Aula 4
Projeto, Solo

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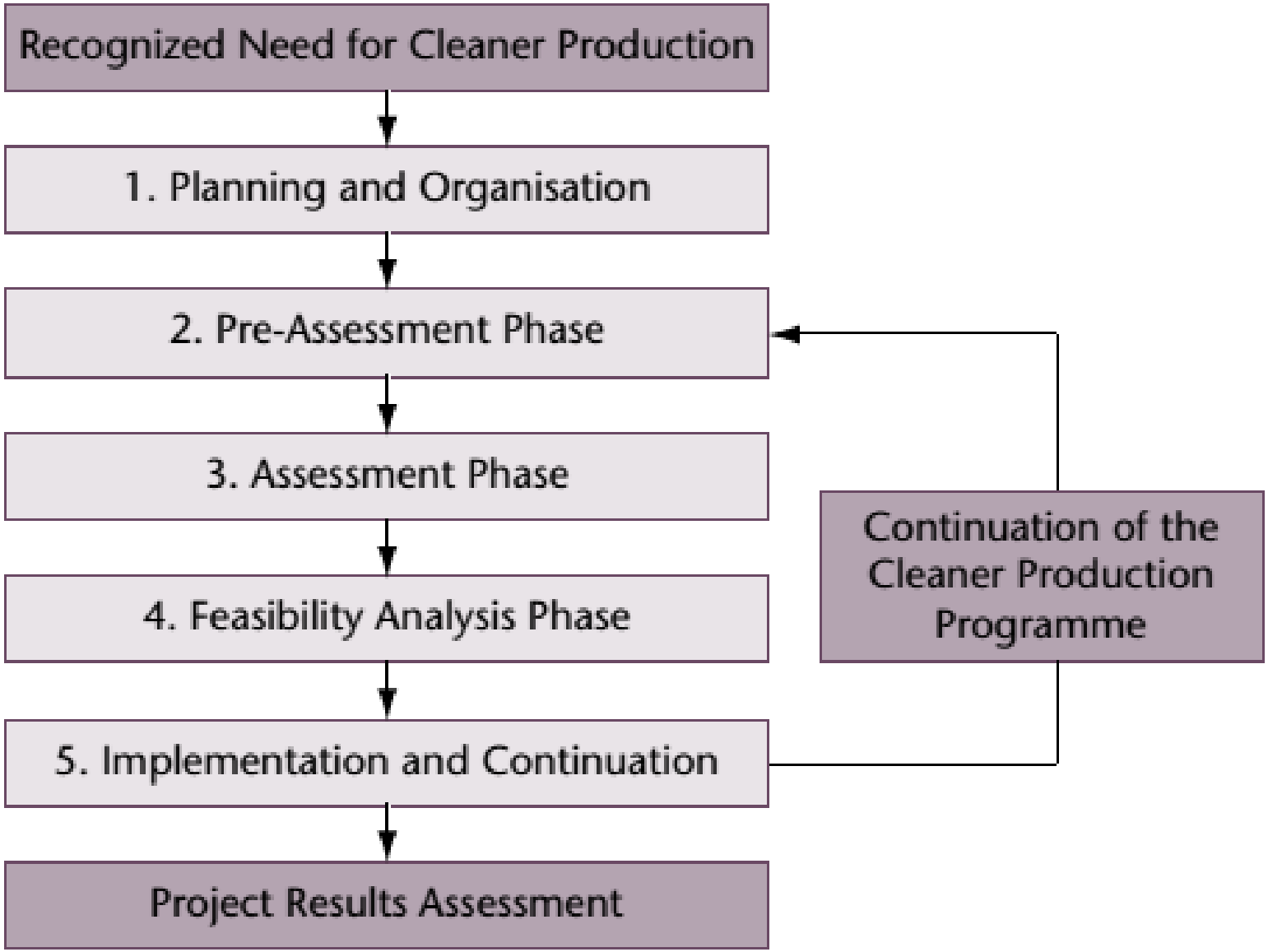
Estrutura do projeto

- Introdução (Apresentação)
  - do problema
  - da entidade onde será desenvolvido (empresa etc...)
- Objetivos
- Metodologia
- Resultados esperados
- Cronograma (tabela)

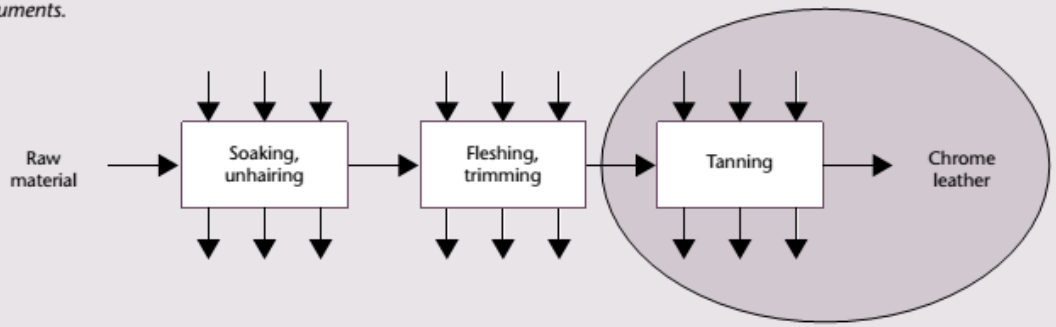

Recognized Need for Cleaner Production
1. Planning and Organisation
2. Pre-Assessment Phase
3. Assessment Phase
4. Feasibility Analysis Phase
5. Implementation and Continuation
Project Results Assessment
Continuation of the Cleaner Production Programme

Avaliação

- 1. Produção Mais Limpa. Método UNEP / UNIDO
- 2. Planejamento e Organização Produção Mais Limpa.
- Obter Compromisso de Gestão. Estabelecer uma equipe de projeto. Desenvolver Política Ambiental, Objetivos e Metas. Planejar a Avaliação da Produção Mais Limpa .
- 3. Pré -avaliação.
- Descrição da empresa e Fluxograma. Walk-through de Inspeção. Estabelecer um Foco.
- 4. Avaliação .
- Coleta de dados quantitativos. Levantamento de material. Identificar Oportunidades de Produção Mais Limpa. Anotar e Classificar opções.
- 5. Avaliação e Estudo de Viabilidade .
- Avaliação Preliminar. Avaliação Técnica. Avaliação Econômica. Avaliação Ambiental. Selecione Opções viáveis.
- 6. Implementação e continuação.
- Prepare um plano de implementação. Implementar opções selecionadas. Monitorar o desempenho. Sustentar atividades mais limpas de produção
- ISO 14001

Case Study 4.2 Material Balance for Tanning in Leather Treatment

This example focuses on the constructing of material balance for the tanning process in leather treatment technology. *Please note that the figures used in this exercise do not represent a real situation. They are ball park figures drawn from various documents.*



Process inputs

Inputs and water usage:

Hides processed	40 tonnes/day
Process water (tannage)	30 m³/day
Rinse water (tannage)	140 m³/day
Total plant water	1800 m³/day
Tanolin (16% Cr)	2076 kg/day (322 kg Cr/day) (8 kg Cr/tonne of hides)

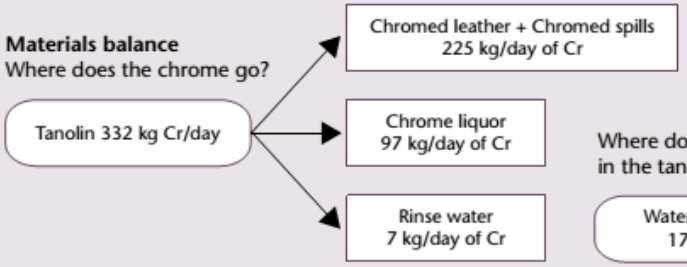
Waste reuse/recycling:

There is no recycling of waters or solids.
Expected absorption rate of Tanolin is 70% (i.e. 30% is wasted).

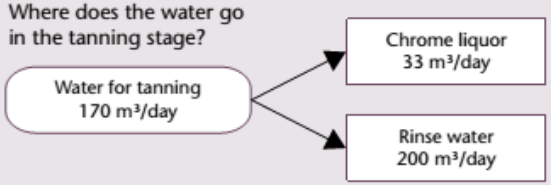
Process outputs

Chrome leather	7 tonnes/day
Trimmings and shavings	7 tonnes/day
(Containing together	*225 kg Cr/day)*
Tanning liquors	33 m³/day 90 kg Cr/day
Tanning rinse waters	200 m³/day 7 kg Cr/day
Total plant wastewater	1800 m³/day

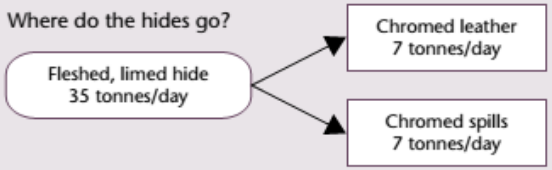
Materials balance
Where does the chrome go?



Where does the water go in the tanning stage?



Where do the hides go?



