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OF SCIENCE AND TECHNOLOGY

Department of Land and Spatial Sciences

The role of forestland in mitigating climate change

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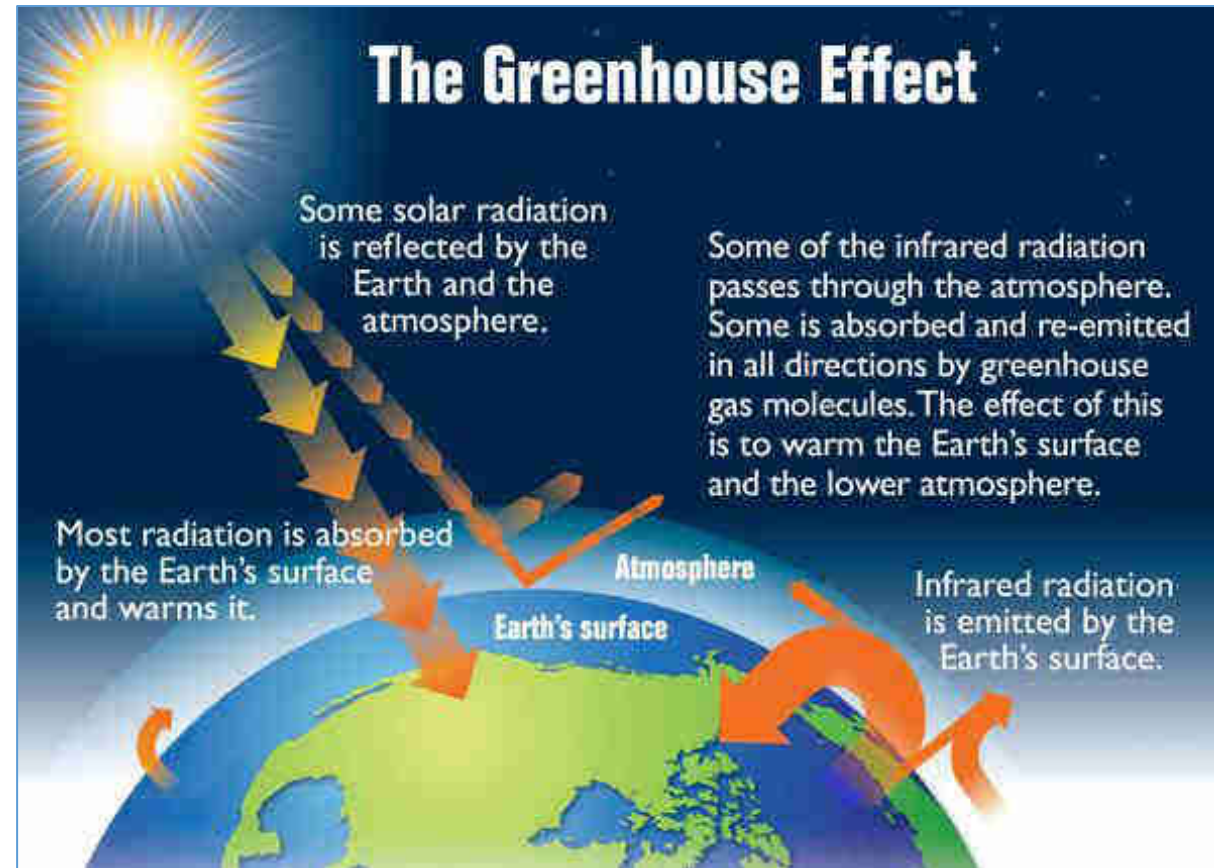
Understanding climate change

