

## Supplementary Material

Table S1. Reclassification of the reference and target dataset for accuracy assessment analysis. The reference (GLC-SHARE) and classified (LUH2) data were reclassified into four common classes: (1) forest, (2) crops, (3) open areas, and (4) urban. Classes absent in the focus dataset were masked-out.

original class code	original class name	code (name) after reclassification
GLC-SHARE		
1	Artificial surfaces	4 (urban)
2	Cropland	2 (crops)
3	Grassland	3 (open areas)
4	Tree covered areas	1 (forest)
5	Shrubs covered areas	3 (open areas)
6	Herbaceous vegetation, aquatic or regularly flooded	3 (open areas)
7	Mangroves	3 (open areas)
8	Sparse vegetation	3 (open areas)
9	Bare soil	3 (open areas)
10	Snow and glaciers	masked-out
11	Water bodies	masked-out
LUH2		
1	C3 Annual Crops (c3ann)	2 (crops)
2	C3 Nitrogen-Fixing Crops (c3nfx)	2 (crops)
3	C3 Perennial Crops (c3per)	2 (crops)
4	C4 Annual Crops (c4ann)	2 (crops)
5	C4 Perennial Crops (c4per)	2 (crops)
6	Managed Pasture (pastr)	3 (open areas)
7	Forested Primary Land (primnf)	1 (forest)
8	Non-Forested Primary Land (primn)	3 (open areas)
9	Rangeland (range)	3 (open areas)
10	Potentially Forested Secondary Land (secdf)	1 (forest)
11	Potentially Non-Forested Secondary Land (secdn)	3 (open areas)
12	Urban Land (urban)	4 (urban)