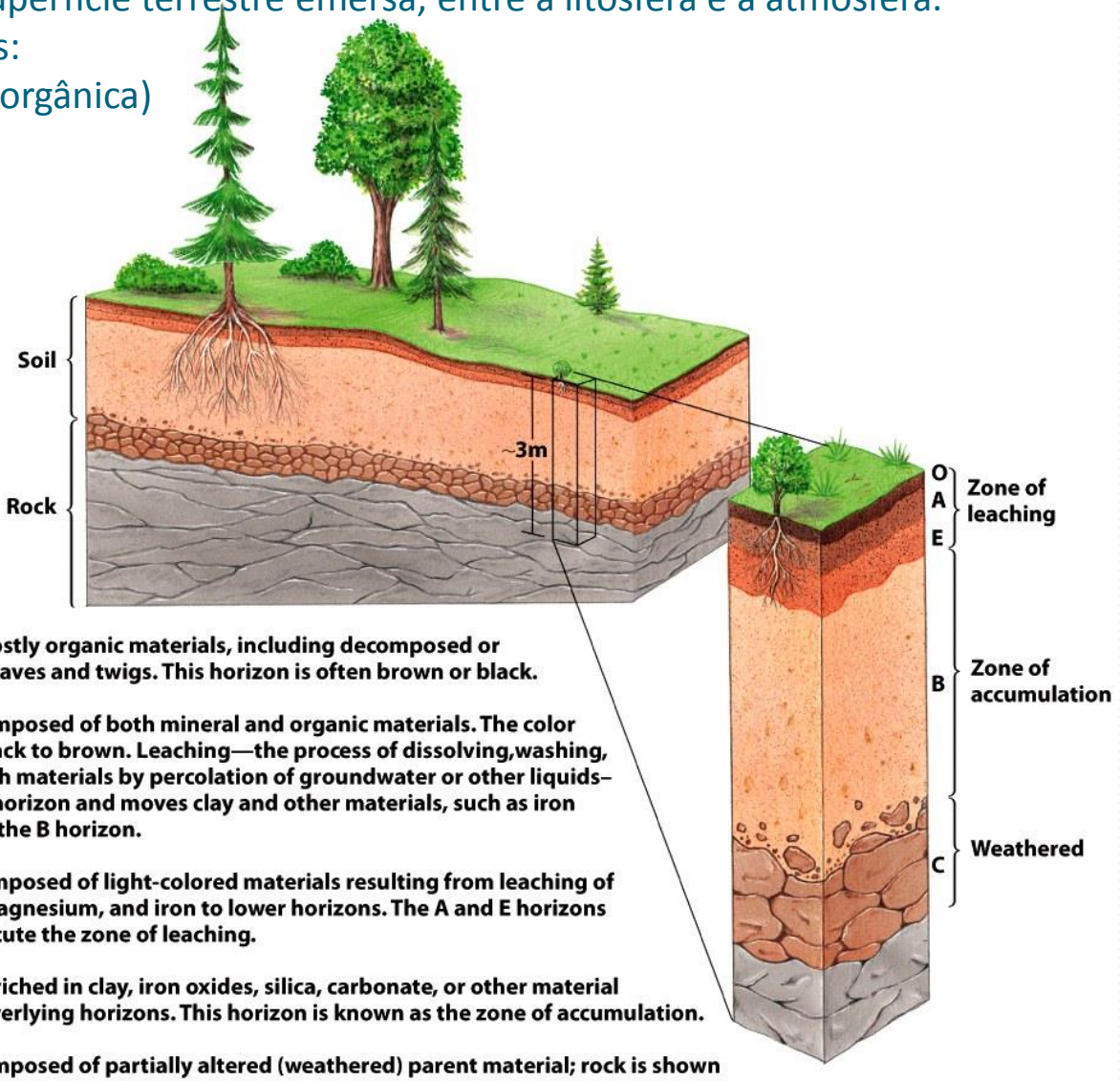
Source: UNEP, 1996b.

O que é o solo?

material inconsolidado que cobre a superfície terrestre emersa, entre a litosfera e a atmosfera.

Os solos são constituídos de três fases:

- sólida (minerais e matéria orgânica)
- líquida (solução do solo)
- gasosa (ar)



Horizons

O **Horizon is mostly organic materials, including decomposed or decomposing leaves and twigs. This horizon is often brown or black.**

A **Horizon is composed of both mineral and organic materials. The color is often light black to brown. Leaching—the process of dissolving,washing, or draining earth materials by percolation of groundwater or other liquids–occurs in the A horizon and moves clay and other materials, such as iron and calcium, to the B horizon.**

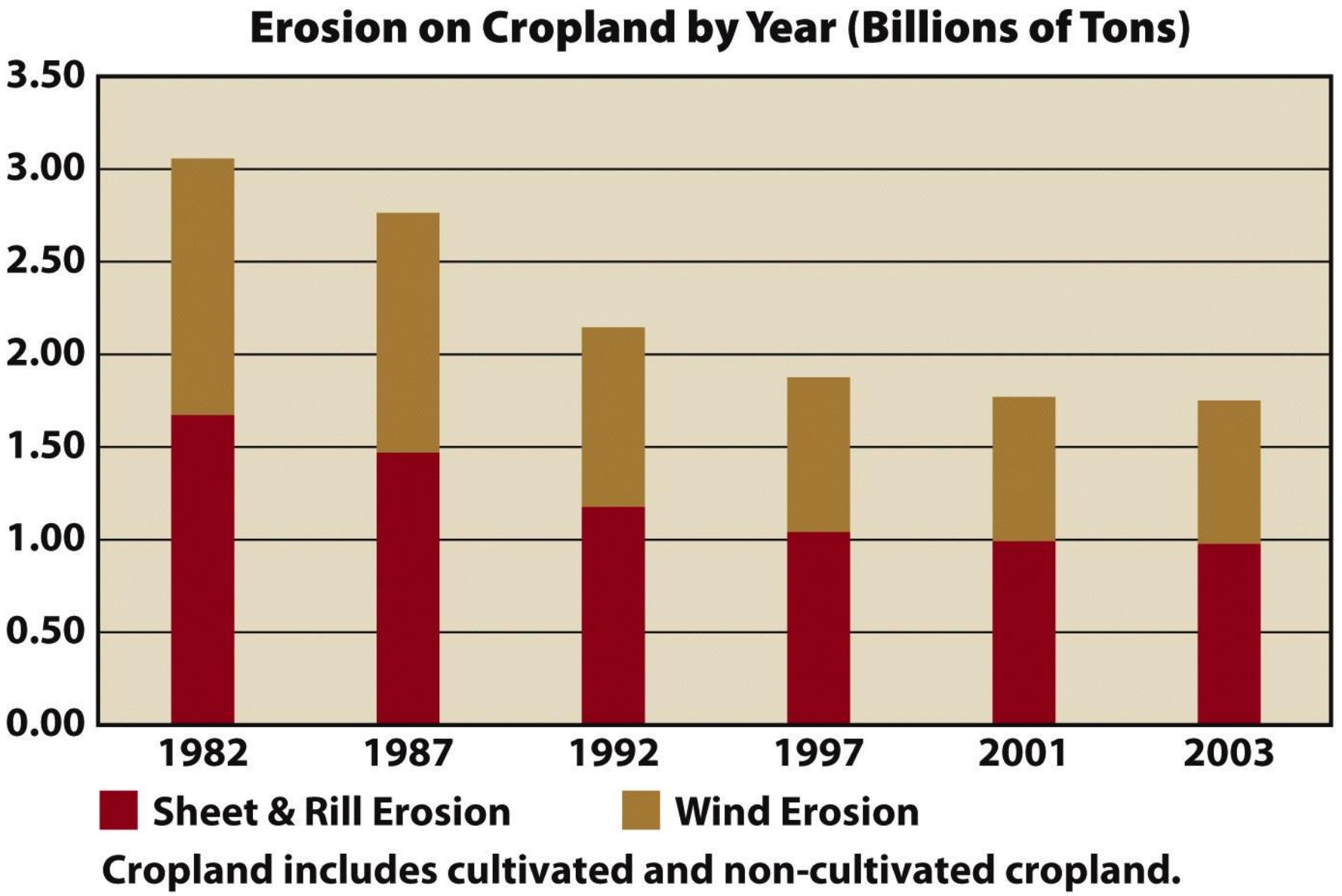
E **Horizon is composed of light-colored materials resulting from leaching of clay, calcium, magnesium, and iron to lower horizons. The A and E horizons together constitute the zone of leaching.**

B **Horizon is enriched in clay, iron oxides, silica, carbonate, or other material leached from overlying horizons. This horizon is known as the zone of accumulation.**

C **Horizon is composed of partially altered (weathered) parent material; rock is shown here, but the material could also be alluvial in nature, such as river gravels, in other environments. This horizon may be stained red with iron oxides.**