Why and how it happens



Climate change

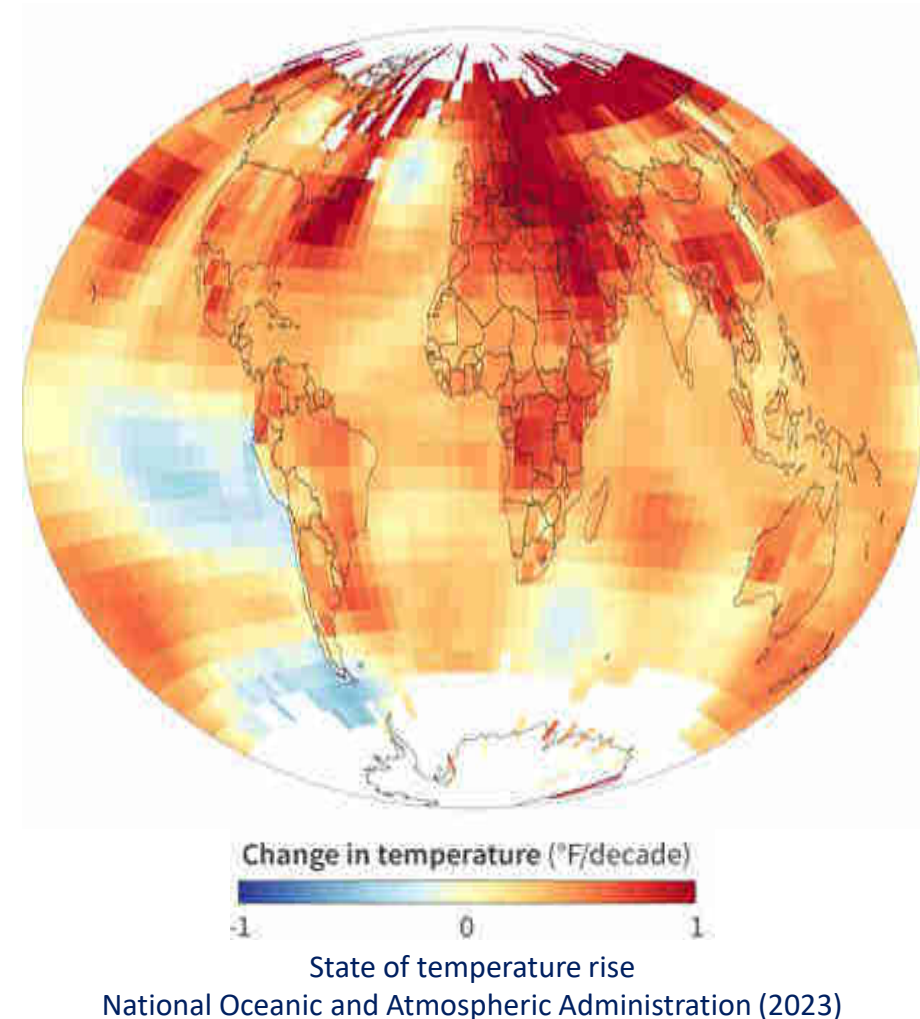
- Climate change refers to long-term shifts in temperatures and weather patterns (natural or human caused).
- Since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas.
- It is due to greenhouse gas (GHG) emissions that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures.





Greenhouse Gases

- Greenhouse gases (or GHGs) are gases in the earth's atmosphere that trap heat.
- The GHGs act like the glass walls, without them temperatures would drop to as low as -18°C (-0.4°F) which would make it too cold to sustain life on earth.
- The GHGs keep the earth's temperature at an average 14°C (57°F).
- Excess release of greenhouse gases are the cause of global warming and climate change.
- Most of the planet is warming (yellow, orange, red). Only a few locations, most of them in Southern Hemisphere oceans, cooled over this time period





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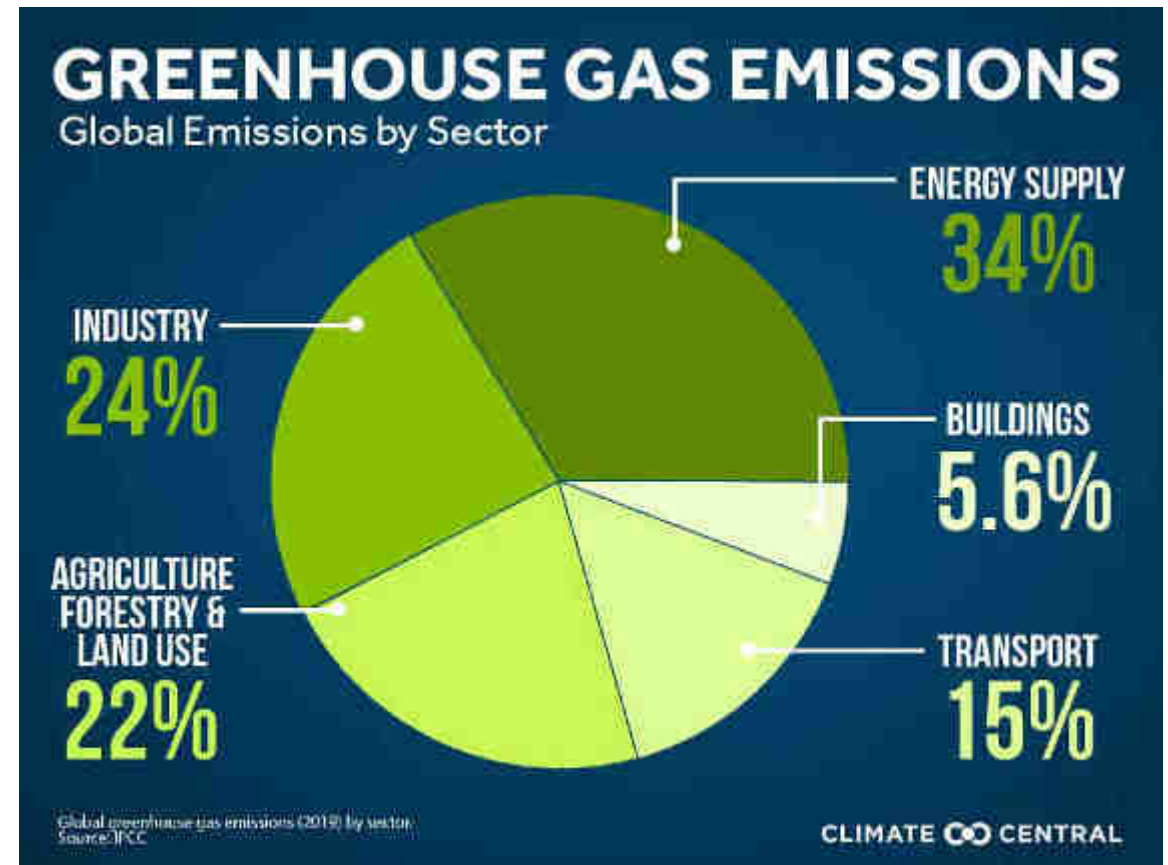
Connecting land and and climate change
What the available data are saying



