



PART 3

Read the text below and answer questions 27–40.

FORESTS AND CLIMATE CHANGE: A COMPLEX INTERPLAY

Forests occupy a privileged position in climate debates because they affect the atmosphere through several mechanisms that do not always align. They are widely described as “carbon sinks”, yet this label can obscure the fact that forests simultaneously influence radiative forcing, surface energy exchange, and regional hydrology. A dense canopy generally darkens the land surface, reducing albedo and absorbing more incoming solar radiation than open ground. In high-latitude regions where snow cover is common, replacing bright snow with dark trees can increase warming even if carbon storage rises. At the same time, forests often cool the surface by evapotranspiration: water taken up by roots is released as vapour, removing heat from the land and increasing humidity. These competing pathways help explain why the climatic value of a forest cannot be captured by a single number.

The carbon dimension is also more conditional than popular summaries suggest. Forests store carbon in living biomass and soils, but the net balance depends on whether growth exceeds mortality and decomposition. When conditions are favourable, forests can accumulate carbon for decades; when stress increases, the balance can reverse. Warming can lengthen growing seasons and accelerate photosynthesis in some temperate systems, yet it can also intensify drought, raise vapour-pressure deficits, and push trees beyond physiological thresholds. In such cases, slower growth coincides with higher mortality, and dead wood and litter are broken down by microbes, releasing carbon dioxide back to the atmosphere. Under severe stress, forests may shift from a sink to a source, creating a carbon cycle feedback that further strengthens warming.

Disturbance has become a critical link between climate change and forest emissions, and wildfire is the most visible form. Fire is a natural process in many ecosystems, but hotter and drier conditions can increase the likelihood of extreme events that burn more intensely and spread more rapidly. High-severity fires can kill mature trees, destroy seed sources, and damage soils, reducing the capacity for rapid recovery. Carbon that was accumulated over years can be released in days, while regrowth may be slow or uncertain if repeated droughts occur or if invasive grasses increase flammability. Smoke can travel long distances and harm human health far from the burn area, turning forest disturbance into a public-health issue as well as an ecological one. These dynamics complicate mitigation claims that assume steady, predictable carbon uptake.



Water-related effects can amplify risk in ways that are often underestimated in carbon-only policies. Forests recycle moisture through evapotranspiration, influencing cloud formation and rainfall patterns. In some regions, large-scale deforestation reduces atmospheric moisture and can lower regional precipitation, pushing landscapes toward drier conditions that favour grasslands rather than forests. This shift matters because it can create self-reinforcing change: reduced rainfall stresses remaining trees, which then transpire less water, further weakening rainfall recycling. In the tropics, researchers have warned of tipping points in which continued loss and warming could trigger long-term drying and widespread ecosystem change. Such thresholds are difficult to locate precisely, but the possibility of abrupt transitions strengthens the case for protecting intact forests before resilience is eroded.

As these risks grow, adaptation has become a more prominent component of forest policy, yet it introduces trade-offs. Fuel reduction, controlled burning, and thinning can lower catastrophic fire risk by reducing fuel loads and altering stand structure. However, such interventions can be politically contentious, costly, and contested by stakeholders who worry about biodiversity impacts or short-term landscape disturbance. Another approach is assisted migration, in which species or genotypes from warmer or drier regions are introduced to improve future survival. This strategy may increase tolerance to heat and drought, but it carries ecological uncertainty, including the possibility of introducing pests or disrupting existing species interactions. In practice, adaptation decisions often reflect not only ecological science but also social legitimacy and governance capacity.

Carbon offset markets have increased interest in forest protection and restoration, but they have also amplified scrutiny of credibility. A central question is additionality: whether a project truly causes extra carbon storage beyond what would have happened anyway. If forests were unlikely to be cleared, crediting their protection risks paying for outcomes that were already probable. Permanence is another concern because disturbances such as fire, drought, or illegal clearing can release stored carbon in the future, undermining the climate benefit that was sold earlier. Leakage further complicates claims by shifting deforestation to other locations when pressure is displaced rather than reduced. Measurement challenges run through all of these debates because baselines and future risks are not directly observable; they depend on models, assumptions, and counterfactual scenarios.