R **Unweathered (unaltered) parent material. (Not shown)**

Erosão: o grande problema do solo agrícola



Taxa de desertificação

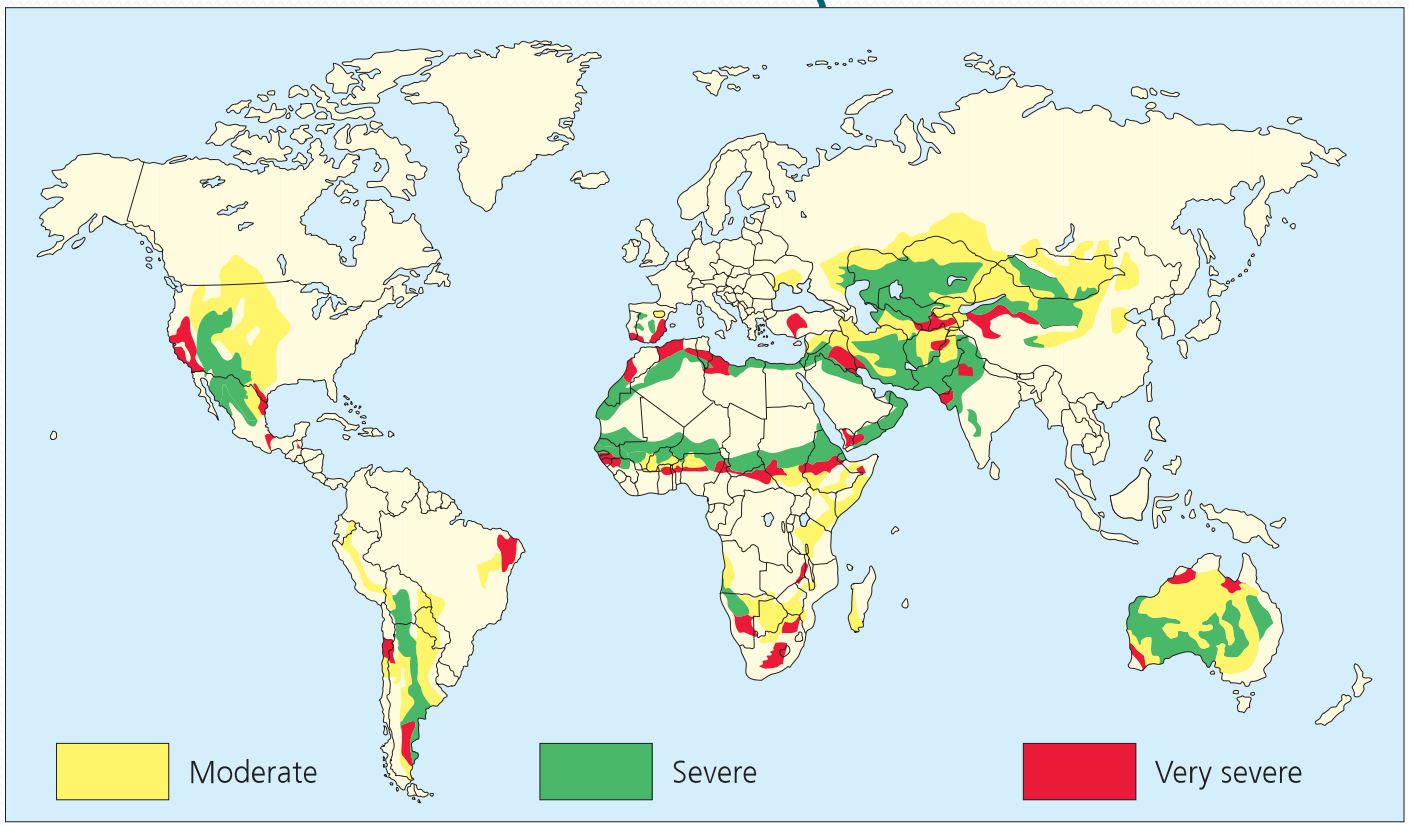


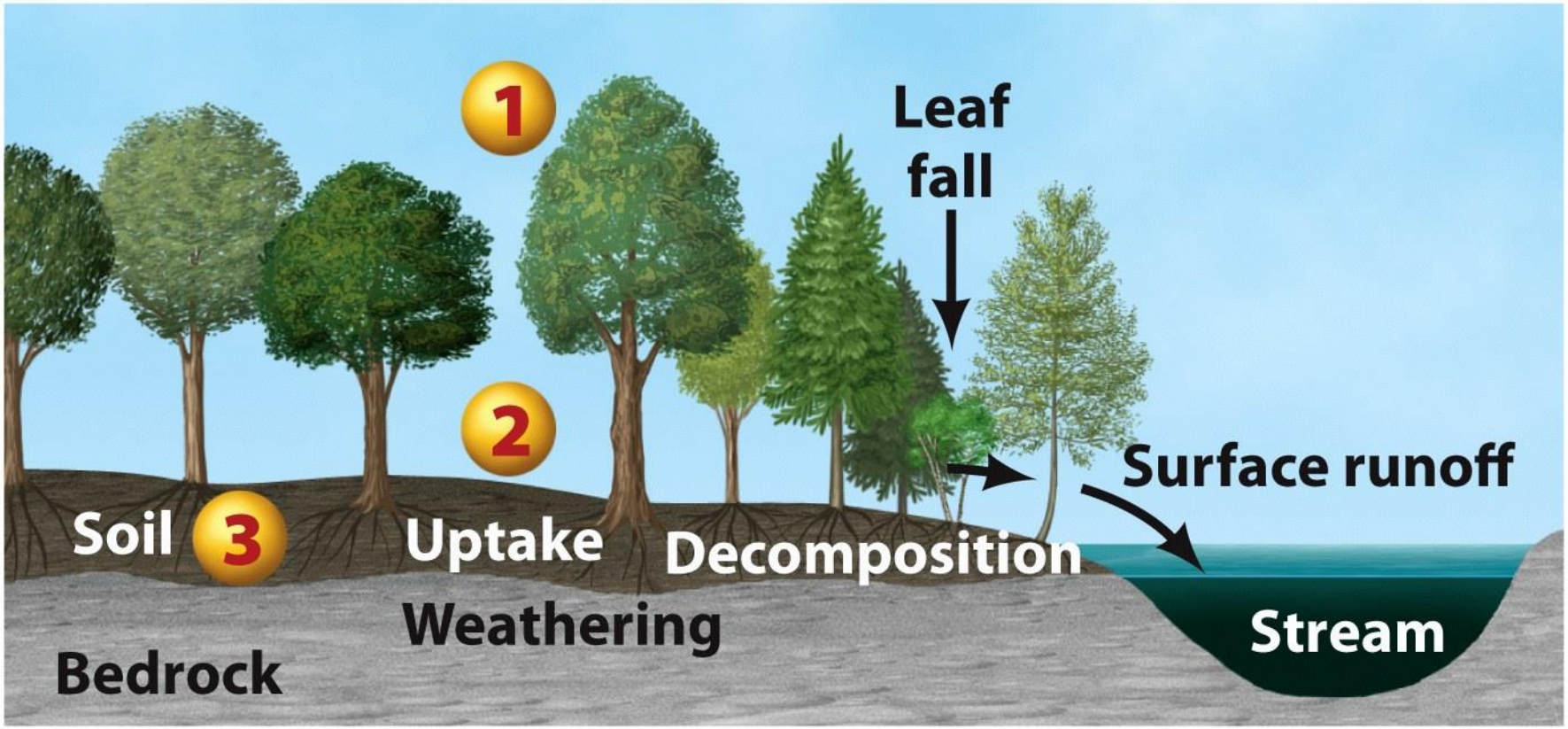
Figure 12-13 Natural capital degradation: desertification of arid and semiarid lands. It is caused by a combination of prolonged drought and human activities that expose soil to erosion. **Question:** Can you see any geographical pattern associated with this problem? (Data from U.N. Environment Programme and Harold E. Drengue)

O avanço do deserto do Saara (África)

Figure 12-12 *Severe desertification.* Sand dunes threaten to engulf an oasis in the Sahel region of West Africa. Such severe desertification is the result of prolonged drought from natural climate change and destruction of natural vegetation from human activities such as farming and overgrazing.

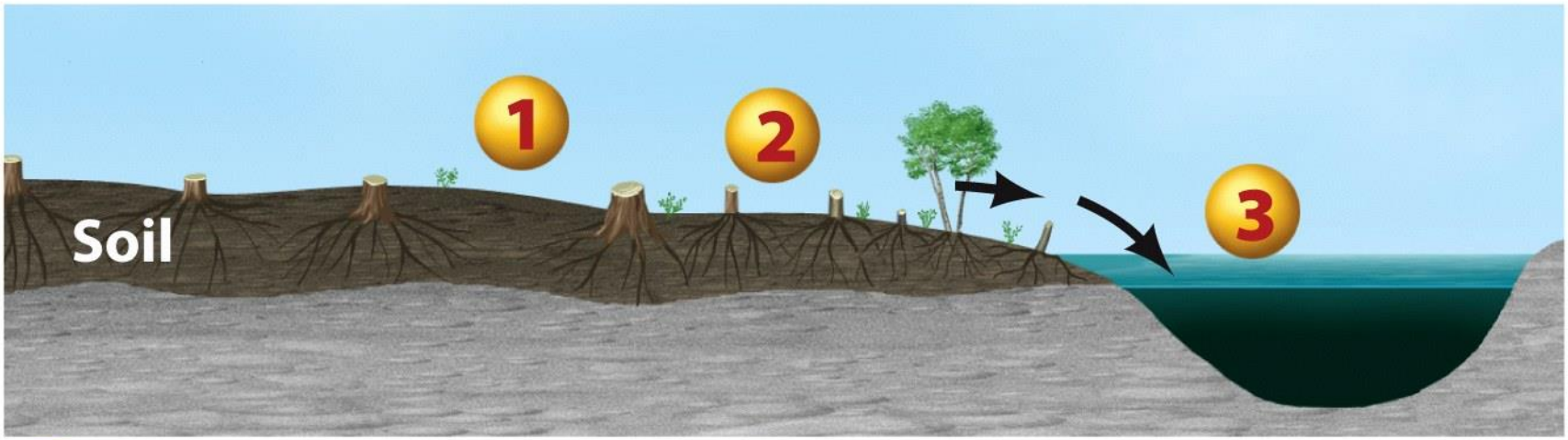
Voltchev-UNEP/Peter Arnold, Inc.