The global land sector is the main origin of GHGs

- The land sector: Energy, industry, transport, buildings, agriculture, forests and other land uses are among the main origin of the GHGs emissions.
- About 77% of the agricultural land on the planet is directly used for raising animals.
- About 23% is used for raising crops:
- Since half of the crops are fed to animals, animal agriculture accounts for more than 86% of the agricultural land area on earth.

Climate healers (2023)

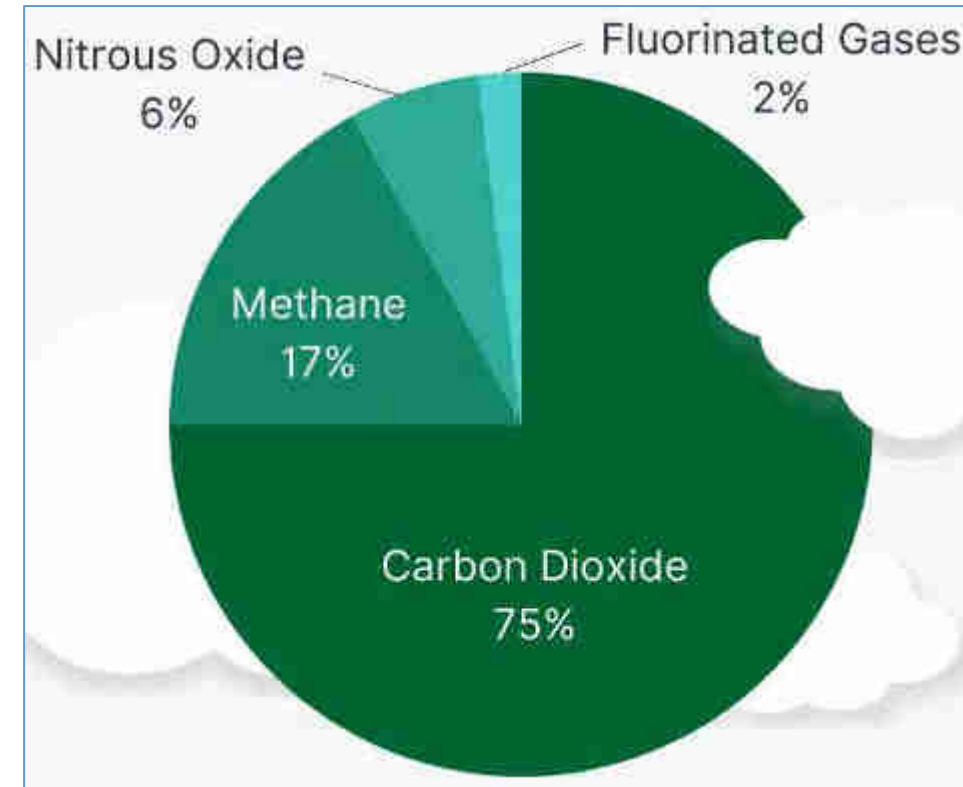




What the data say about forestland

- Land stores three times as much CO₂ as the atmosphere. 98% of the CO₂ stored on land is in forests and cropland while 2% is in deserts and grazing land used for animal agriculture.
- In the past 10,000 years, humans have cut about 3 trillion trees, about half the trees on the planet –mainly to raise animals for food.
- If we restore the native ecosystems on the grazing lands that are currently being used for animal agriculture, we can reverse climate change.
- Forests are one of the most important solutions to addressing the effects of climate change. Approximately 2.6 billion tonnes of carbon dioxide (one-third of the CO₂ released from other sources), is absorbed by forests every year.

Climate healers (2023)



Emission by sources



How people are experiencing climate change

- Expectation in temperature rise: a 2.8°C temperature rise by the end of the century.
- Climate scientists and policymakers agree that limiting global temperature rise to no more than 1.5°C would help us avoid the worst climate impacts and maintain a liveable climate.
- Climate change can affect our health, ability to grow food, housing, safety and work. Some of us are already more vulnerable to climate impacts, such as people living in small island nations and other developing countries.
- Conditions like sea-level rise and saltwater intrusion have advanced to the point where whole communities have had to relocate, and protracted droughts are putting people at risk of famine. In the future, the number of “climate refugees” is expected to rise.



