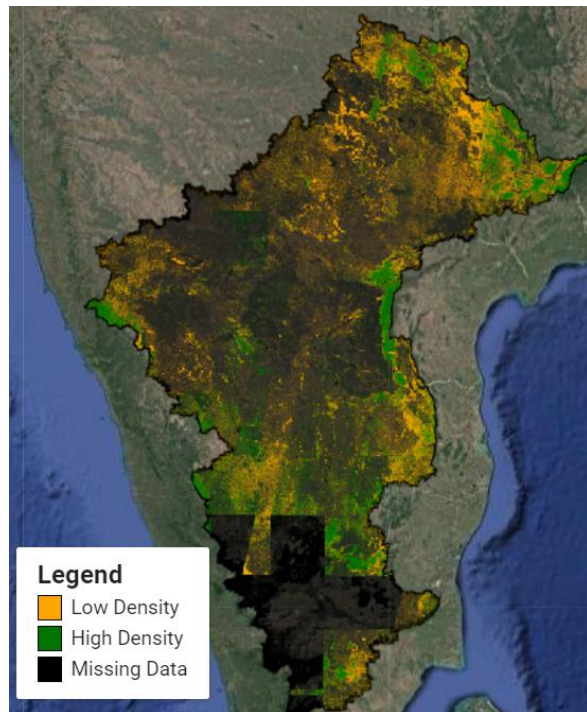
Thresholds for Classification (Low vs High)

Canopy Cover Density	62%
Median Canopy Height	12 m
75 th Percentile Canopy Height	16 m
Maximum Canopy Height	23 m