A vegetação tem um papel essencial na proteção do solo



1. Trees shade ground.
2. In cool shade, decay is slow.
3. Trees take up nutrients from soil.

A vegetação tem um papel essencial na proteção do solo



1. Branches and so on decay rapidly in open, warm areas.
2. Soil is more easily eroded without tree roots.
3. Runoff is greater without evaporation by trees.

Feedback positivo:

desmatamento causa mais desmatamento

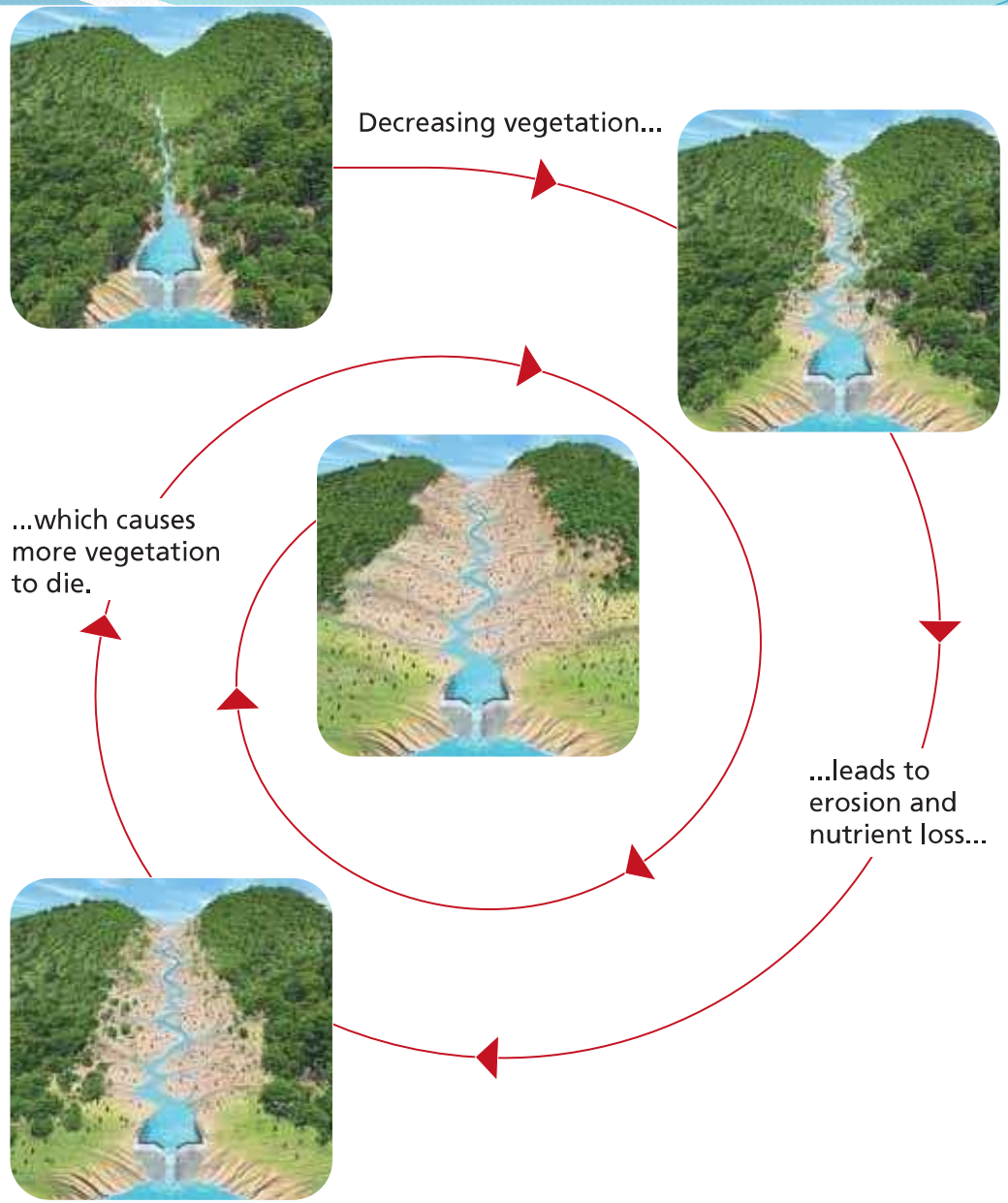
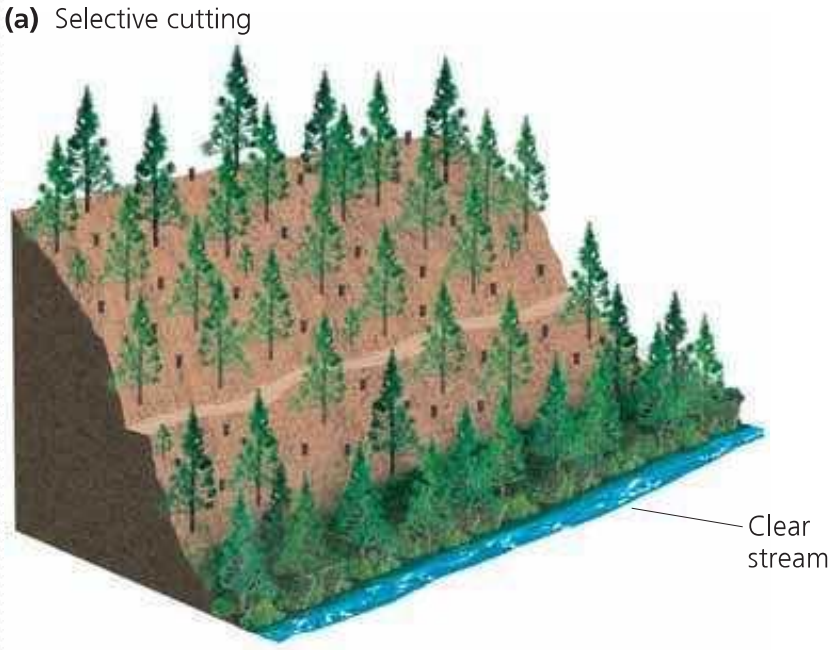
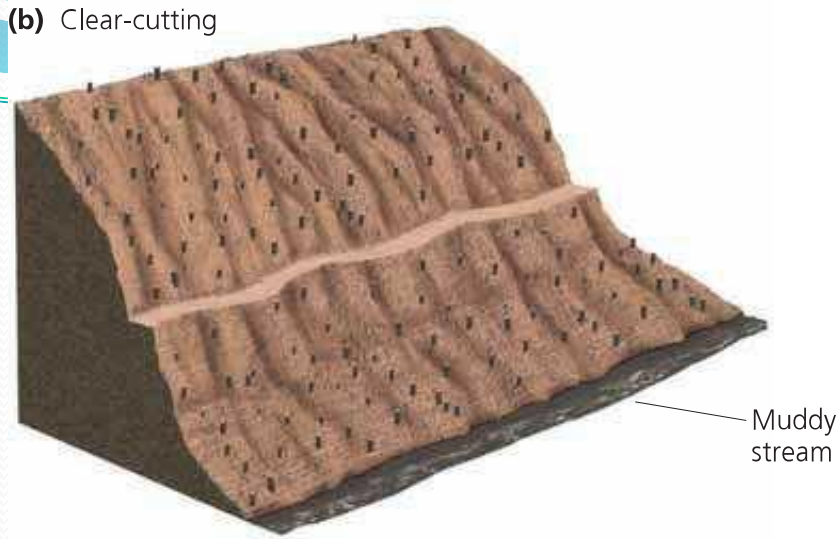


Figure 2-11 *Positive feedback loop.* Decreasing vegetation in a valley causes increasing erosion and nutrient losses, which in turn causes more vegetation to die, which allows for more erosion and nutrient losses. The system receives feedback that continues the process of deforestation.

Diferentes modos de extração de madeira

Se você fosse o dono do terreno, o que faria?





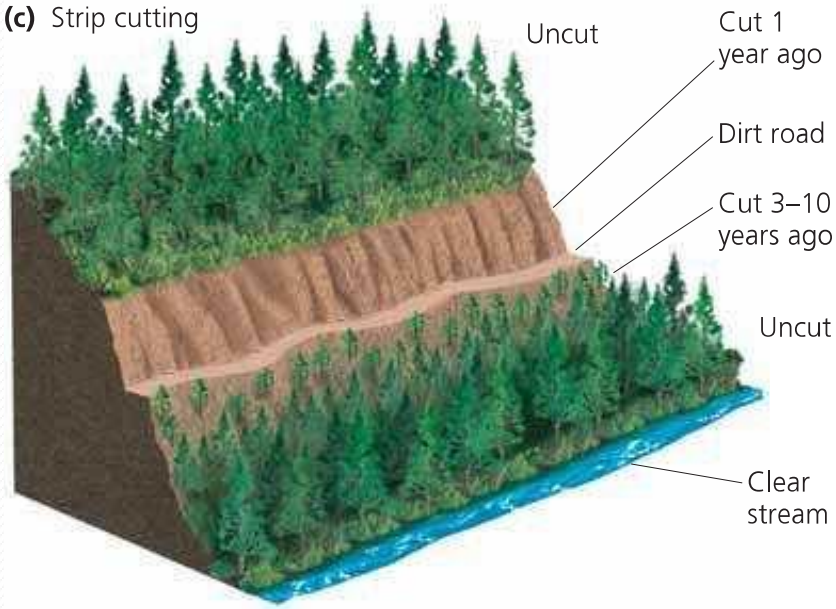


Figure 10-6 Major tree harvesting methods. **Question:** If you were cutting trees in a forest you owned, which method would you choose and why?

