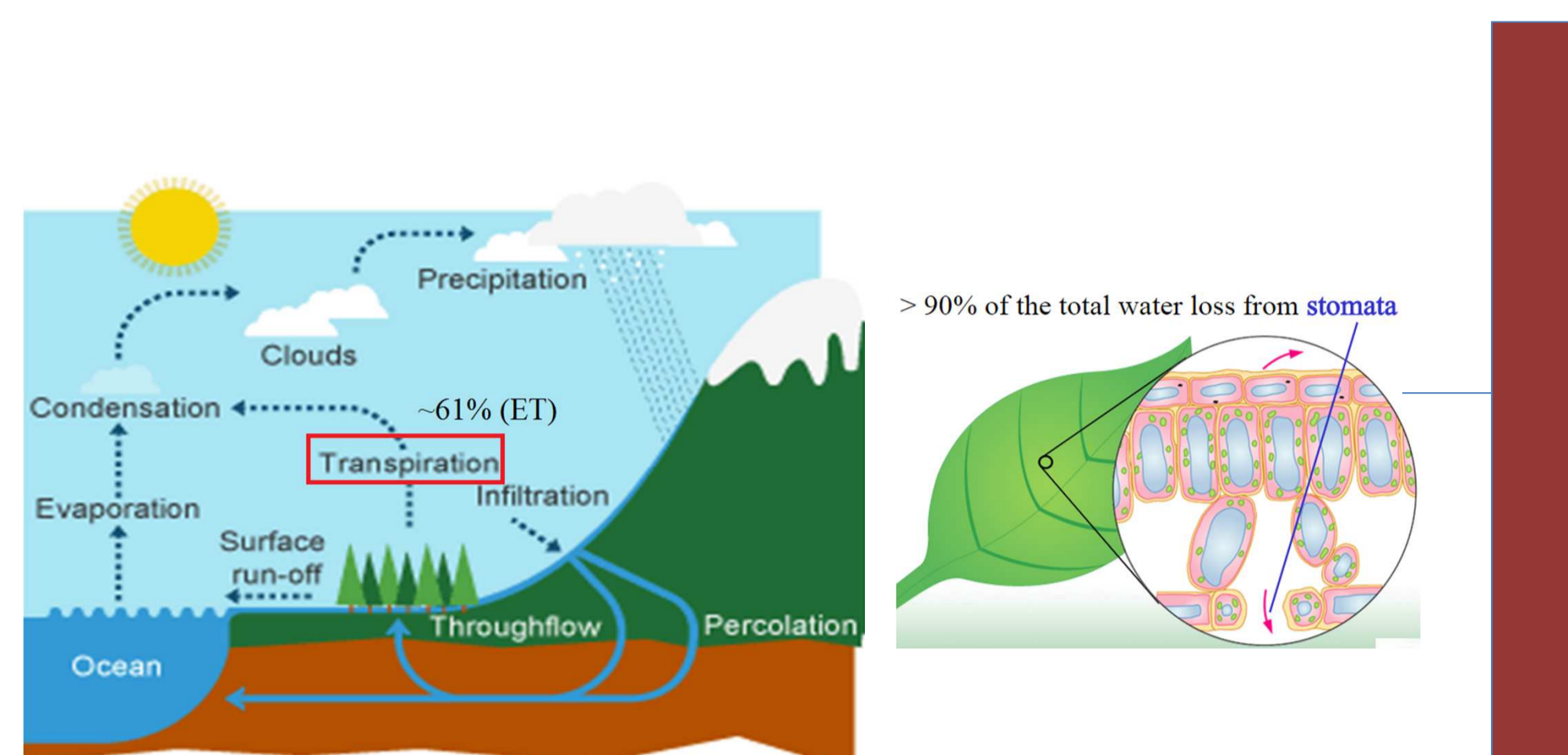


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## INTRODUCTION:

Water-use efficiency is a key feature of ecosystem functioning and a key process in the global water cycle, With leaf transpiration representing 61% of the total evapotranspiration on ecosystem scale (Schlesinger et al., 2014).