**Canopy Cover Density
(AY 2021)**

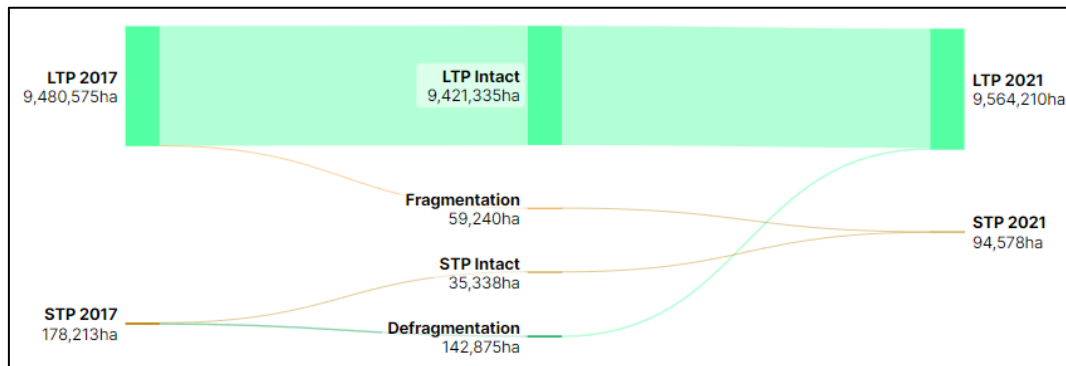
**Canopy Height
(AY 2021)**

**Tree Health Change
(AY 2017-2021)**



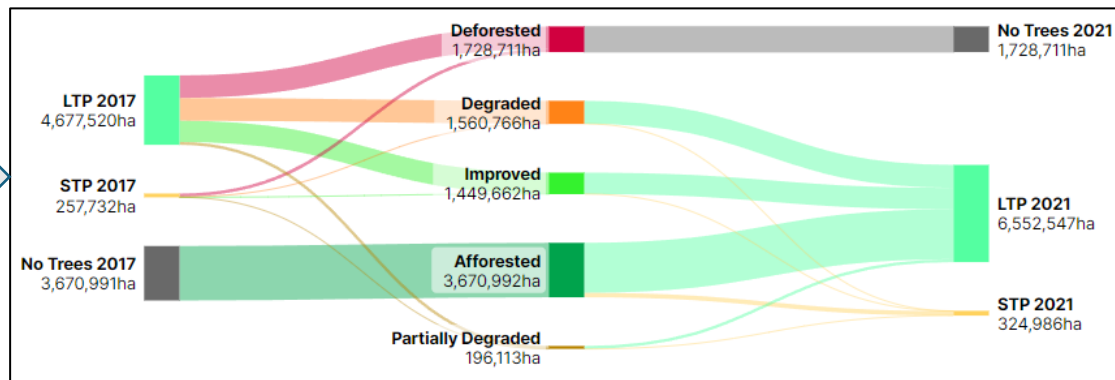
Southern Plateau and Hills Region

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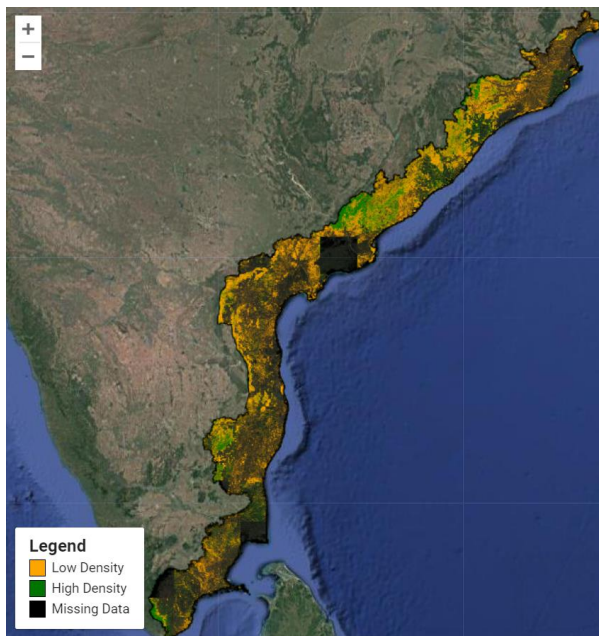
2,983,862 ha of missing satellite data

East Coast Plains and Hills Region

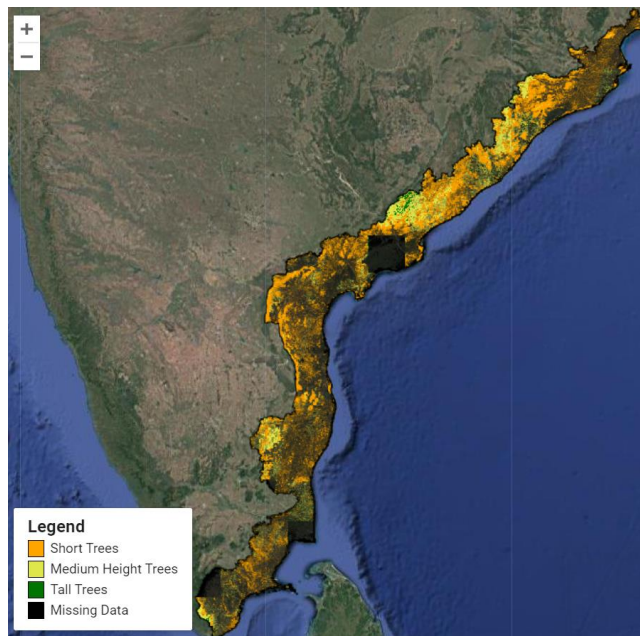
Thresholds for Classification (Low vs High)

Canopy Cover Density	67%
Median Canopy Height	12 m
75 th Percentile Canopy Height	16 m
Maximum Canopy Height	23 m