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The crux of the matter

Why forestland matters for climate change mitigation



Forests provide important environmental services & irreplaceable economic opportunities

Sinks of carbon dioxide

The world's forests absorb and store carbon in both above and below ground biomass



Habitats for biodiversity conservation

The world's forest area primarily designated for biodiversity and forest within protected areas have increased since 1990



Providers of important environmental services

Forests managed for clean water supply, resilience against disasters, recreation, cultural and spiritual activities have increased since 1990

Sustaining livelihood and economic opportunities

Forests supply the world's population with wood and non-wood forest products. In low-income countries woodfuel is still the most important wood product



Using forests as a means of climate change mitigation

- Changing the carbon cycle and the effect on its concentrations in the atmosphere are crucial in reducing global warming and shaping climate change.
- Forests play important roles as both sinks and sources of carbon dioxide.
- Forests absorb carbon dioxide through photosynthesis, store it as carbon, and release it through respiration, decomposition and combustion.
- The capacity of a forest to act as a carbon sink increases with the forest's rate of growth and its ability to retain the carbon on a permanent basis.
- Vigorous young forests may sequester a great deal of carbon as they grow. In contrast, the vegetation and soils of old-growth forests typically store large quantities of carbon but add to these stocks at a slower rate.



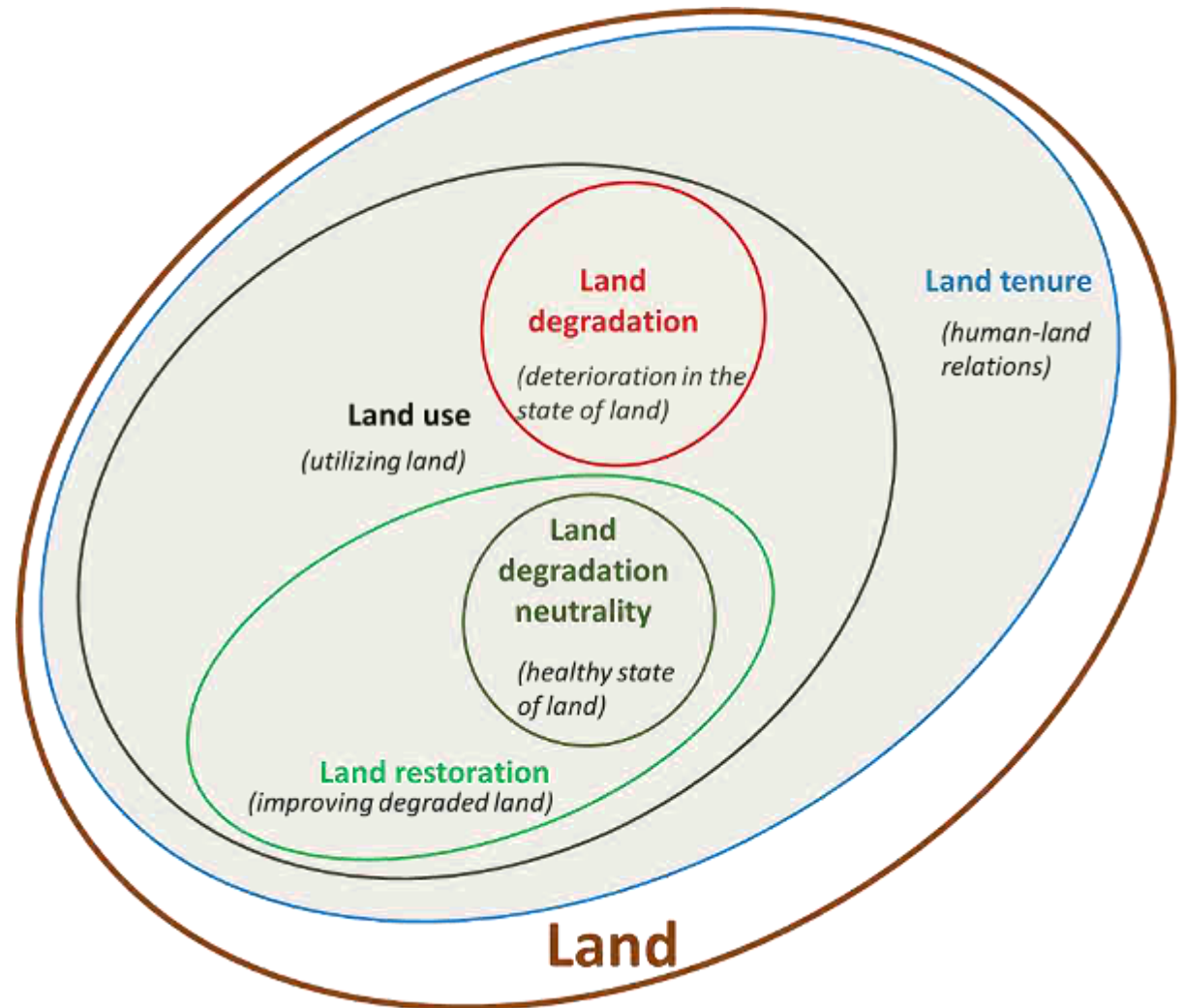
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Links between land tenure and forest degradation and afforestation
Forestland tenure helps with restoration of trees for climate change mitigation



