The Set-Up

1. We know that forests can recover: mayas, floresta tijuca, puerto rico
2. ecological restoration improves soil conditions by retaining and delivering nutrients to plants, affecting nutrient and biogeochemical cycles
3. Aboveground biomass recovery after 20 years was on average 122 megagrams per hectare (Mg ha-1), corresponding to a net carbon uptake of 3.05 Mg Cha-1 yr-1, 11 times the uptake rate of old-growth forests). Aboveground biomass stocks took a median time of 66 years to recover to 90% of old-growth values
4. we know it can be relatively quick in some cases

The question is: what is the best way to go from deforested -> forested?

1. You have been approached by someone who asks you to restore this piece of property to primary forest. They can only go one parcel at a time. What is an important question you need to ask them before responding?

   Trying to generate discussion about issues that can influence success or failure of restoration strategies (Table 14.2, p 286 in Chazdon) before exploring differences between natural and assisted rengeneration (https://onlinelibrary.wiley.com/doi/10.1111/btp.12381) and ultimately landing on assisted regeneration as the most effective means.

   - budget
   - prior land-use
   - goal (biodiversity, carbon)
   - proximity to forest patches
   - Are there socioeconomic incentives
   - What do local people currently use the land for? Would local people use the forest in some way?

   After the list has been generated, ask people to upvote the most important ones, as well as reflect on any that are missing.

2. Now zoom out on the picture. There are mutliple sites to where you can start - which one is best, why? What could lead you to change your mind?

   - proximity to forest
   - Presence of trees in the area.
   - Might lead to change mind is things like prior land use.

3. Now that we've identified a site, what do you do? "How do you actually take a pasture and turn it into a rain forest?"

- **Natural Regeneration** (Leave it alone): Natural forest regeneration is the spontaneous recovery of native tree species that colonize and establish in abandoned fields or natural disturbances; this process can also be assisted through human interventions such as fencing to control livestock grazing, weed control, and fire protection
- **Assisted Natural Regeneration**: remove weeds, prevent fire, minimize ag impacts
- **Active Restoration**: active restoration requires planting of nursery-grown seedlings, di-

rect seeding, and/or the manipulation of disturbance regimes (for example, thinning and burning) to speed up the recovery process, often at a high cost to establish structural features of the vegetation (hereafter termed vegetation structure), reassemble local species composition, and/or catalyze ecological succession

Recent analysis combining the data from hundreds of studies found thgat ecological restoration success is higher for natural regeneration than for active restoration in tropical forests

4. Factors influencing success or direction of natural regeneration

    - Type: Pasture, shifting cultivation, conventional agriculture, agroforestry, etc.
        - Crop(s): species/pasture grass species/livestock species

- Intensity:
    - Number of slash and/or burning events
    - Livestock density
    - Use of machinery, pesticides or herbicides
- Length of the fallow period
- Weeding practice (clear or selective weeding), Weeding frequency
- Presence of remnant trees (% cover or density)
- Frequency:
    - Burning events frequency
    - Slash-and-burn frequency
    - Land cleaning/ploughing frequency
    - Cropping frequency
- Duration
    - Amount of time since old-growth forest clear cut
    - Amount of time in continuous use (e.g. as agriculture or pasture)
    - Average length of the cropping period over the period of land use
    - Length of the last cropping phase previous to abandonment
- Spatial extent
    - Size of the agricultural field or pastureland
    - Size of the agricultural mosaic