Clear-cut (corte raso)

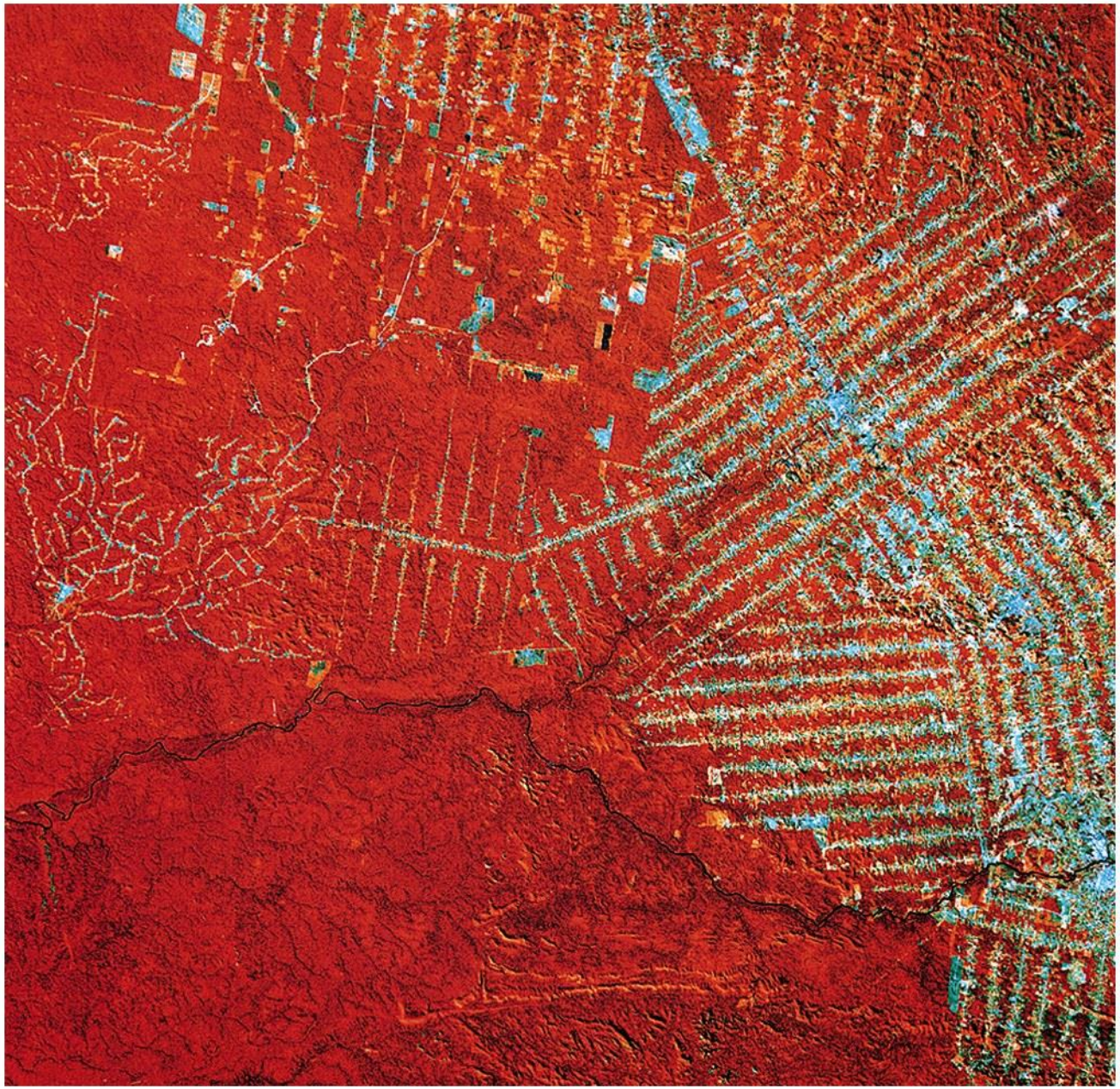
TRADE-OFFS

Clear-Cutting Forests

Advantages		Disadvantages
Higher timber yields		Reduces biodiversity
Maximum profits in shortest time		Destroys and fragments wildlife habitats
Can reforest with fast-growing trees		Increases water pollution, flooding, and erosion on steep slopes
Good for tree species needing full or moderate sunlight		Eliminates most recreational value

Figure 10-8 Advantages and disadvantages of clear-cutting forests. **Question:** Which single advantage and which single disadvantage do you think are the most important? Why?

Processo de desmatamento



Desmatamento

UNEP/GRID-Sioux Falls

UNEP/GRID-Sioux Falls

Figure 3-1 **Natural capital degradation:** satellite image of the loss of tropical rain forest, cleared for farming, cattle grazing, and settlements, near the Bolivian city of Santa Cruz between June 1975 (left) and May 2003 (right).

Desmatamento

Figure 10-13 Satellite images of Amazon deforestation in the state of Rondônia, Brazil, between 1975 and 2001.