Tenure and land degradation or restoration relations (neutral relations)

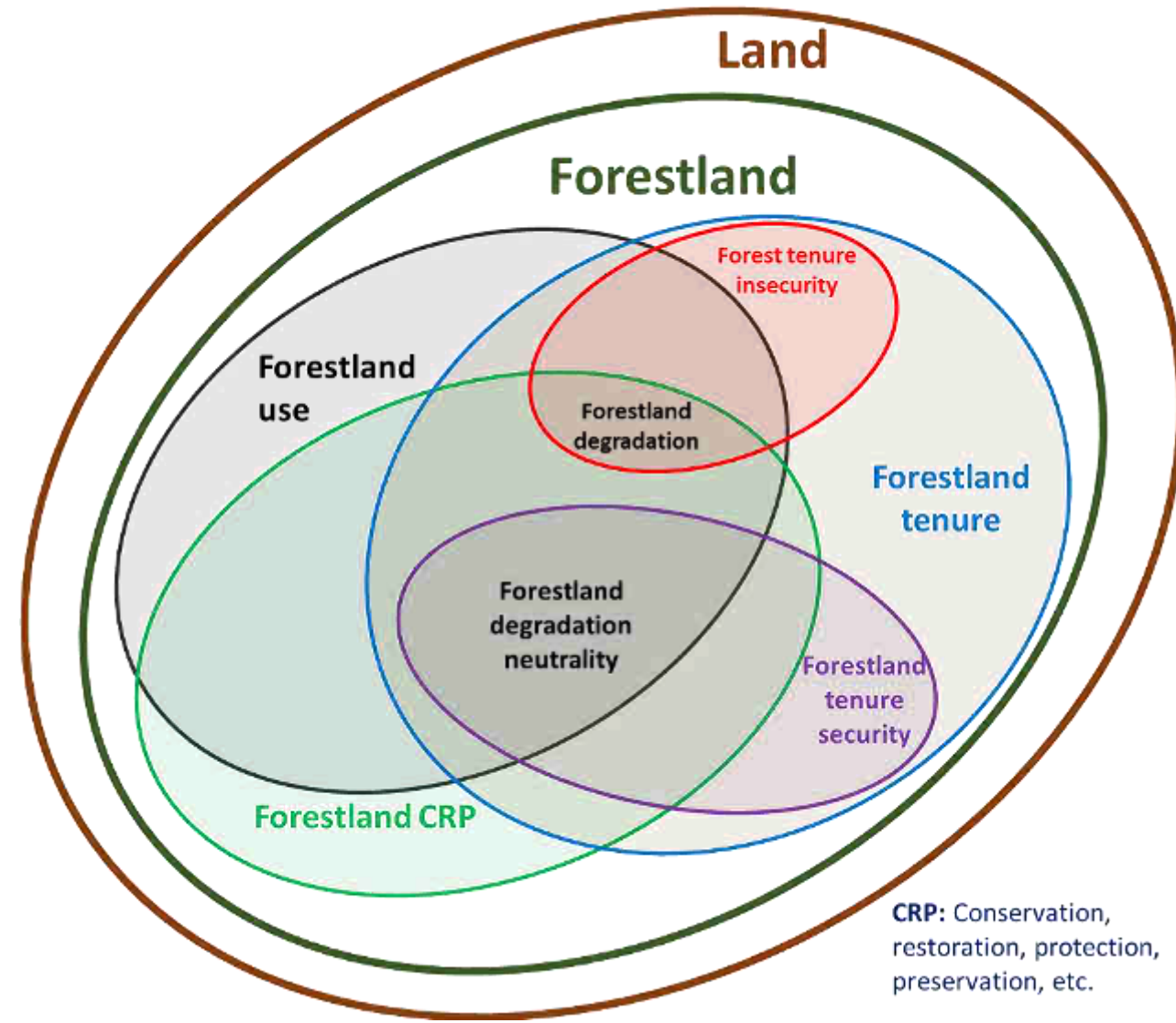
- In its neutral state land, degradation, degradation neutrality, tenure, restoration, and land use are intertwined within the concept of land.
- Land tenure is embedded in all land issue.
- Land use is embedded in
- tenure.
- Restoration and degradation are embedded within land use.