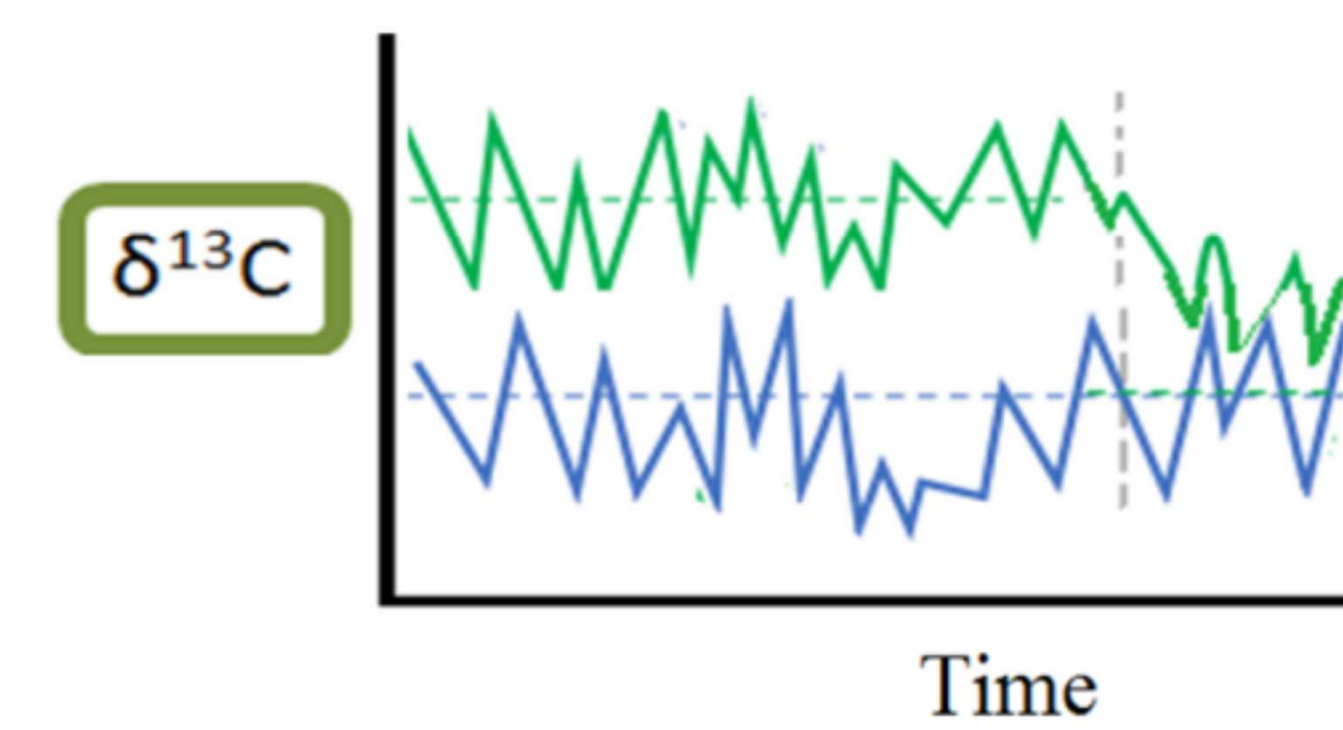
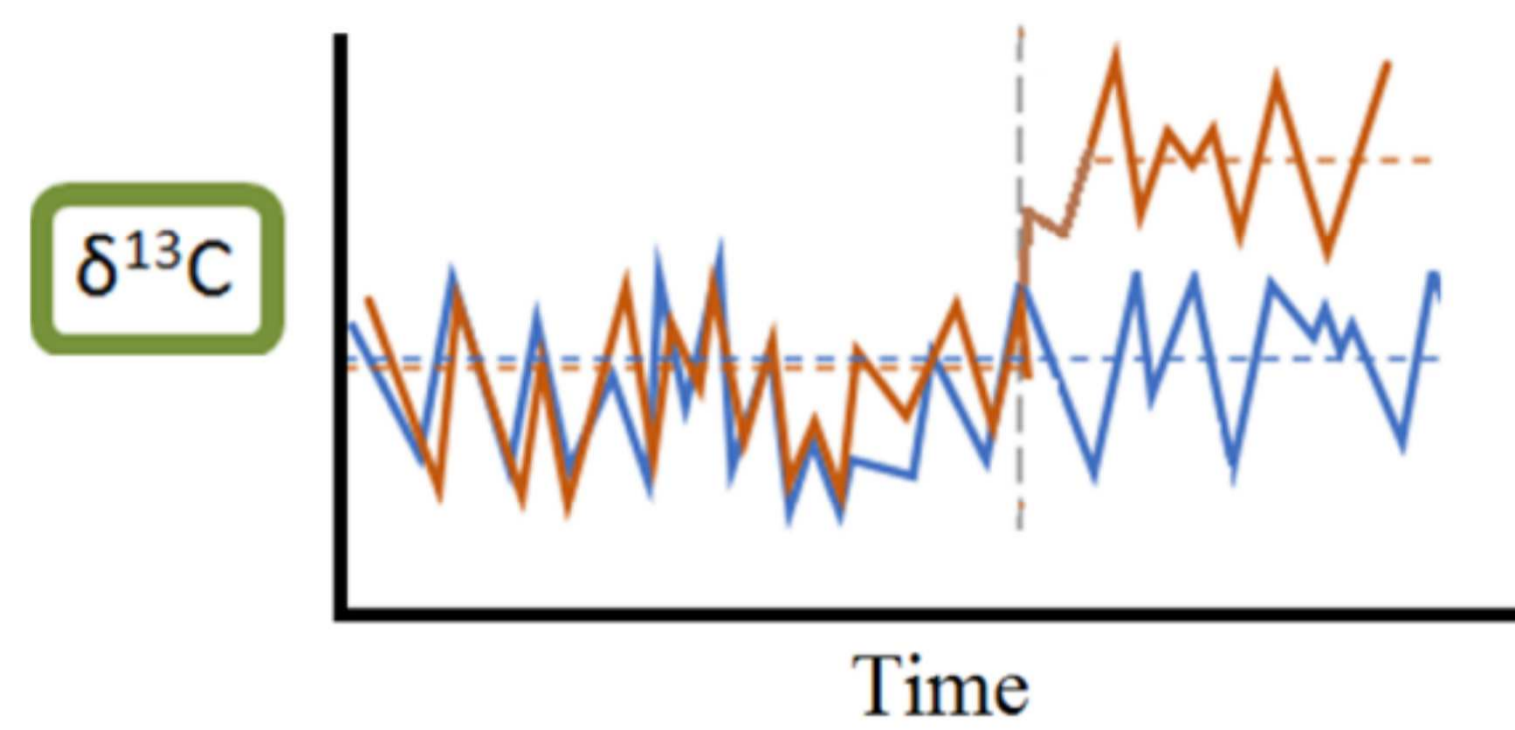
- Light intensity
- Temperature
- Relative humidity
- Air movement
- Soil water

### What happens to transpiration and water availability in ecosystems when land-cover changes occur: degradation vs. forest recovery?