UNEP/GRID-Sioux Falls

UNEP/GRID-Sioux Falls

Solo degradado

Solo degradado

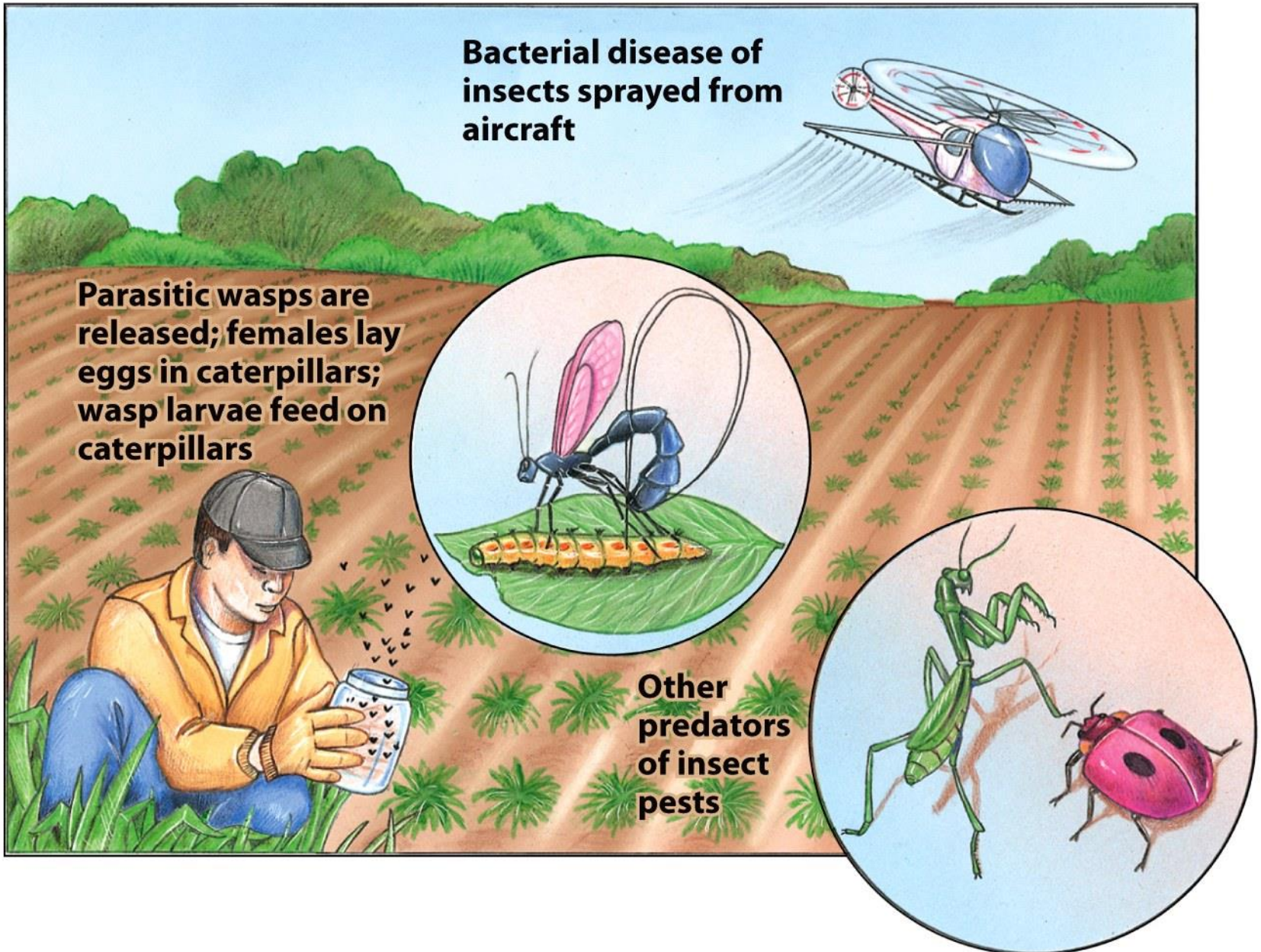
Solo degradado

Solo degradado

Terraceamento

Terraceamento

Controle de pragas



Utilização de fertilizantes do solo no planeta

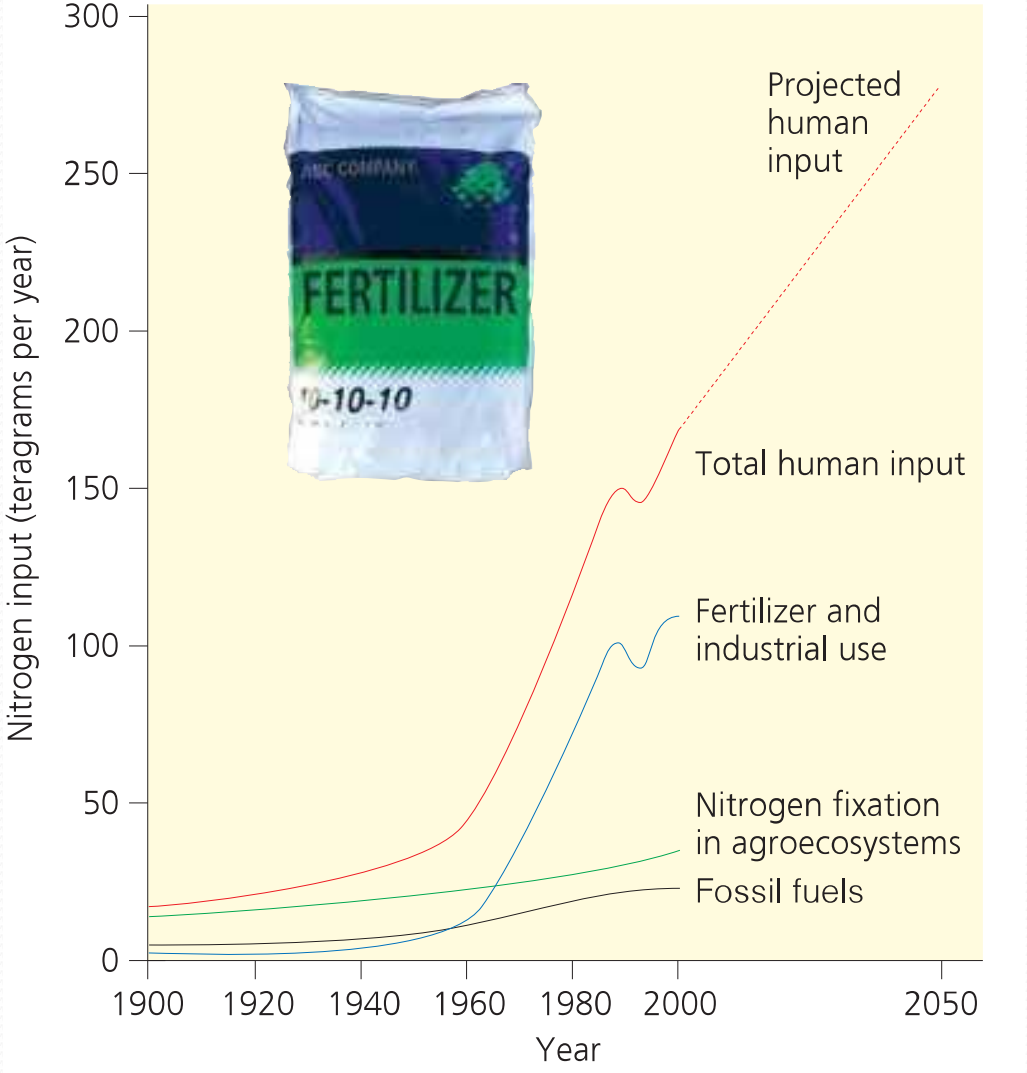
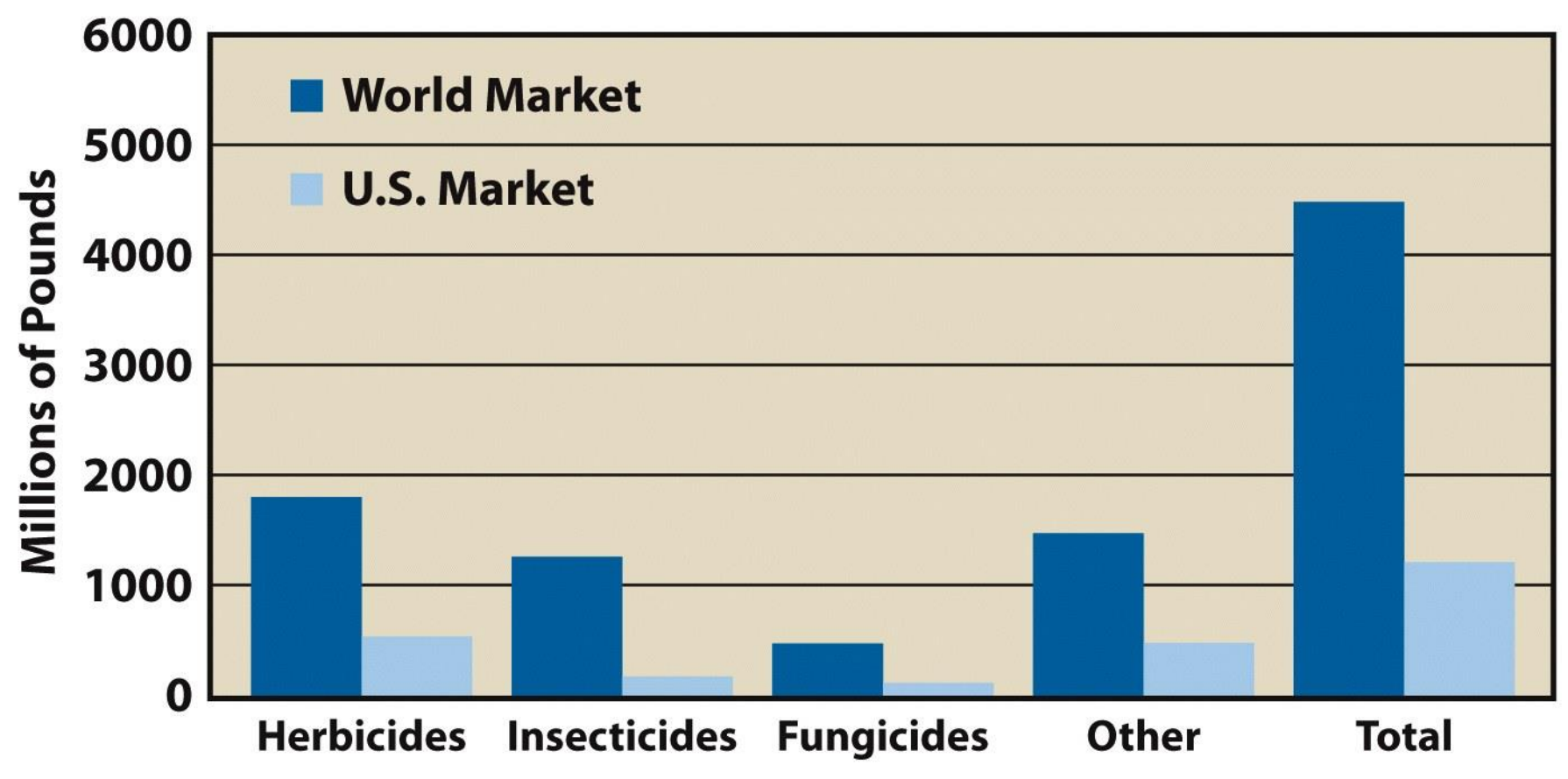
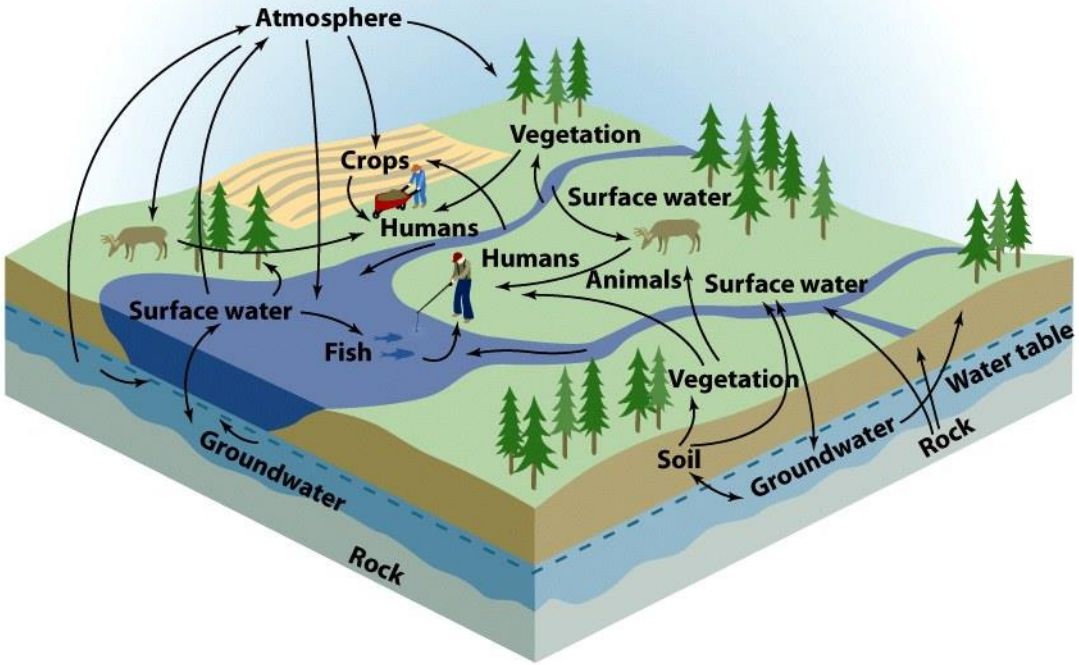