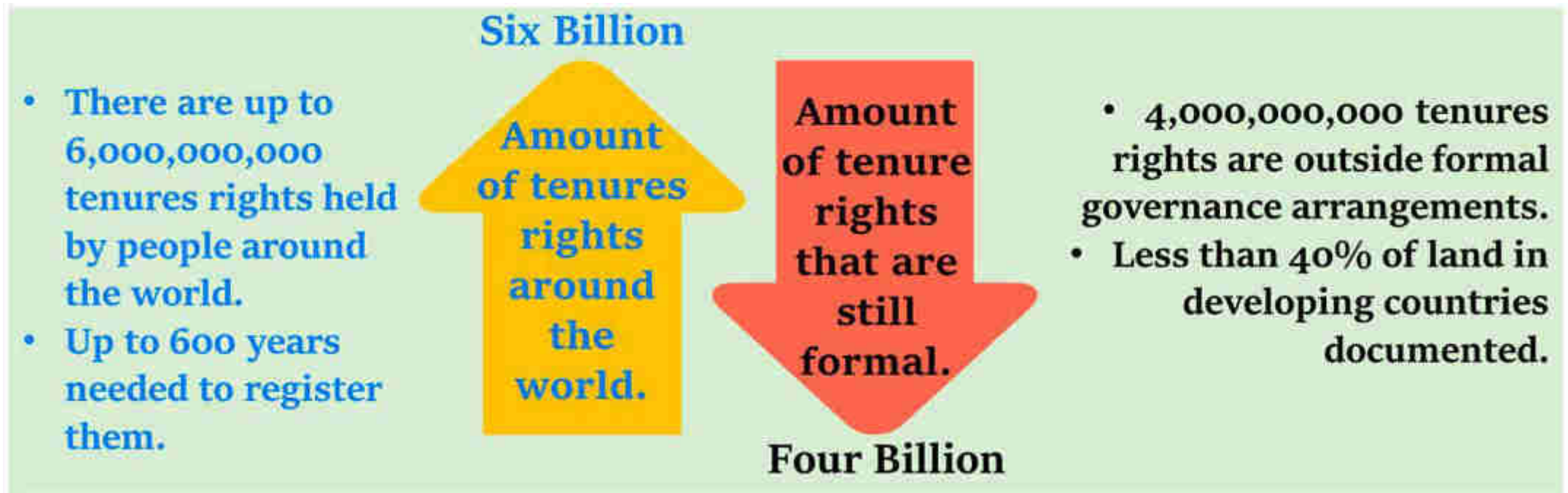
Tenure-restoration nexus (tenure responsive relations)

- Forestland tenure security (as opposed to tenure insecurity) “allows forestland users to exercise their tenure rights in the form of moral, legal, and social entitlements which accrue to the individuals or group for holding, owning, and using forestland.
- The presence of forestland tenure security serves as an enabler or and its absence serves as a disabler of forestlands for climate change mitigation





Forestland rights documentation is crucial for managing forests for climate change mitigation



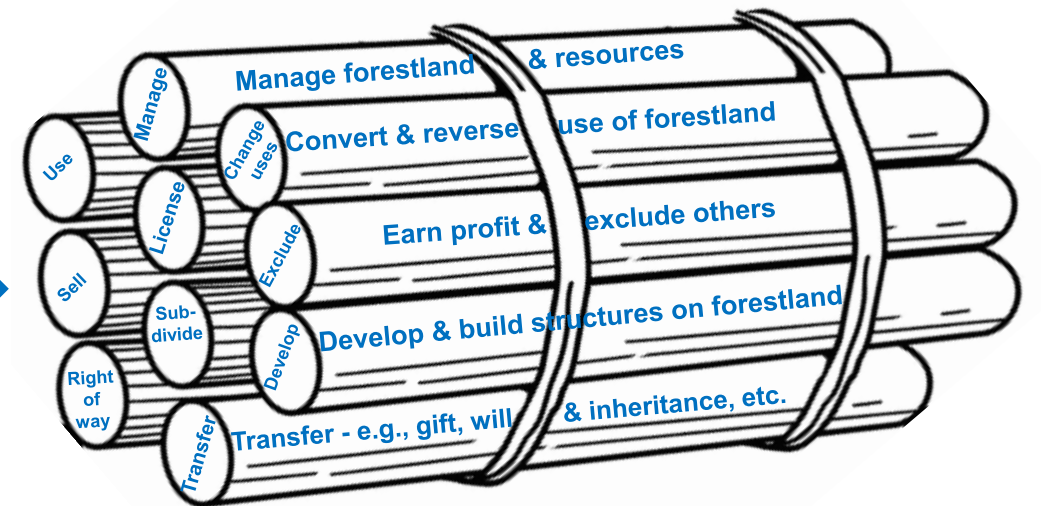
- The task of securing land tenure requires enormous efforts.
- As existing timeframes are unrealistic, alternative opportunities are necessary for formalising and strengthening tenure rights.