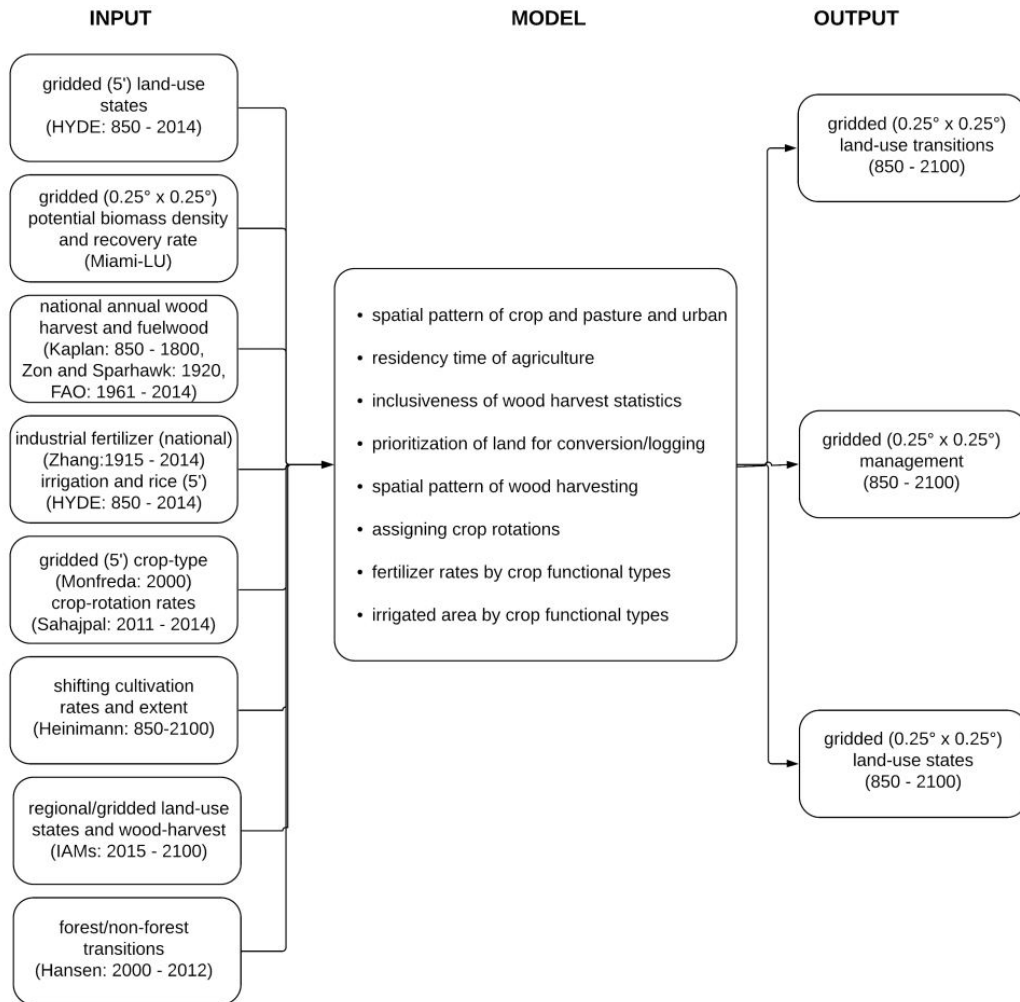


Figure S1. Framework to generate land use and land cover states of Land-Use Harmonization (LUH2, Hurtt et al . 2020)

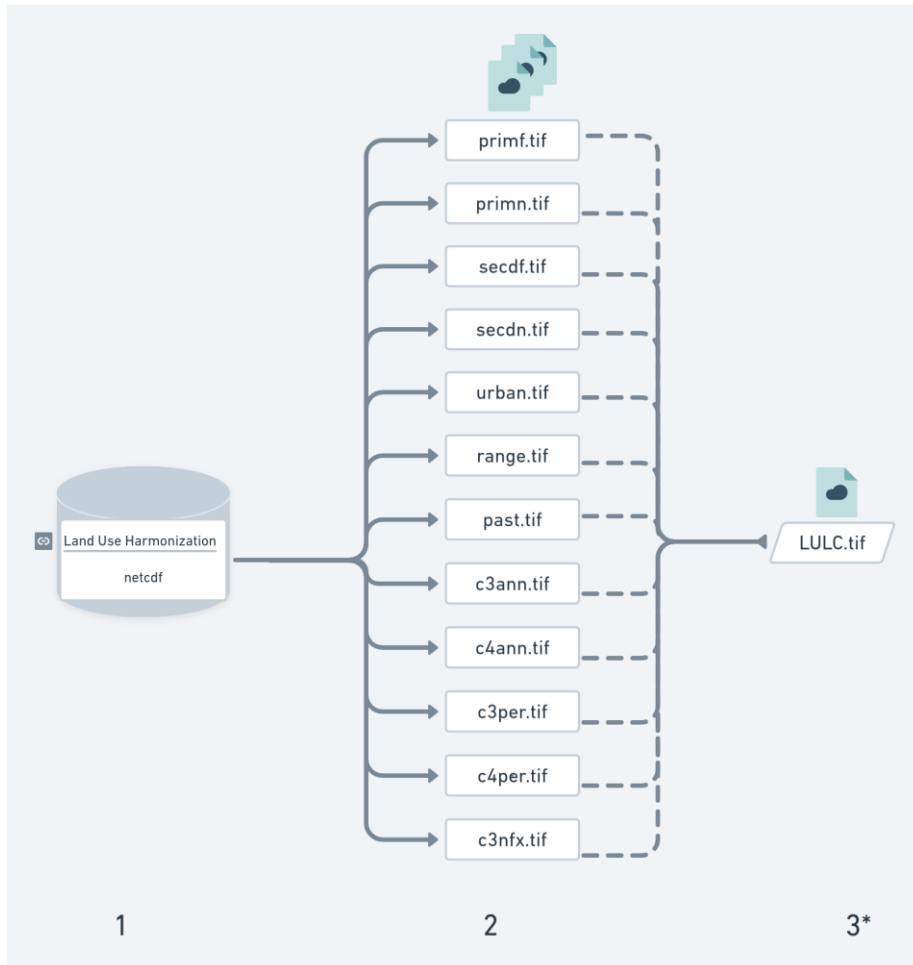


Figure S2. Workflow: 1) Extract every single state (state-files) per year from 850 to 2100, with two future scenarios (SSP2 and SSP5) from 2015 on; 2) Save every state-files (continuous data) in TIFF format; and 3\*) Create new categorical data (LULC-files) of land-use land-cover combining 12 state-files in TIFF format.