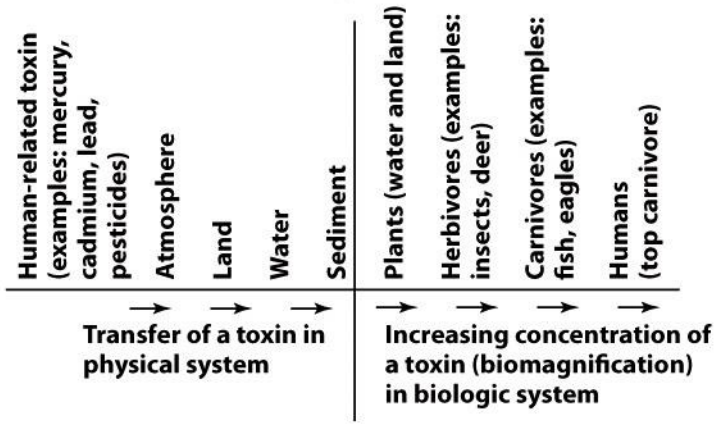
Figure 3-20 Global trends in the annual inputs of nitrogen into the environment from human activities, with projections to 2050. (Data from 2005 Millennium Ecosystem Assessment)

“Agro-business”

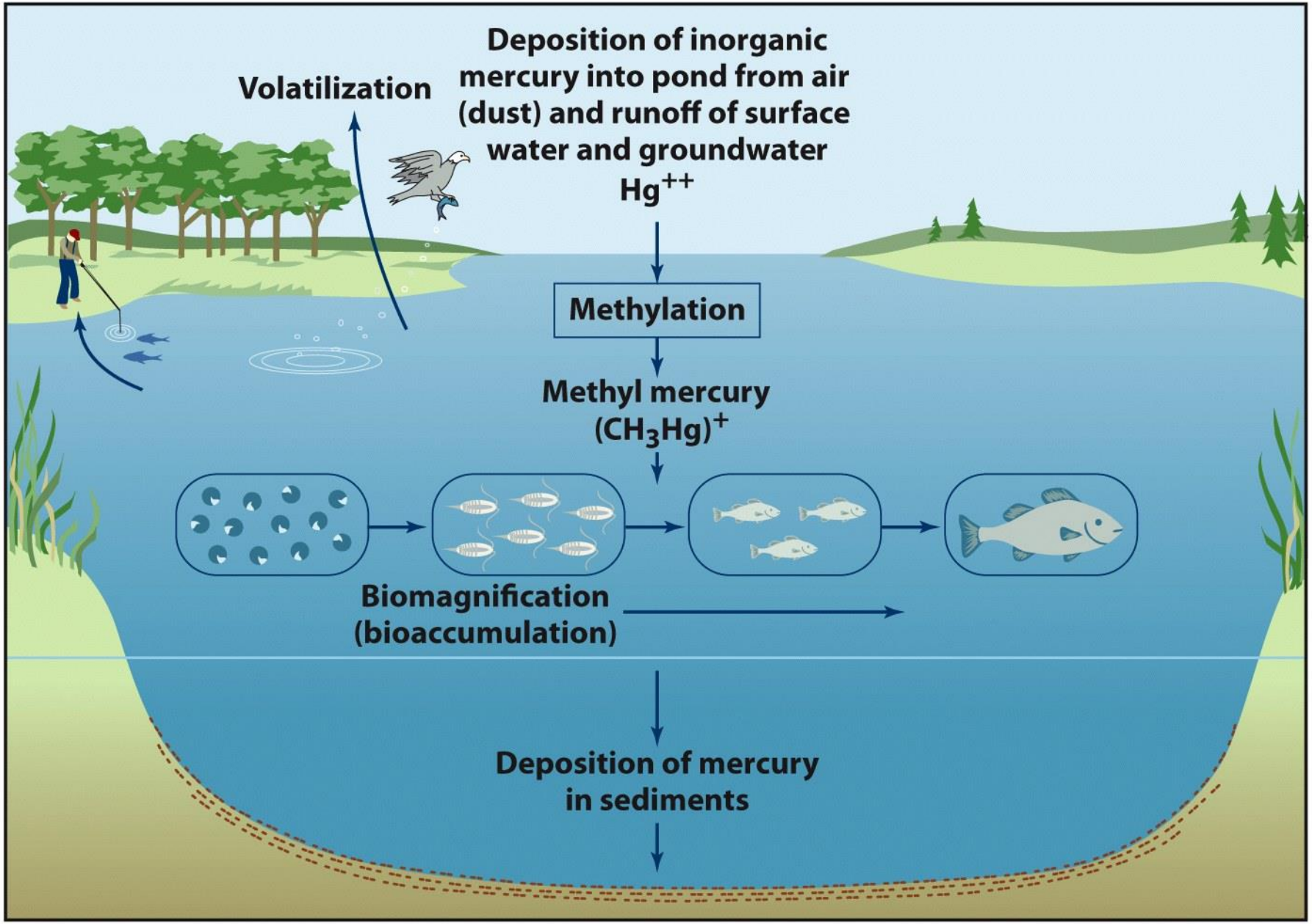


Poluentes s biológicos





Contaminação por mercúrio: bioacumulação



Agricultura orgânica sustentável

SOLUTIONS

Sustainable Organic Agriculture

More

- High-yield polyculture
- Organic fertilizers
- Biological pest control
- Integrated pest management
- Efficient irrigation
- Perennial crops
- Crop rotation
- Water-efficient crops
- Soil conservation
- Subsidies for sustainable farming and fishing

Less

- Soil erosion
- Aquifer depletion
- Overgrazing
- Overfishing
- Loss of biodiversity
- Food waste
- Subsidies for unsustainable farming and fishing
- Soil salinization
- Population growth
- Poverty

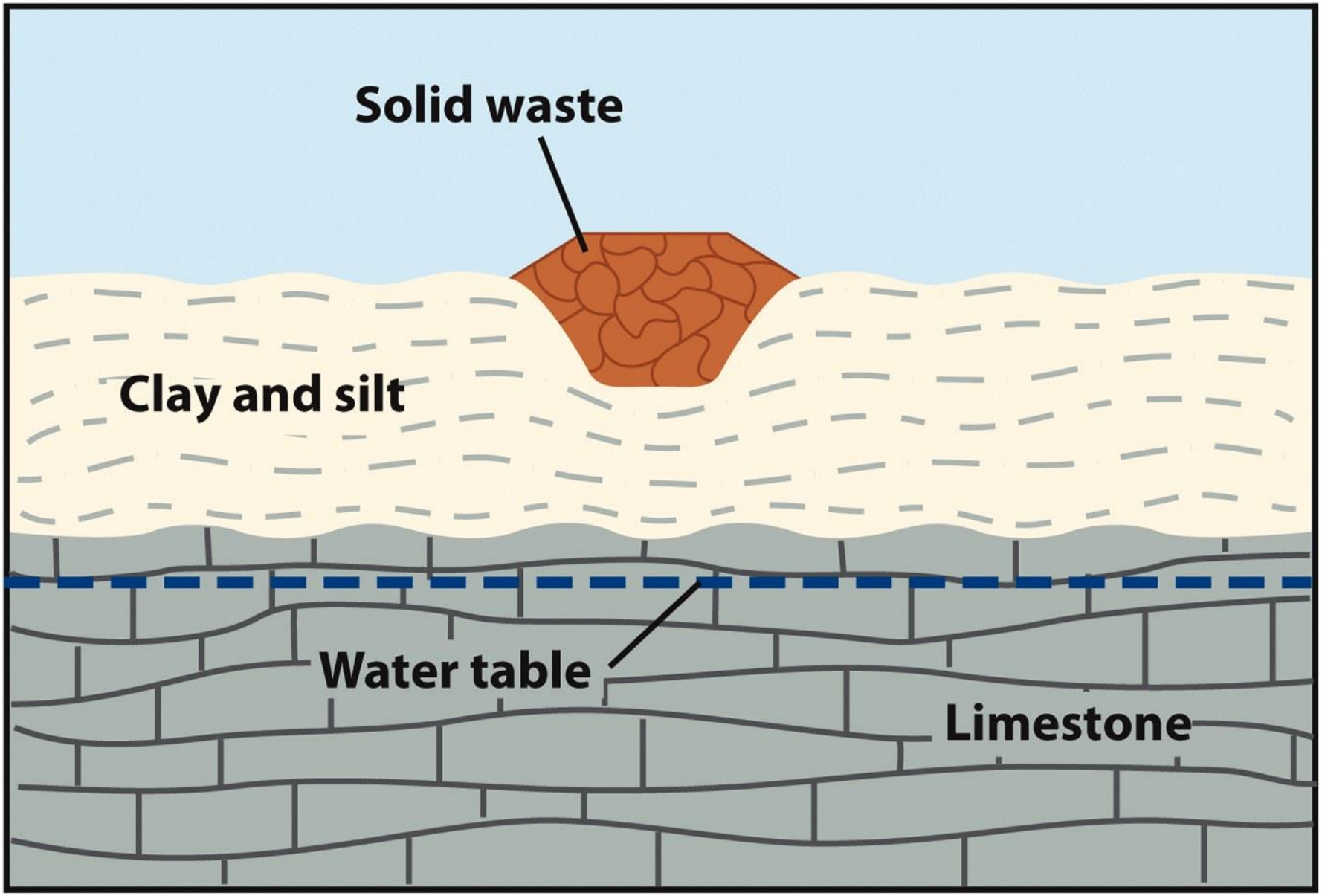
Figure 12-31 Major components of more sustainable, low-throughput agriculture based mostly on mimicking and working with nature (**Concept 12-6B**). **Question:** Which two solutions do you think are the most important? Why?