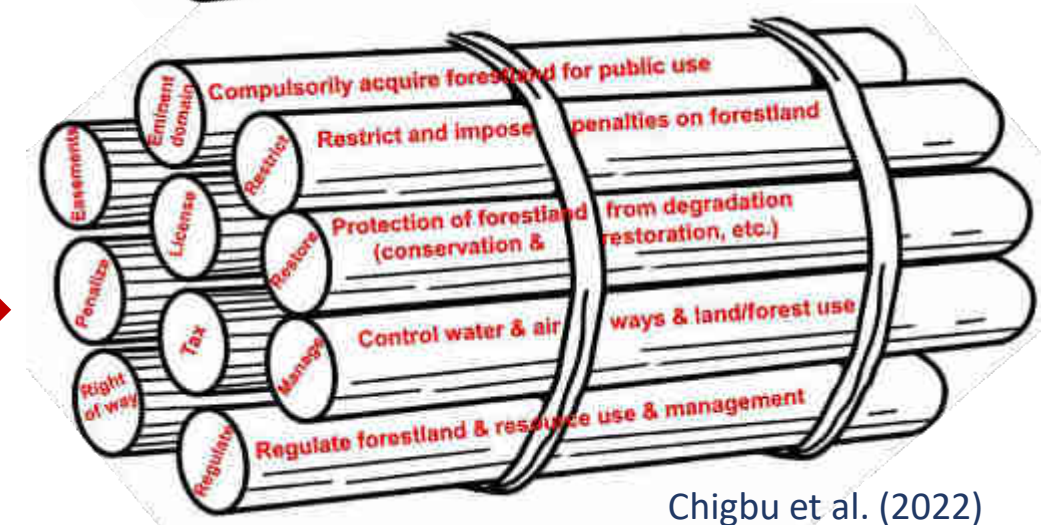
Forestland tenure consists managing a bundle of rights for enabling or disabling mitigation

- Climate change effects have plenty to do with managing bundle of forestland tenure rights
- Rights on forestland evolve depending on culture, practices and mechanisms for coping with challenges.
- How those who have them exercise them matters in CPR for climate change.

Typical bundle of rights which individuals and groups exercise on forestland

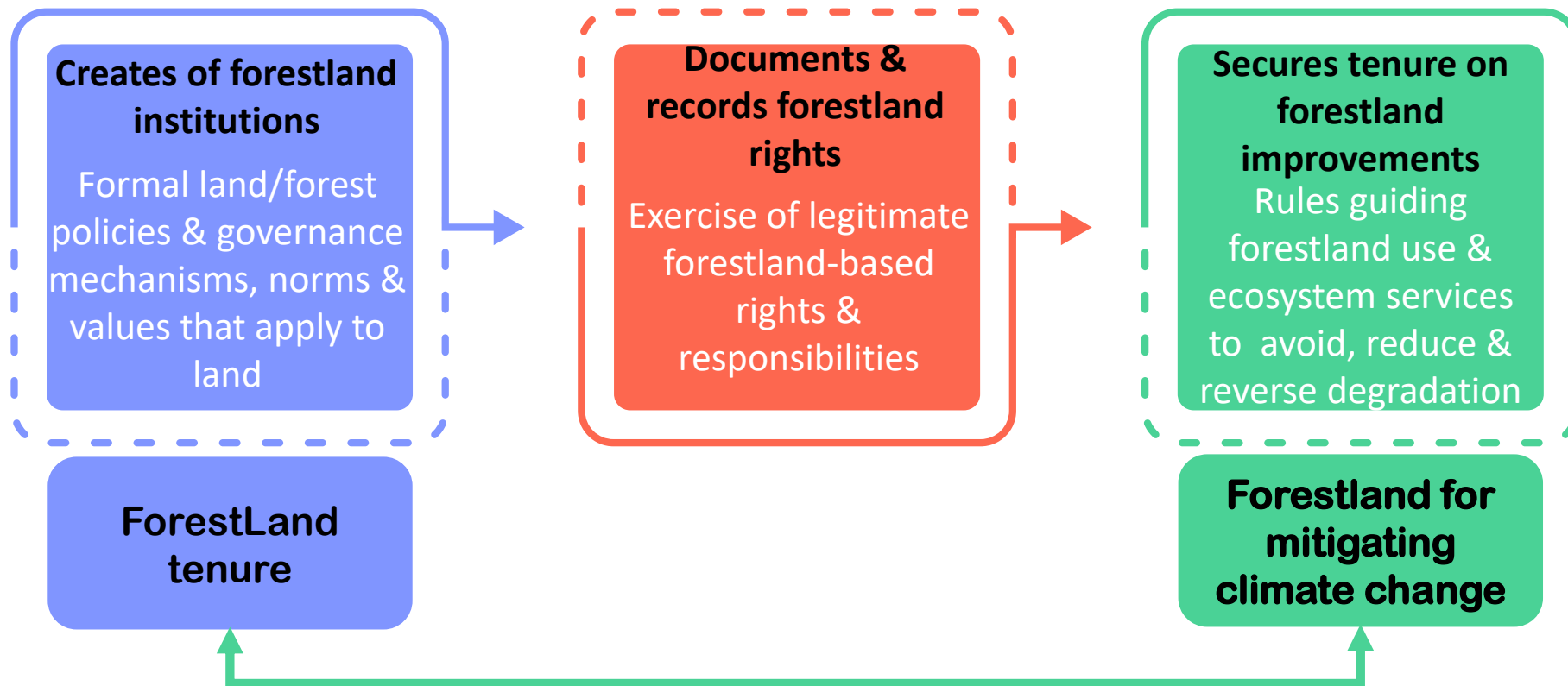


Typical bundle of rights which governments exercise on forestland





Forestland tenure for mitigating climate change



- **Forestland tenure security and forest/land restoration are linked** to one another, and actions in any one area often affects the other areas.
- **Documentation of forestland rights and human behaviour** are at the centre of whether we protect, conserve or restore forests.



