Unit 16 · Vegetation

STUDY NOTES

WHAT NEB'S GRADE 11 EXAM ASKS

- **CDC's grid (2077):** Vegetation: 2 of 75 marks, 2 MCQs (one knowledge, one understanding); with Floral Diversity and Ecology a combined 26
- **The paper:** 11 MCQs × 1 · 8 short × 5 · 3 long × 8; 3 hours; 1 mark per expected point
- **CDC's model paper:** MCQ (1) on **in-situ** conservation
- **MCQ (1 mark)**
  - natural vs cultivated vegetation
  - belt from its height or trees (alpine: no trees; subtropical: chilaune, katus)
  - what "about 44 %" means (forest + other wooded land)
  - in-situ or ex-situ; which is a Ramsar site
  - why seeds are kept dry and cold
  - what follows deforestation (runoff, erosion)
- **The exercise also asks** (short)
  - role of vegetation; soil; erosion control; world economy
  - vegetation types of Nepal by altitude
  - in-situ vs ex-situ; botanical gardens; seed banks
  - deforestation: causes, consequences, measures

Key terms

Vegetation: plant life of a region or habitat.

Natural vegetation: grown without help from people; **virgin vegetation**: never disturbed.

Bioclimatic zone: altitude belt with its own climate and plants.

Tree line: ~4,000 m, where trees stop.

In-situ conservation: protecting species **in their own habitat**.

Ex-situ conservation: protecting them **outside their habitat**.

Protected area: marked area cared for by law for nature and culture.

Buffer zone: area round a park where people live and share its income.

Ramsar site: wetland of international importance (Ramsar Convention, 1971).

Botanical garden: plants grown, labeled, kept for science, education.

Herbarium: collection of pressed, dried, named specimens.

Seed (germplasm) bank: store keeping seeds alive for a long time; **germplasm**: seeds, cuttings, tissue.

Recalcitrant seeds: die if dried or frozen (mango, litchi, tea).

Deforestation: loss of forest to other use or bare land.

Vegetation

- crops, orchards are vegetation, not **natural** vegetation
- decided by **climate** (rain more in east, little behind the Himalaya), **altitude** (~6 °C per 1,000 m), **slope, aspect**
- Dobremez (1976): **11 bioclimatic zones**; 118 ecosystems, 75 vegetation types (1995)

Importance

1. drives **water, carbon, nitrogen cycles** (transpiration; photosynthesis; nodules, utis)
2. shapes **soil**: roots break rock, **humus**; depth, chemistry, texture
3. **home and food** for animals
4. **food, timber, firewood, medicine** for people (willow → aspirin; chiraito, timur)
5. **holds soil**: **interception**, **infiltration**, less **overland flow**; cleared slope → runoff, erosion, springs weaker

Vegetation belts of Nepal

- **~60 m** (Kechana Kalan, Jhapa) to **8,848.86 m** (Sagarmatha, 2020) in ~200 km

Belt	Height	Plants
tropical	< ~1,000 m: Terai, Bhabar, Chure, inner Terai	*Shorea robusta* (sal), saj, karma, botdhayero, simal; sisau, khayar by rivers; chir pine on Chure ridges; phanta grasslands
subtropical	1,000–2,000 m	*Schima wallichii* (chilaune), *Castanopsis indica* (katus); chir pine on dry slopes; *Alnus nepalensis* (utis)
temperate	2,000–3,000 m	**oaks** (phalant, khasru, banj), maples, *Rhododendron arboreum* (lali gurans); blue pine, hemlock, deodar (west)
subalpine	3,000–4,000 m	*Abies spectabilis* (fir), *Betula utilis* (bhojpatra), *R. campanulatum*; tree line at top
alpine	4,000–5,000 m	**no trees**: dwarf rhododendrons, junipers, *Berberis*, *Caragana*; meadows, *Caltha*; yak pastures, yarsagumba
nival / tundra	> 5,000 m	**lichens, mosses**, cushion plants

- names and heights differ between books (temperate "deciduous"; subalpine as "temperate coniferous evergreen"); give the height and trees
- sal stops ~1,500 m: **frost** kills seedlings

Present state

- **FRA Nepal** (2010–2014): **forest 40.4 %** (5.96 million ha); other wooded land 4.4 % → **44.7 %** ("about 44 %")
- satellite map of 2010: 39.1 % forest, 29.8 % farmland; 23.4 % patch and edge forest; core forest 79.3 % inside protected areas, 63 % outside
- FAO: 1.4 % a year lost (2000–2005), ~530 km^2 a year
- 2022: forest + other wooded land **46.1 %** (43.4 % forest); hill tree cover nearly doubled (1992–2016), mostly regrowth
- figures differ by definition; quote whose and which year