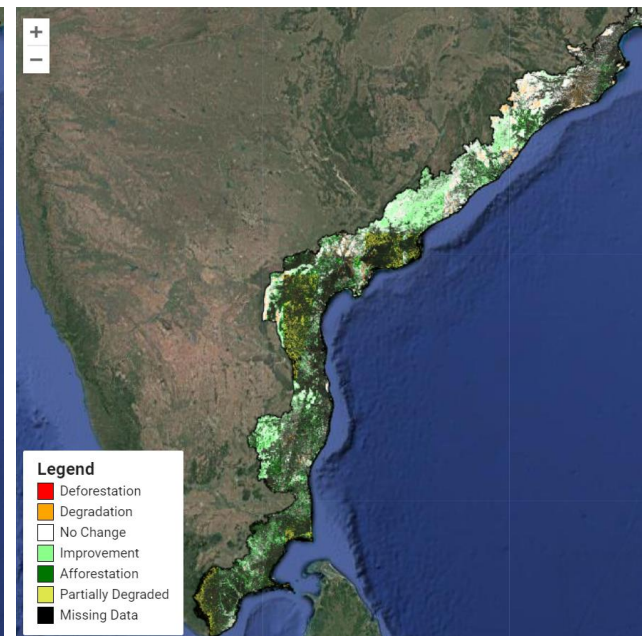
**Canopy Cover Density
(AY 2021)**



**Canopy Height
(AY 2021)**

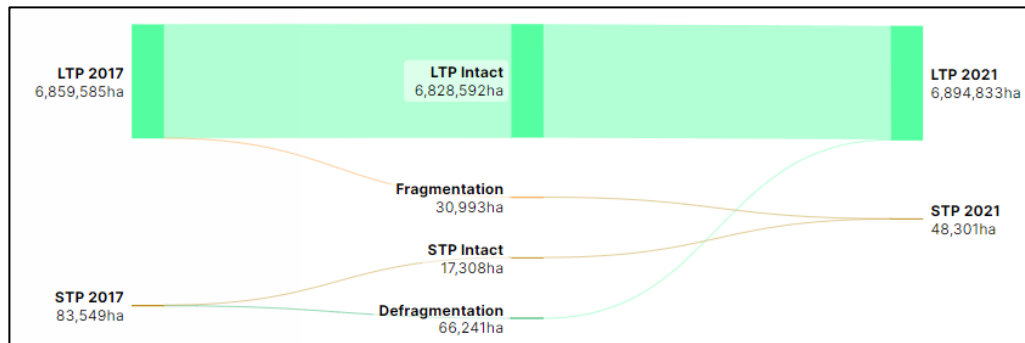


**Tree Health Change
(AY 2017-2021)**



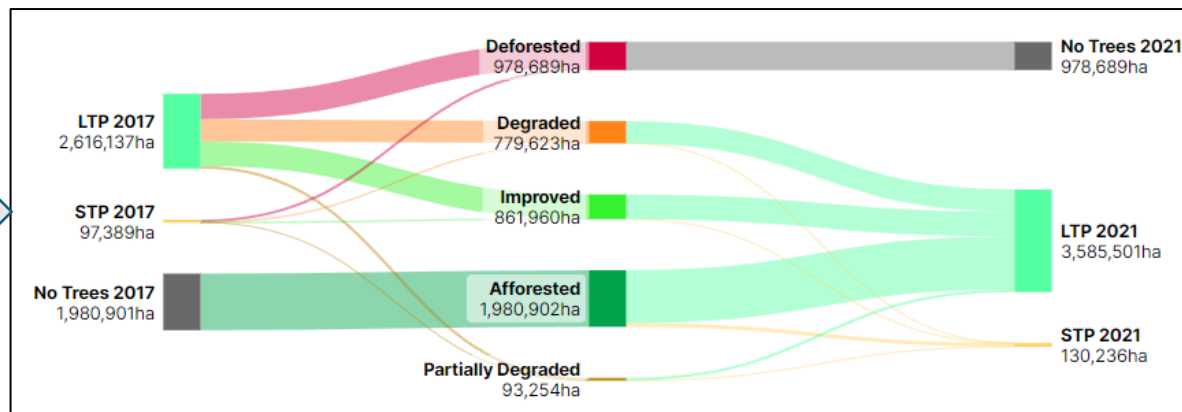
East Coast Plains and Hills Region

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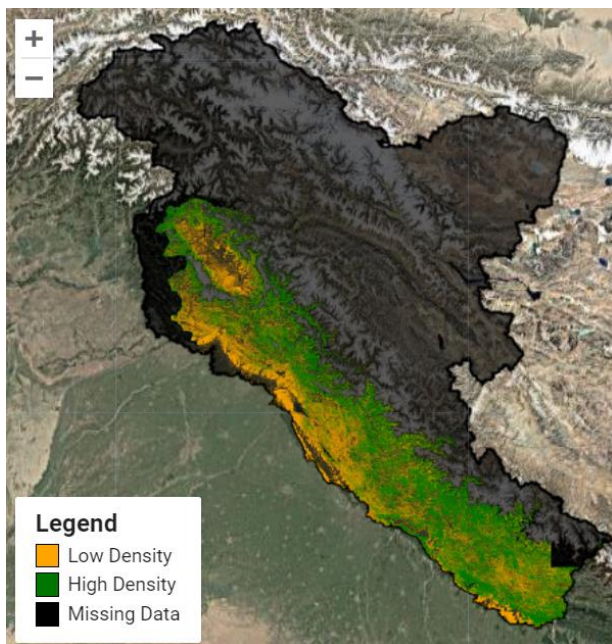