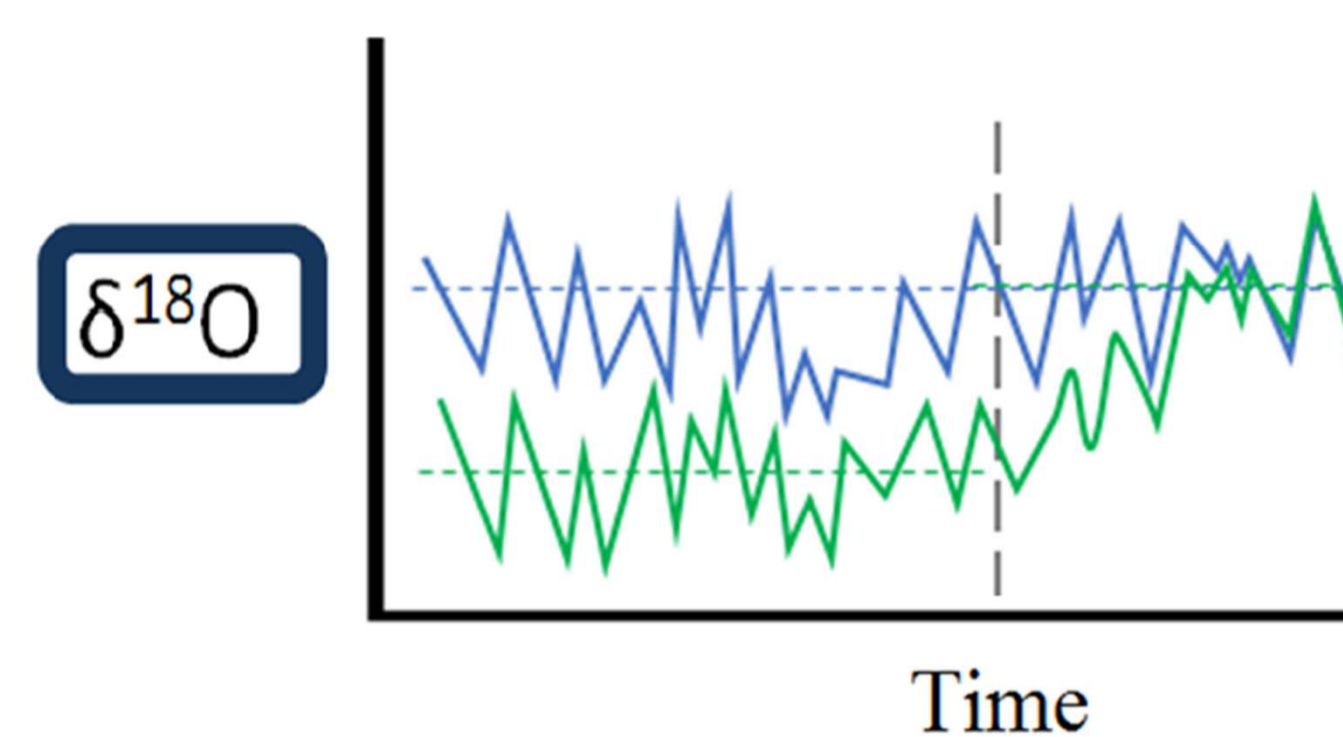
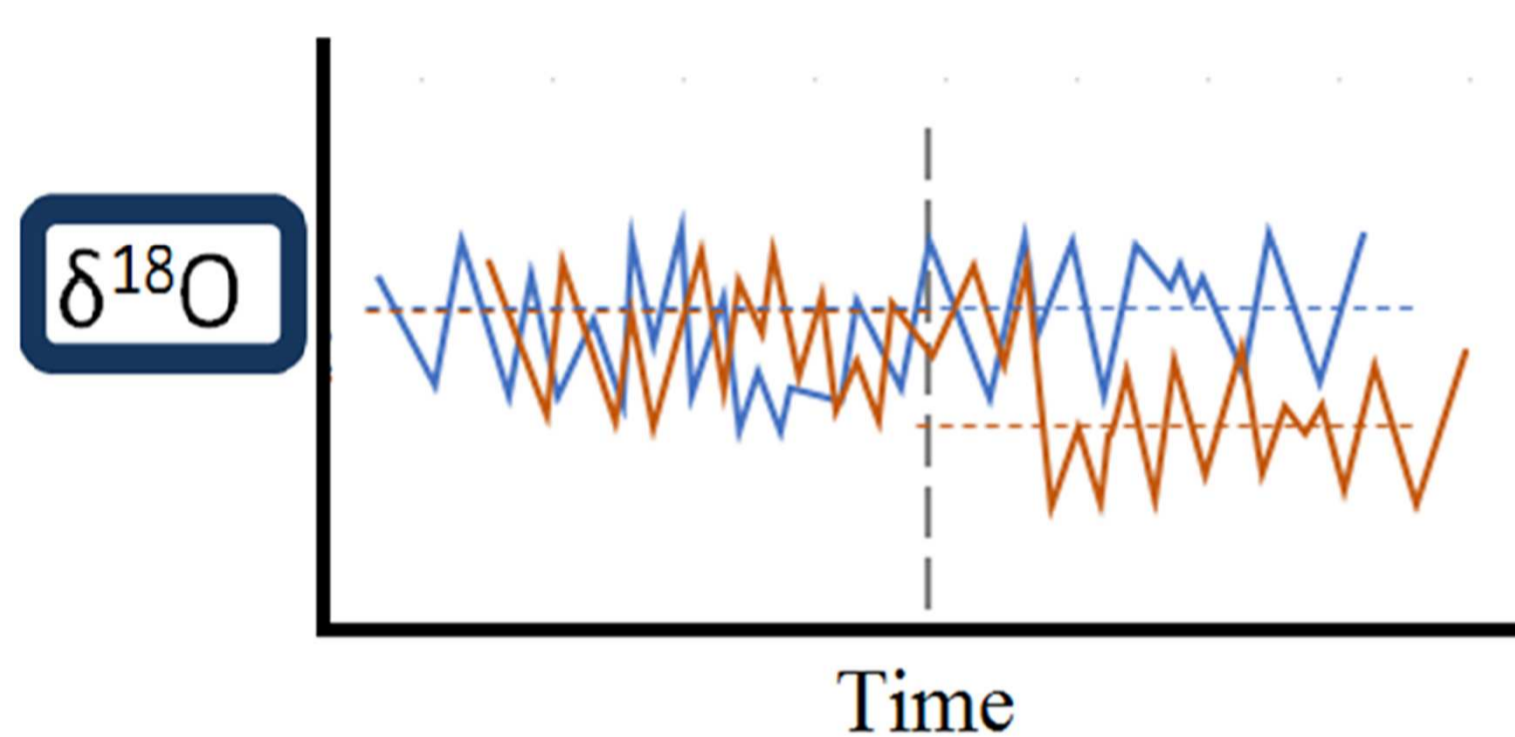
- Tree rings record the environmental conditions and physiological processes to which trees are subjected and can be used as a proxy for changing growth conditions (Van der Sleen et al., 2017).
- *Bertholletia excelsa*, a protected tree species, remains after land-use transformation, thus witnessing changes

