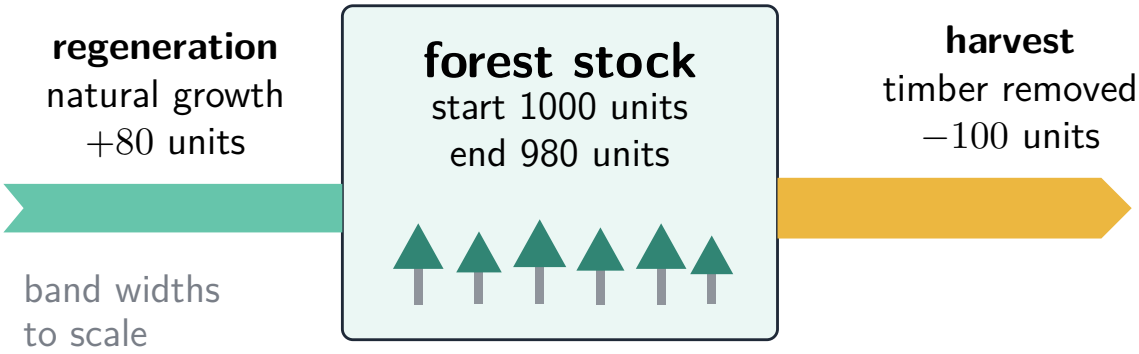
Exercise walk-through

7.1 Natural resources: uses and management

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An invented stock budget



$$1000 + 80 - 100 = 980 \text{ units}$$

harvest exceeds regeneration by 20

if these flows continue, the stock falls by 20 each period

the yield is sustainable only if harvest $\leq$ regeneration

> $1000 + 80 - 100 = 980$ units; use exceeds regeneration by 20 units.

Resource security: two water contexts

Singapore

Four National Taps: catchments, imports, NEWater and desalination.

Diversity improves resilience but needs energy, finance and quality management.

Jordan, 2023 strategy

About 61 m^3 **renewable** freshwater/person/year in the dated account.

Scarcity, demand, groundwater and unequal access; planned supply is not delivered capacity.

Check yourself

Your turn

A reusable item matches disposable energy at 20 uses and grows more slowly thereafter. At which whole-number use does it first use less?

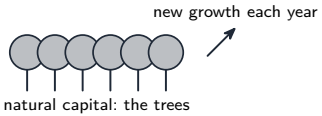
A. 21 uses.

B. 20 uses.

C. 19 uses.

Exercises 2.1·2.2

2.1 Distinguish between natural capital and natural income, using a forest as an example. [2]

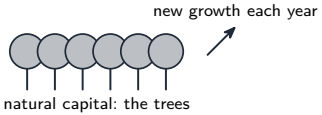


2.2 Explain, with an example, why the value of a natural resource can change over time. [3]



Exercises 2.1·2.2

2.1 Distinguish between natural capital and natural income, using a forest as an example. [2]



2.1

natural capital: the stock of the resource, e.g. all the trees in the forest; natural income: the yield or flow from it, e.g. the new wood that grows each year

2.2 Explain, with an example, why the value of a natural resource can change over time. [3]



2.2

a resource only has value when people need it and have the technology to use it; e.g. lithium was of little use until rechargeable batteries; demand for electric cars raised its value; value can also fall, e.g. coal as countries move to renewables

exercises.lol exercises.com.cn

Exercise 3.1 (a)

3.1 A managed forest holds $50\,000$ m^3 of timber. The trees add 4% of this volume each year.

(a) Calculate the sustainable yield of timber per year. [2]



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(a) $0.04 \times 50\,000 = \mathbf{2000}$ m^3 per year

Exercise 3.1 (b)

3.1 A managed forest holds $50\,000$ m^3 of timber. The trees add 4% of this volume each year.

(b) The owner harvests $3\,500$ m^3 a year. Explain the effect on the forest over time. [2]

Exercise 3.1 (b)

3.1 A managed forest holds 50 000 m^3 of timber. The trees add 4% of this volume each year.

(b) The owner harvests 3 500 m^3 a year. Explain the effect on the forest over time. [2]

(b) harvest is 1500 m^3 more than growth each year, so the stock (natural capital) falls; a smaller stock grows less each year, so the sustainable yield falls too, until the forest may be lost

Exercise 3.2 (a)

3.2 Mangrove forests grow along tropical coasts.

(a) Identify **two** ecosystem services provided by mangroves. [2]



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3.2 Mangrove forests grow along tropical coasts.

(a) Identify **two** ecosystem services provided by mangroves. [2]



(a) any two: protect coasts from storms and erosion; nursery for fish; store carbon; timber and fuel; filter water

Exercise 3.2 (b)

3.2 Mangrove forests grow along tropical coasts.

(b) Evaluate giving mangrove ecosystem services a money value. [3]

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(b) Evaluate giving mangrove ecosystem services a money value. [3]

(b) strength: a money value lets services be compared with the profit from clearing, e.g. for shrimp farms, so they are counted in decisions; limitation: many values (cultural, spiritual, existence) are hard to price, and estimates vary widely; judgement: useful as one tool alongside other values