Western Himalayan Region

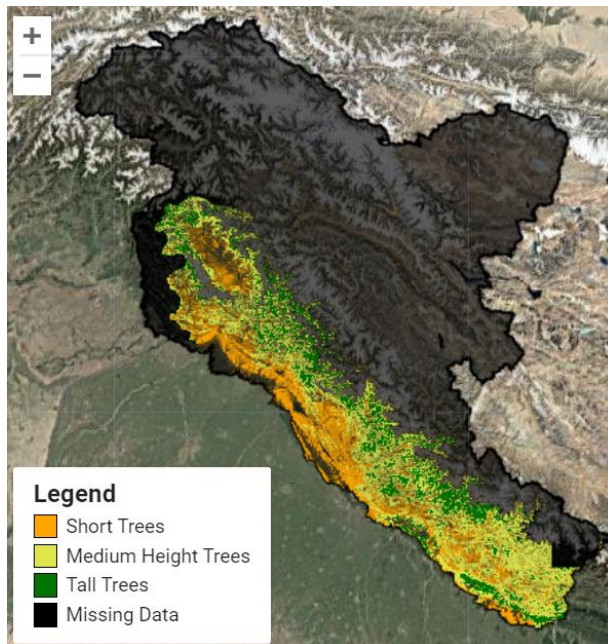
Thresholds for Classification (Low vs High)

Canopy Cover Density	78%
Median Canopy Height	14 m
75 th Percentile Canopy Height	20 m
Maximum Canopy Height	30 m

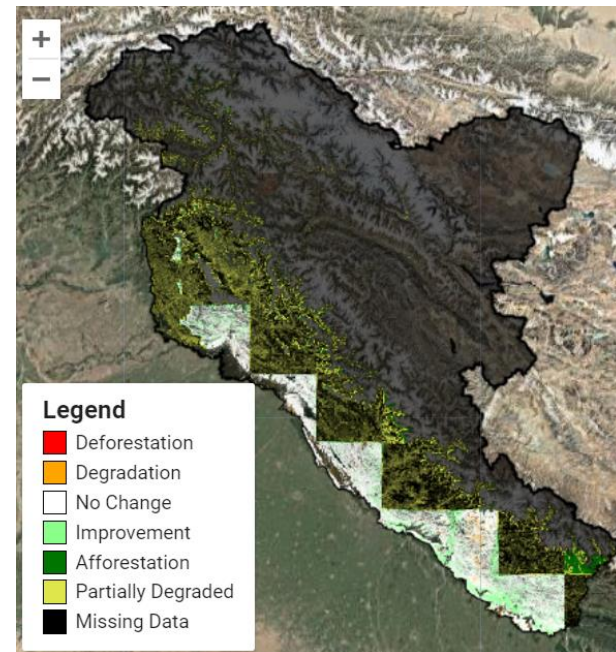
Canopy Cover Density (AY 2021)



Canopy Height (AY 2021)