For these reasons, a growing policy argument is that climate strategy should not chase the highest short-term carbon numbers at the expense of long-term stability. Diverse forests may accumulate carbon more slowly than fast-growing monocultures, yet they can be more resistant to disease, drought, and fire, and thus provide more durable climate



benefits. A resilience approach emphasises protecting intact forests, restoring connectivity across fragmented landscapes, and supporting Indigenous stewardship where it strengthens long-term governance and ecological continuity. It also treats forests as multi-service systems, where water regulation, biodiversity, and local livelihoods are integral to climate outcomes rather than side benefits.

Ultimately, forests illustrate a difficult reality: they can slow climate change, but climate change can also weaken forests' ability to help. The most credible role for forests in climate policy depends on limiting warming, reducing deforestation, and managing landscapes for changing disturbance regimes. Overstating certainty can backfire if promised carbon benefits fail to materialise under future stress. A more scientifically grounded approach recognises complexity, invests in monitoring and governance, and prioritises strategies that remain robust even as climate conditions continue to shift.

Questions 27–31

Select the correct answer.

27 Why does the passage imply that forests cannot be evaluated only through the idea of “carbon sinks”?

- A** Because carbon storage is unrelated to climate policy outcomes
- B** Because forests also alter radiative forcing and water–energy exchange in ways that can oppose carbon benefits
- C** Because forests always increase albedo and therefore cool the planet
- D** Because forests affect climate only when they are converted into farmland

28 What inference is made about warming and forest carbon balance?

- A** Warming increases growth everywhere and therefore strengthens sinks universally
- B** Warming mainly changes carbon storage through cloud formation rather than physiology
- C** Warming can both increase productivity and raise mortality, so net outcomes differ by region
- D** Warming reduces decomposition rates, leading to consistent long-term carbon gains

29 According to the passage, why can extreme fires undermine mitigation claims?

- A** They can release years of stored carbon rapidly while recovery may be slow or uncertain
- B** They prevent any carbon from entering the atmosphere because charcoal locks it away
- C** They reliably improve biodiversity, leading to faster carbon uptake everywhere
- D** They eliminate drought and therefore stabilise forests in all climates

30 What is suggested about large-scale deforestation and rainfall?



- A** Deforestation increases precipitation by exposing brighter soils
- B** Deforestation affects rainfall only through changes in ocean temperatures
- C** Deforestation raises rainfall because open land transpires more water than forests
- D** Deforestation can reduce regional precipitation by weakening moisture recycling

31 Which option best reflects the passage's policy-oriented conclusion?

- A** Forest offsets are straightforward because future risks can be directly observed
- B** Forest policy should prioritise strategies that remain durable under future disturbances
- C** Monoculture planting is presented as the strongest method for long-term resilience
- D** The passage argues that carbon markets eliminate the need for governance reforms

Questions 32–36

Choose **TRUE** if the statement agrees with the information given in the text, choose **FALSE** if the statement contradicts the information, or choose **NOT GIVEN** if there is no information on this.

32 The passage states that in snowy high-latitude regions, darker forest cover can increase warming by reducing albedo.

33 The passage suggests that high-severity fires can slow regeneration by killing mature trees and damaging soils.

34 The passage indicates that deforestation can contribute to drier regional conditions by weakening evapotranspiration-driven moisture recycling.

35 The passage states that controlled burning always increases biodiversity in every forest type.

36 The passage argues that carbon offset measurement is easy because baselines and alternative futures can be directly observed.

Questions 37–40

Complete the sentences below. Choose **ONE WORD ONLY** from the text for each answer.

37 Critics question whether offset projects create real extra storage, a concern known as

38 Forest credits are disputed because stored carbon may not last, raising doubts about

39 Offsets may fail if deforestation pressure is displaced to other places, which is called



40 A resilience approach may support long-term stability through Indigenous

Answer Key

27. B

28. C

29. A

30. D

31. B

32. TRUE

33. TRUE

34. TRUE

35. NOT GIVEN

36. FALSE

37. additionality

38. permanence

39. leakage

40. stewardship