## HYPOTHESES

- Water-use efficiency of *B. excelsa* increases abruptly after conversion from forest to pasture
- Water-use efficiency of *B. excelsa* decreases gradually during secondary forest recovery

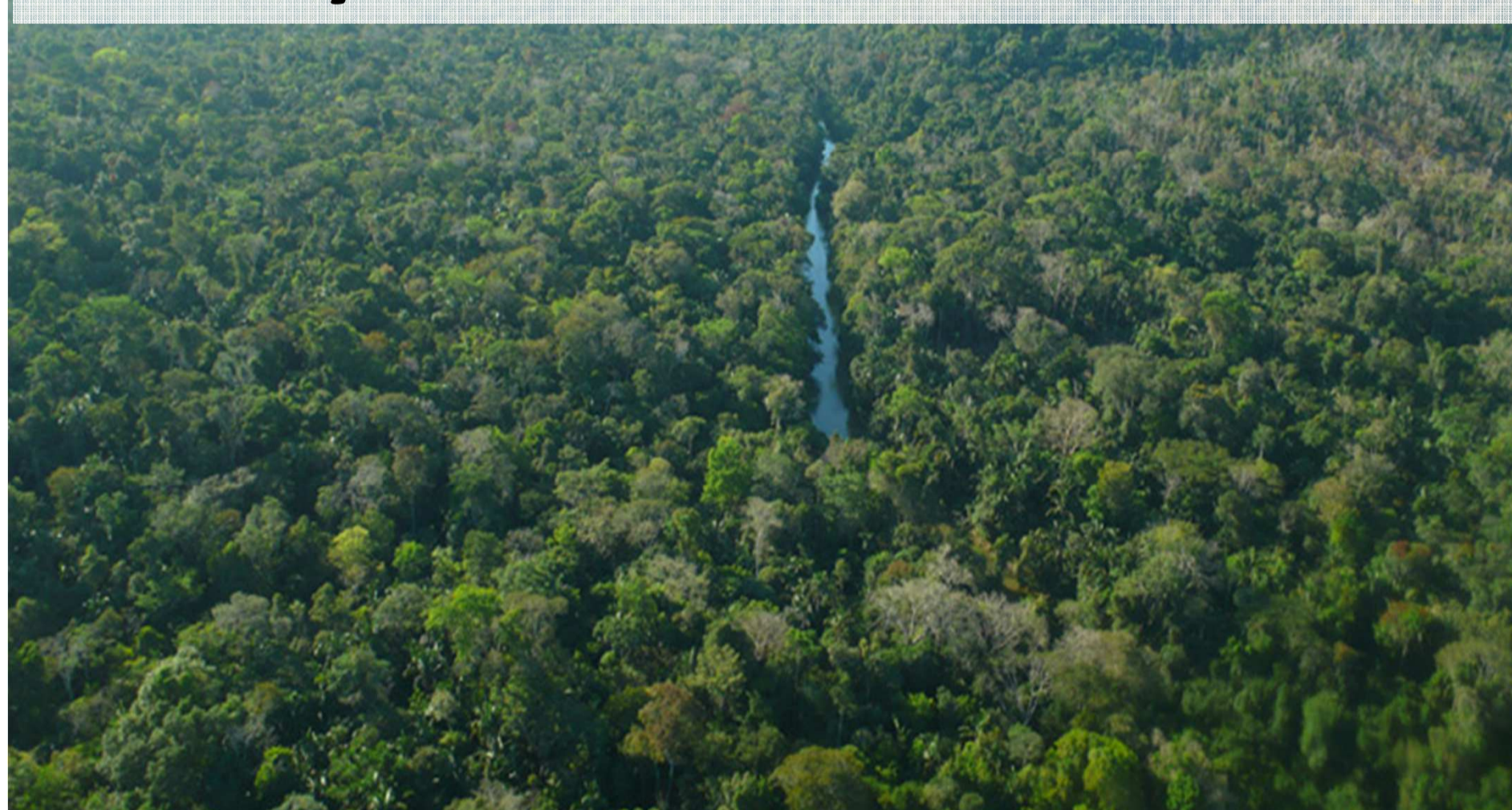


- Water availability declines abruptly after conversion from forest to pasture.
- The availability of water gradually recovers in the re-establishment of secondary forest