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Forestland is crucial for climate change mitigation:
Evidences of “presence” and “absence” of forestland
tenure security



Evidences 1: Presence of forestland tenure security in climate change

- The application of customarily based governance of small-scale forestry in **Guinea** is a key social and environmental practice leading to restoration of forestland (Huntington and Marple-Cantrell, 2021).
- Creation of forest-use rules and regulations have been found to help with forest restoration in This allows for clearly defined regulations (including conservancy and **village bylaws**) and traditional practice of periodical (e.g., only morning and evening) forest use practices. This is common in south-eastern **Nigerian** villages.
- A forest restoration plan (in the **Central African Republic**) led to identifying tenure rights and the implications of the plan on people's land rights and livelihood options to enable users to make informed decisions to avoid overgrazing and forest/grassland fires and to reduce their impacts (IUCN et al., 2020).
- Enclosures has been reported to be used in the **Somali Region Pastoral Areas of Ethiopia** (Napier and Desta, 2011). In this custom, the pastoralists' traditional enclosures, considered protected grazing for calves, are strategies for forest regeneration.
- Local farmers in the **Sahel** have been known to conserve carbon in soils using **zero tilling** practices in **cultivation, mulching** and other soil management techniques (Osunade 1994).



Evidence 2: Absence of forestland tenure security in climate change

- In **DRC**, the lack of permission for the Pygmy groups to own forestland and exercise their forestland rights stifled them from gaining access to forests and protecting their indigenous species from arbitrary use and degradation (IUCN et al., 2020).
- **Globally**, weak conflict-resolution mechanisms enable large-scale land acquisitions, which cause tenure insecurity, and result in the lack of the responsibility to avoid forest degradation caused by large-scale land investors (Robinson and Raven, 2020).
- All over Africa, the abandonment of customary conservation practices, such as the observation of “**oracular rivers and forest**” and “**fallow**” agriculture has resulted in increasing deforestation and forest degradation (Orr et al., 2017). It has also reduced actions geared towards reducing degradation and reversing past degradation.
- In **Cameroon, Nigeria, and Kenya**, overlapping legal frameworks and legal pluralism create difficulties in following the customary system of forestland tenure. This usually leads to inappropriate use of forestland, which exacerbates existing forest degradation scenarios (UN-Habitat et al., 2012).
- In **Malawi**, communities (at households’ level) with tenure insecurity caused by informal short-term tenancy contracts and customary gender-biased inheritance practices are less likely to invest in forest and soil conservation measures (Lovo, 2006).



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Finally...

How those who have forestland rights exercise their rights matter in mitigating climate change



Securing forestland tenure is crucial for mitigating climate change

- People who have a long-term right or obligation on forestland are more likely to use the forest more productively.
- Those who have a short-term interest in forestland tend to use that forest inappropriately. This is because they are under immense pressure to reap benefit from the forest before the expiration of their short-term lease.
- If people do not have secure titles (or provable documented evidence) to the forest they are using, they misuse it because they have no defined responsibility to improve it.
- Those who own forestland (i.e., communal freehold) are more likely to engage in activities that would not lead to forest degradation.
- It is possible to own forestland through inheritances from ancestors (e.g., in customary and indigenous communities). Where this is the case, the customary/indigenous communities usually have traditional restorative knowledge can benefit climate change.
- Climate change objectives fail because users exploit the bundles of forestland rights that exist on the forest without fulfilling their responsibilities.



References for further discussion

1. Chigbu, U. E. (2023). Connecting land tenure to land restoration. *Development in Practice*, 1-9. <https://doi.org/10.1080/09614524.2023.2198681>
2. Chigbu, U.E., Chilombo, A., Lee, C., Mabakeng, M.R., Alexander, L., Simataa, N.V., Siukuta, M., and Ricardo, P. (2022). Tenure-restoration nexus: a pertinent area of concern for land degradation neutrality. *Current Opinion in Environmental Sustainability*, 57, 101200. www.sciencedirect.com/science/article/pii/S1877343522000525?via%3Dihub
3. Chigbu, U.E., Mabakeng, M.R. and Chilombo, A. (2021). Strengthening Tenure and Resource Rights for Land Restoration. *UNCCD Global Land Outlook Working Paper*. Bonn. <https://www.unccd.int/resources/global-land-outlook/strengthening-tenure-and-resource-rights-land-restoration>



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Thank you