In-situ and ex-situ conservation

- conservation: keep native plants, ecosystems, habitats diverse, healthy; save from loss, extinction

In-situ	Ex-situ
in own habitat	outside it
whole ecosystem	one or a few species
keeps evolving with surroundings	conditions made by people
large; cheap per species; poaching, fire hard to stop	small; costly; each one watched, bred
national parks, wildlife reserves, conservation areas, community forests	botanical gardens, zoos, seed banks, breeding centers (Khorsor elephants; Kasara gharials, vultures)

Protected areas (in-situ)

- kinds: national parks, wildlife reserves, conservation areas, natural, community, religious (Pashupatinath), leasehold forests
- Nepal ~885 km long, 147,181 km^2
- species (2014): ~6,973 flowering plants; 208 mammals, 867 birds, 123 reptiles, 117 amphibians, 230 fishes, 651 butterflies
- first: **Chitwan, 1973**
- 2017: **20 = 12 national parks**, **1 wildlife reserve** (Koshi Tappu), **6 conservation areas**, **1 hunting reserve** (Dhorpatan); Shuklaphanta, Parsa made parks 2017
- **Chhayanath** (Mugu, 2025) → **13** parks, 21 areas (exams may expect 12)
- with **buffer zones ~23 %** of Nepal

Ramsar sites: Convention **1971**; Nepal joined 1988; **10** sites (1987–2016)

- Koshi Tappu (1987); Bishazari, Ghodaghodi, Jagdishpur (2003); Gokyo, Gosaikunda, Phoksundo, **Rara** (2007); Mai Pokhari (2008); Pokhara lakes (2016)

Botanical gardens (ex-situ)

- Theophrastus' garden; Pisa (1544), Padua (1545); greenhouses, labs, **herbariums**; **IABG** (1954)
- uses
  1. material for **systematic studies**
  2. important plants of the region
  3. records of local **flora**
  4. seeds, material for research
  5. **rare, endangered** plants
  6. greenhouses for plants that can't live outdoors there
- Nepal (Department of Plant Resources): **Godawari** (1962, oldest, largest), Hetauda, Daman, Tistung, Dhanushadham, Mai Pokhari, Pokhara, Dhakeri, Mulpani, Dhitachaur, Devariya

Seed banks (ex-situ)

- crops (cereals, soybean, cotton, vegetables) and endangered wild plants
- **dried**, ~**−18 °C** (FAO): **dormant** seeds age slowly; decades to centuries
- tested; germination below ~**85 %** of start → **regenerated**
- **recalcitrant** seeds: field genebanks, tissue in tubes
- importance: **genes** for breeders (yield, disease, drought resistance); **genetic diversity** kept
- Svalbard (2008); Nepal's genebank, Khumaltar; Masada date seed (~2,000 years) sprouted

Vegetation and human activities

Deforestation

- 1970s–80s forecasts (World Bank 1979): hill forests gone by 1990; didn't happen; still lost in parts of Terai, Chure

Causes

1. growing **people and livestock**
2. **timber, firewood**
3. **overgrazing**: seedlings eaten, trampled
4. **spreading farmland** (Terai)
5. **building**: roads, dams, towns, mines

Hazards

1. **soil erosion** (forest < 0.1 t/ha a year; bare > 15 t, > 150×)
2. **lost fertility**
3. **changed climate**: less CO_2 taken up; carbon released; local rain changes
4. **lost habitat**
5. **floods, landslides**
6. **fewer forest products**: timber, firewood, fodder, herbs

Forest management

1. **afforestation**, reforestation
2. **community forests** (Forest Act **1993**; user groups; > 18,000; cut forest loss by ~⅓, 2000–2012)
3. **private forests**
4. **modern pest control** (natural enemies)
5. **agroforestry**
6. **strip plantation** (roads, canals, railways)
7. **alternative energy**: biogas, electricity, LPG, improved stoves
8. **herbal farming**
9. **public awareness**

- planting: not on natural grassland; native mixed trees; people involved; natural regrowth often cheaper

COMMON MISTAKES

✗ Crops are natural vegetation
✓ **cultivated**; natural vegetation grows without people.

✗ Alpine vegetation has forests of fir
✓ **no trees**; fir and birch are **subalpine**.

✗ Nepal's forest is 44 %
✓ **40.4 %** forest; 44.7 % with other wooded land (FRA 2010–2014).

✗ Zoos and seed banks are in-situ
✓ **ex-situ**; national parks are in-situ.

✗ Ex-situ protects the whole ecosystem
✓ **in-situ** does; ex-situ keeps chosen species.

✗ Every seed can be frozen
✓ **recalcitrant** seeds die if dried or frozen.

✗ Nepal's forests vanished as forecast
✓ hill forests **grew back** (community forests).