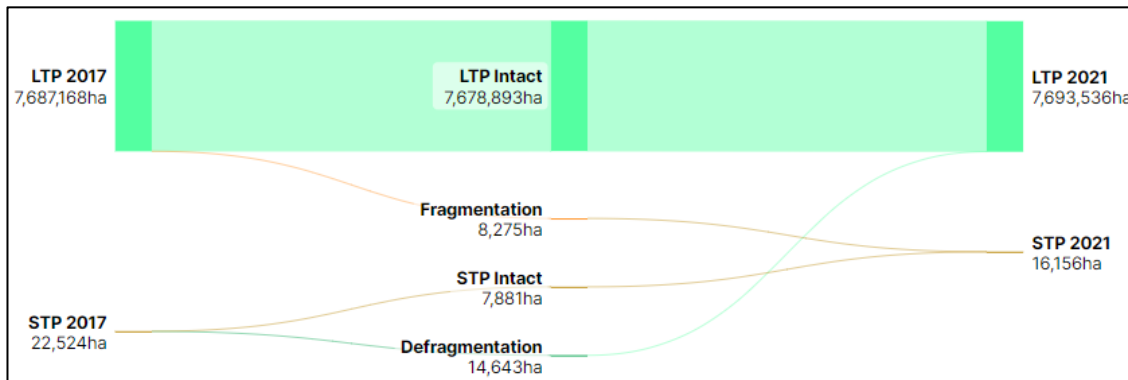


Tree Health Change (AY 2017-2021)



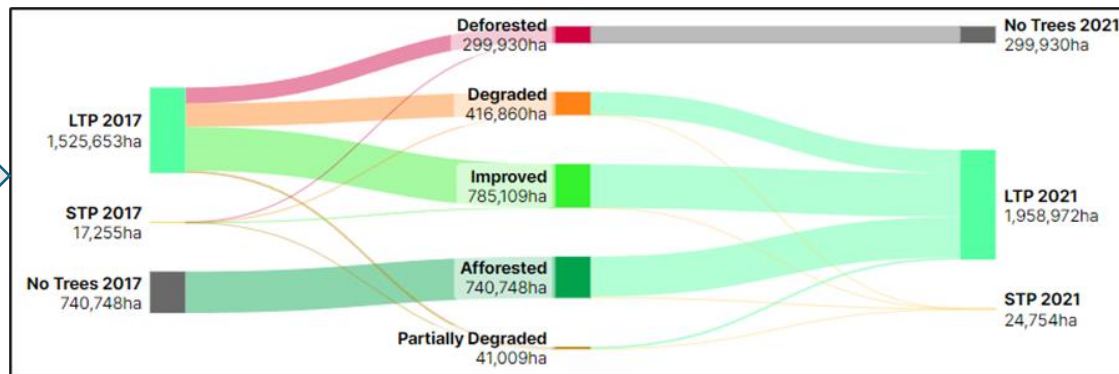
Western Himalayan Region

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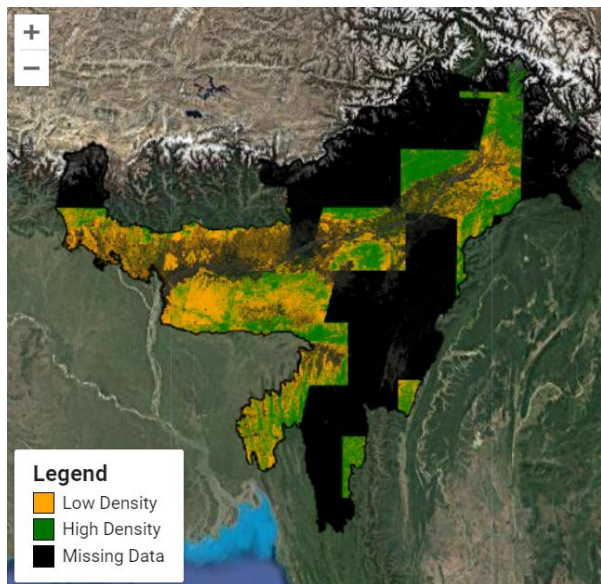