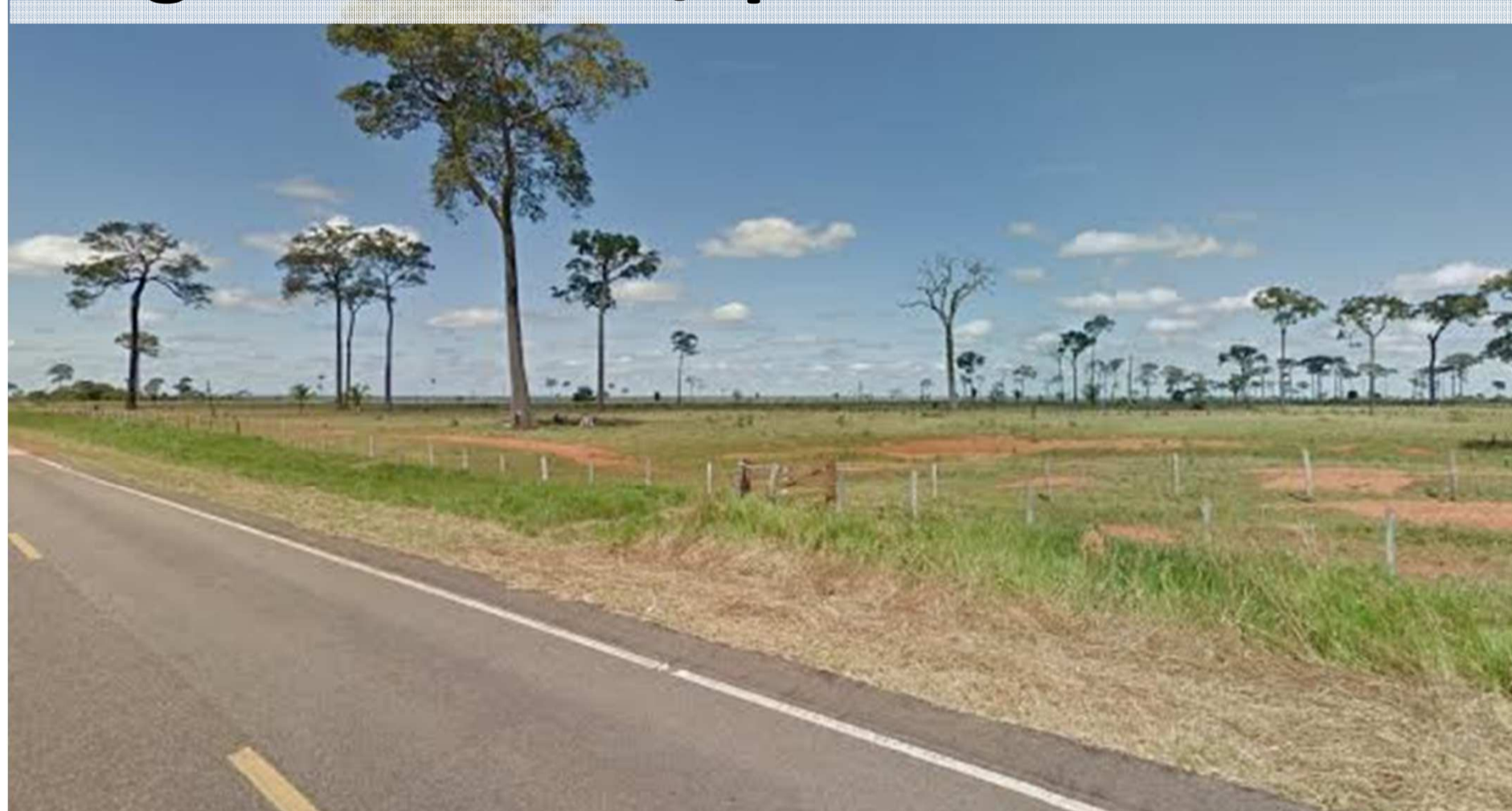


## METHODS: Data collection

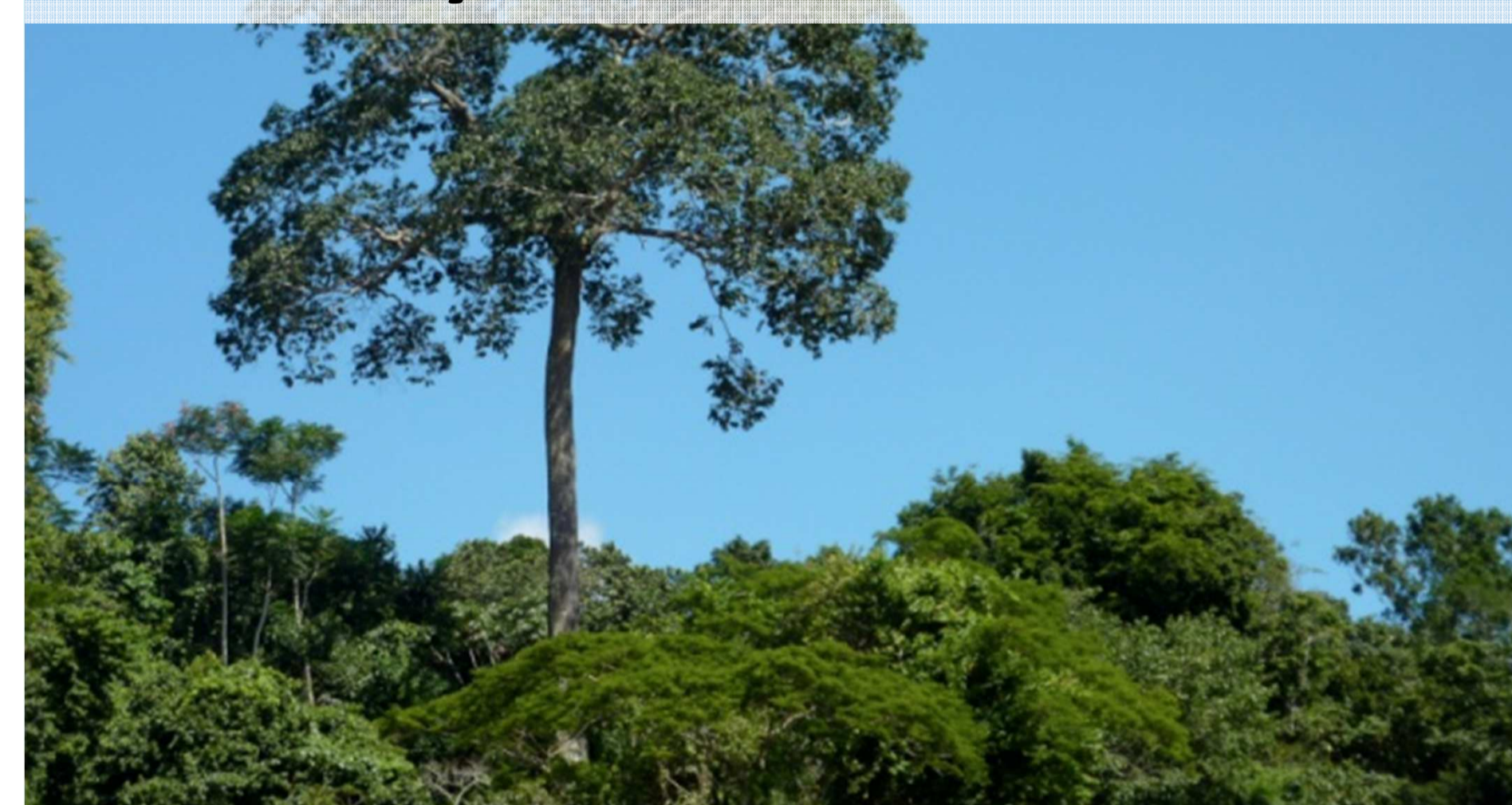
Primary forest



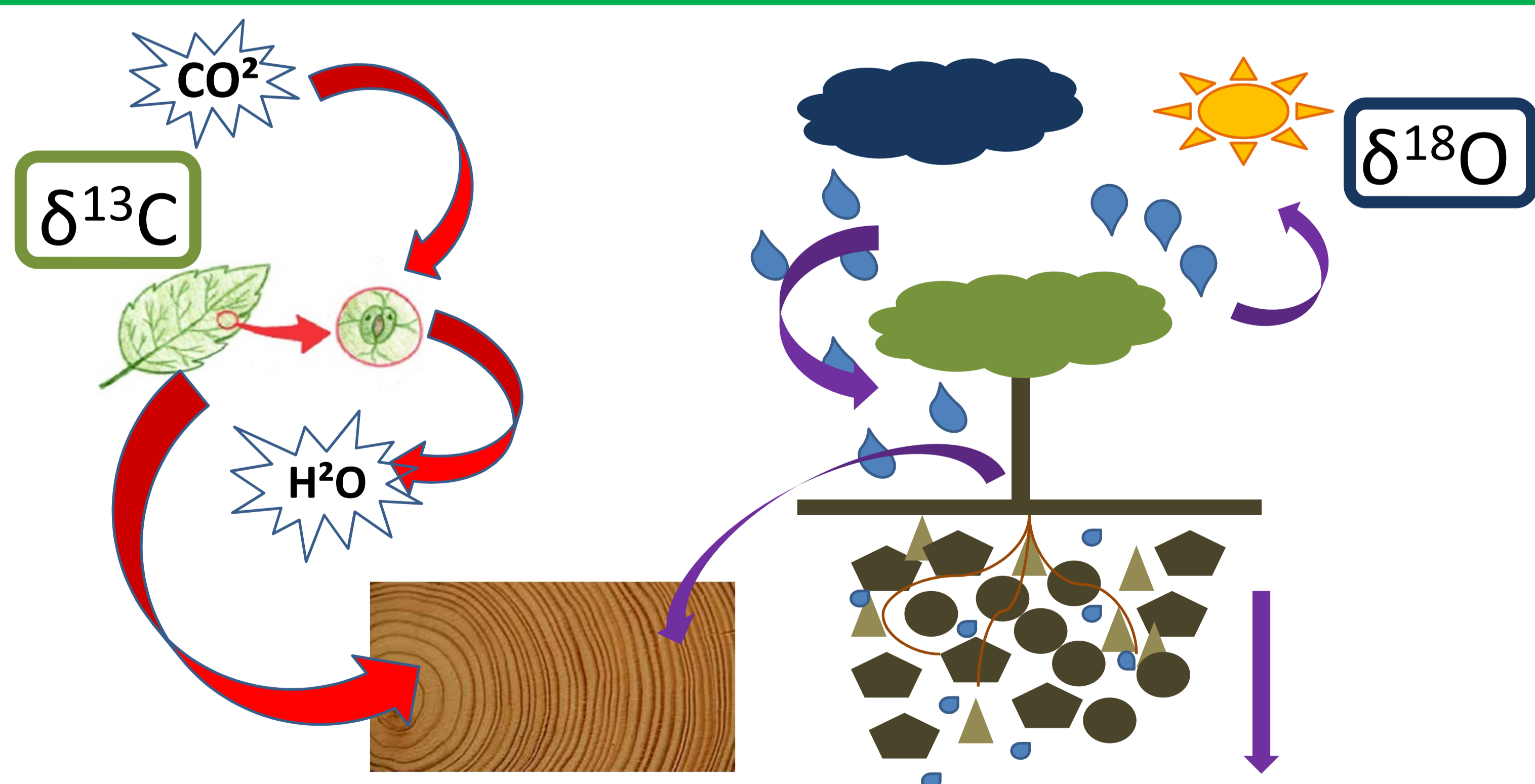
Degraded land / pasture



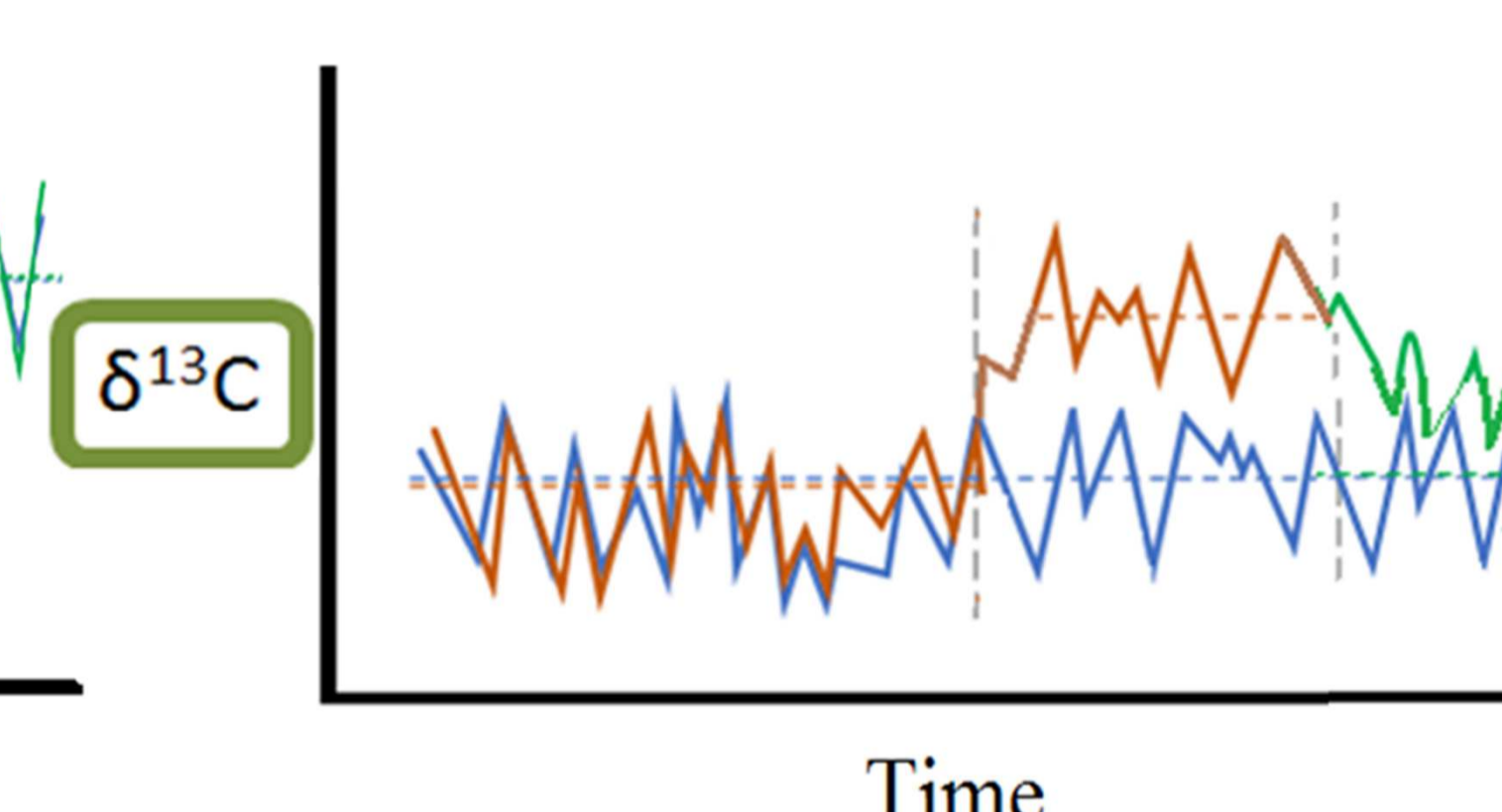
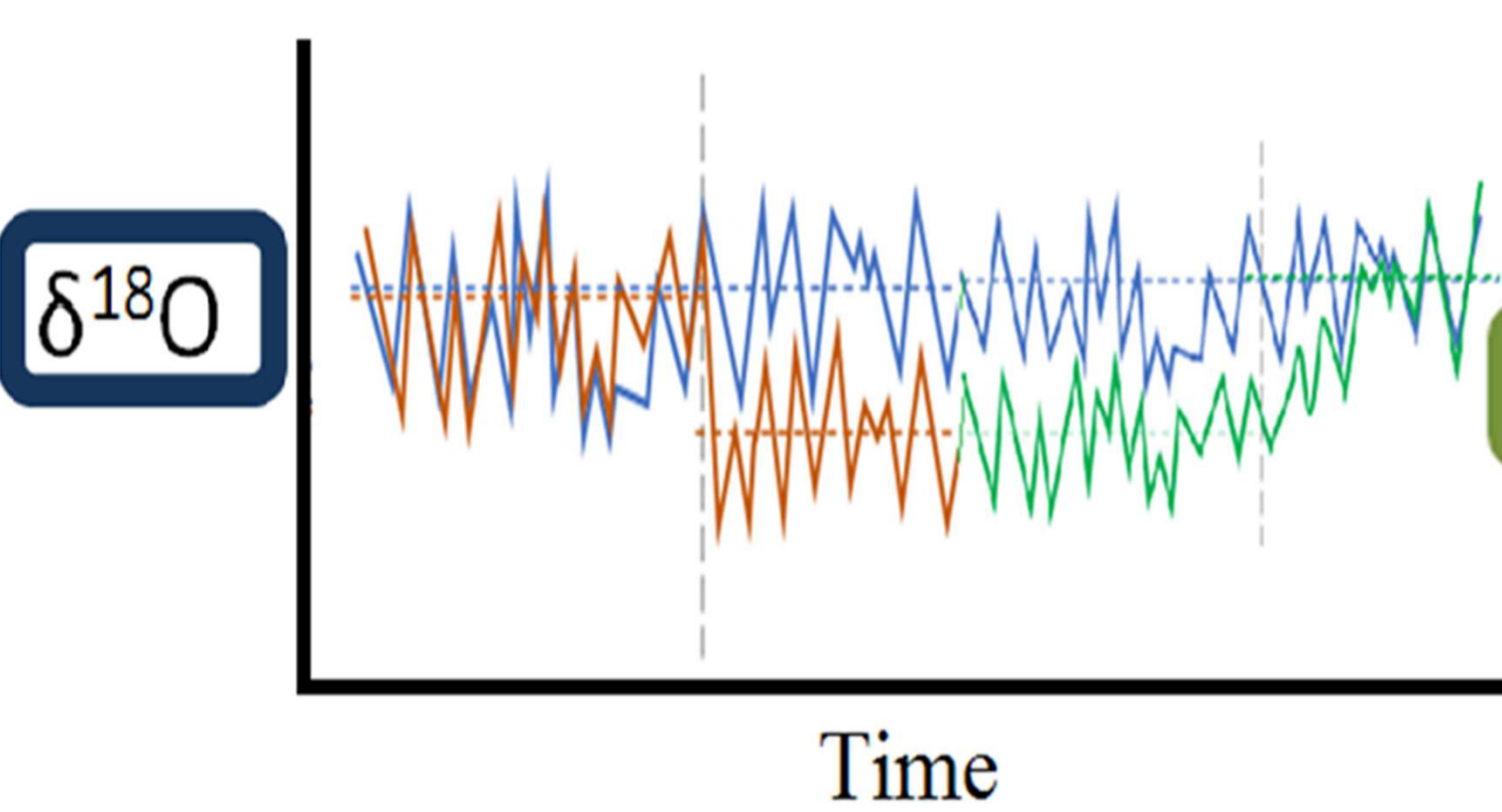
Secondary forest



## METHODS: Isotopic composition



## Expected results



Understanding of changes in the physiological processes and environmental conditions resulting from land-use conversion.  
Improve our assessment of ecosystem services delivered by different land-use types.

$\delta^{13}\text{C}$  Composition:  $\frac{\text{C}^{13}}{\text{C}^{12}}$

- **iWUE** – Water use efficiency
- **C<sub>i</sub>** - intercellular CO<sub>2</sub> concentration leaves

$\delta^{18}\text{O}$  Composition:  $\frac{\text{O}^{18}}{\text{O}^{16}}$

- Environmental conditions :
- Water storage in soil
  - Evapotranspiration

## References

- VAN DER SLEEN, P, ZUIDEMA, P.A., PONS, T.L. Stable isotopes in tropical tree rings: theory, methods and applications. *Functional Ecology*, Abril 2017..
- SCHLESINGER, W.H., JASECHKOL, S. Transpiration in the global water. *Agricultural and Forest Meteorology*, v. 189–190, p. 115–117, 2014.