Eastern Himalayan Region

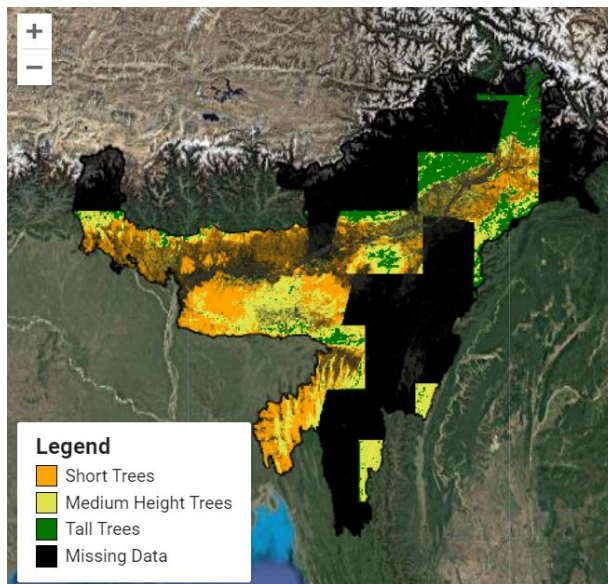
Thresholds for Classification (Low vs High)

Canopy Cover Density	86%
Median Canopy Height	13 m
75 th Percentile Canopy Height	18 m
Maximum Canopy Height	25 m

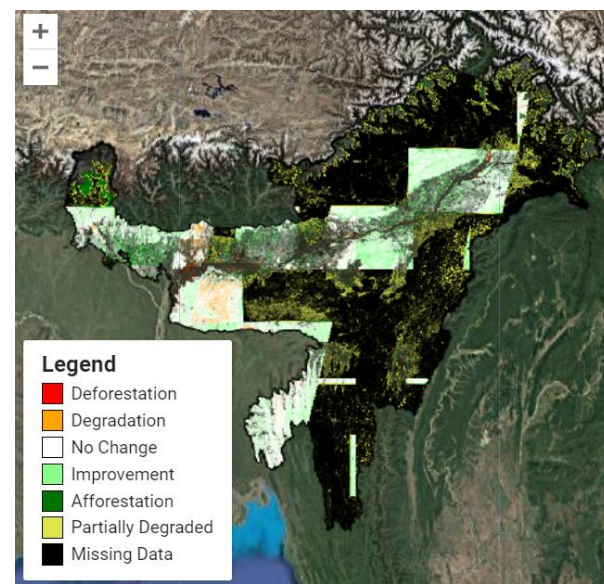
Canopy Cover Density (AY 2021)



Canopy Height (AY 2021)

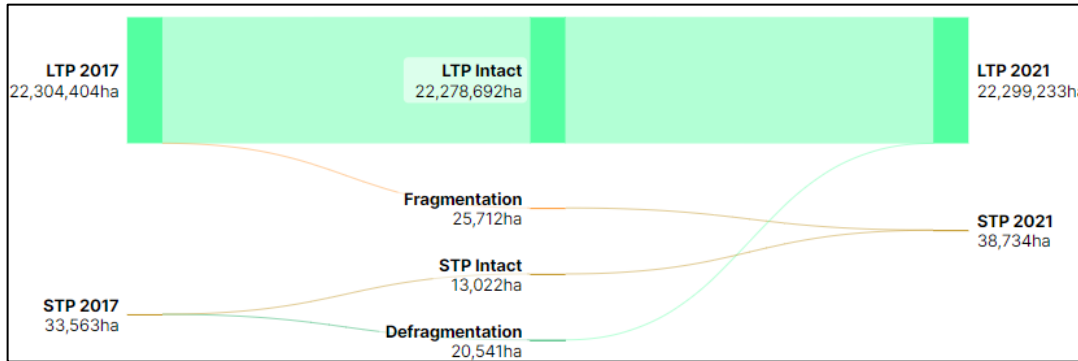


Tree Health Change (AY 2017-2021)



Eastern Himalayan Region

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