O que fazer com o lixo?
Aterros sanitários e poluição de solos

Sean Sprague/Peter Arnold, Inc.

Figure 1-6 *Extreme poverty:* boy searching for items to sell in an open dump in Rio de Janeiro, Brazil. Many children of poor families who live in makeshift shanty-towns in or near such dumps often scavenge all day for food and other items to help their families survive. This means that they cannot go to school.

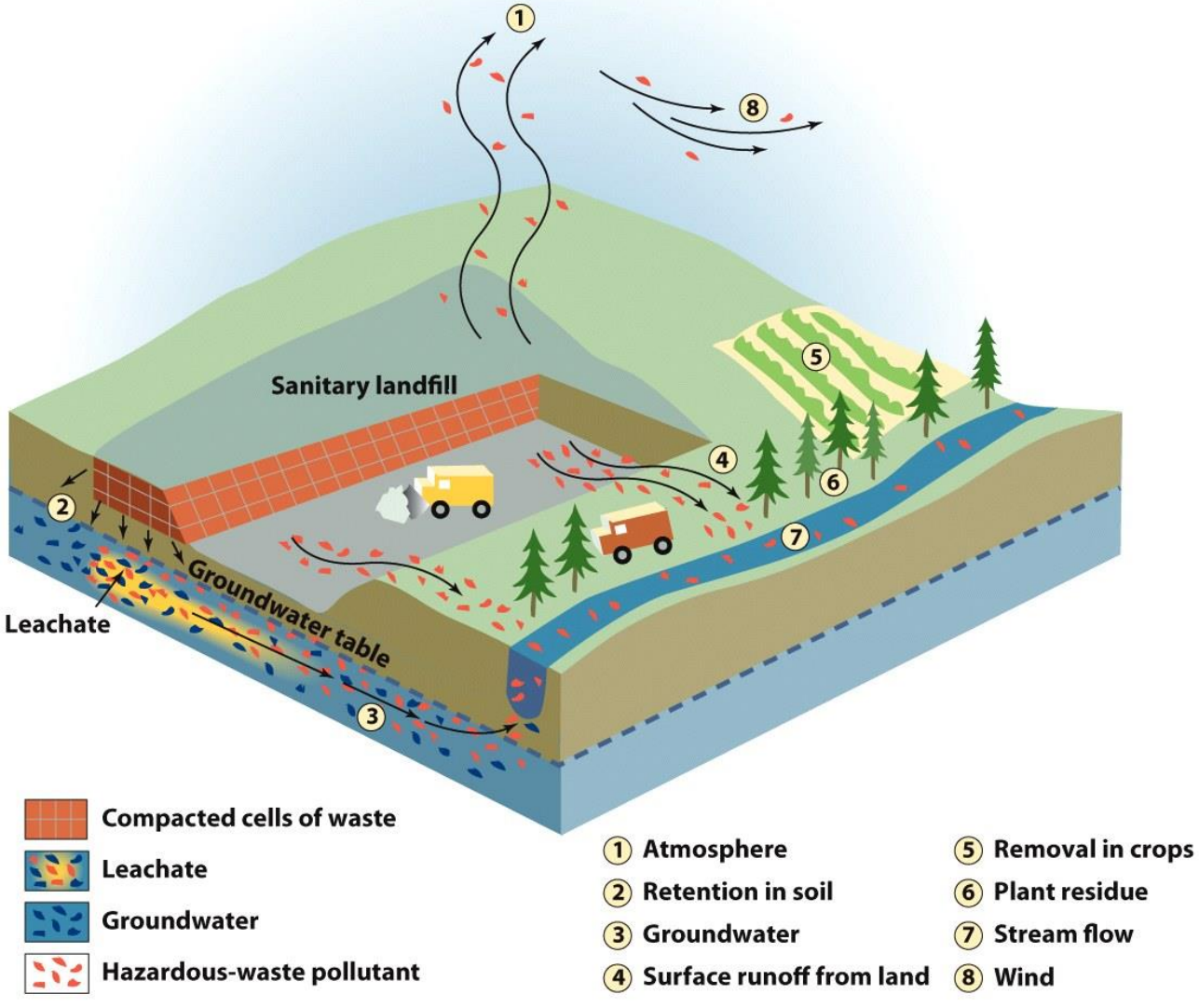
Aterros sanitário de resíduos sólidos



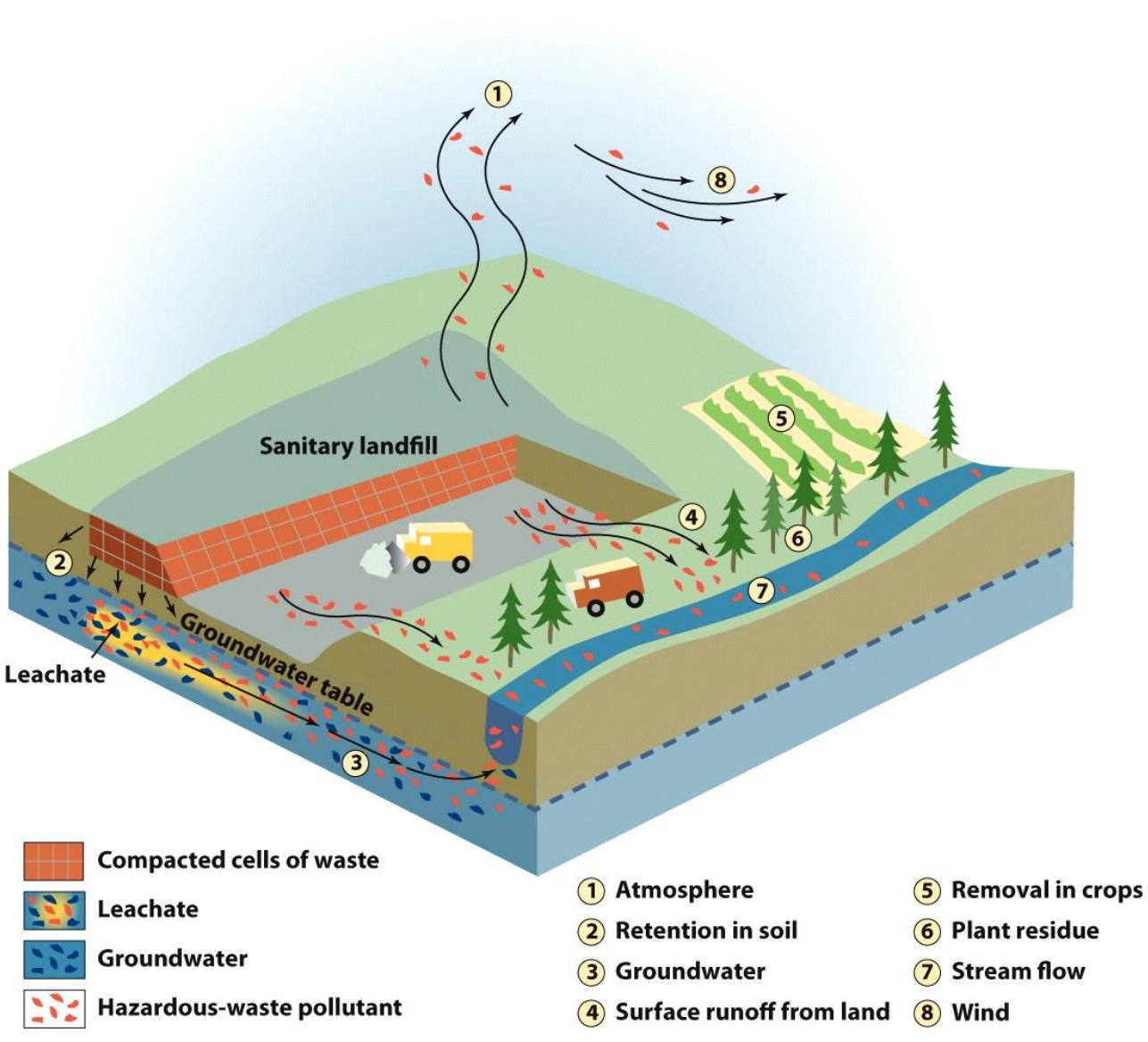
Como Poluentes passar de aterros sanitários para o ambier

1. metano, amônia, sulfeto de hidrogênio, nitrogênio e gases podem ser produzidos a partir de compostos no solo e os resíduos e podem passar para a atmosfera.

2. metais pesados, tais como chumbo, crómio, e ferro, podem ser retidos no solo.



Como Poluentes passar de aterros sanitários



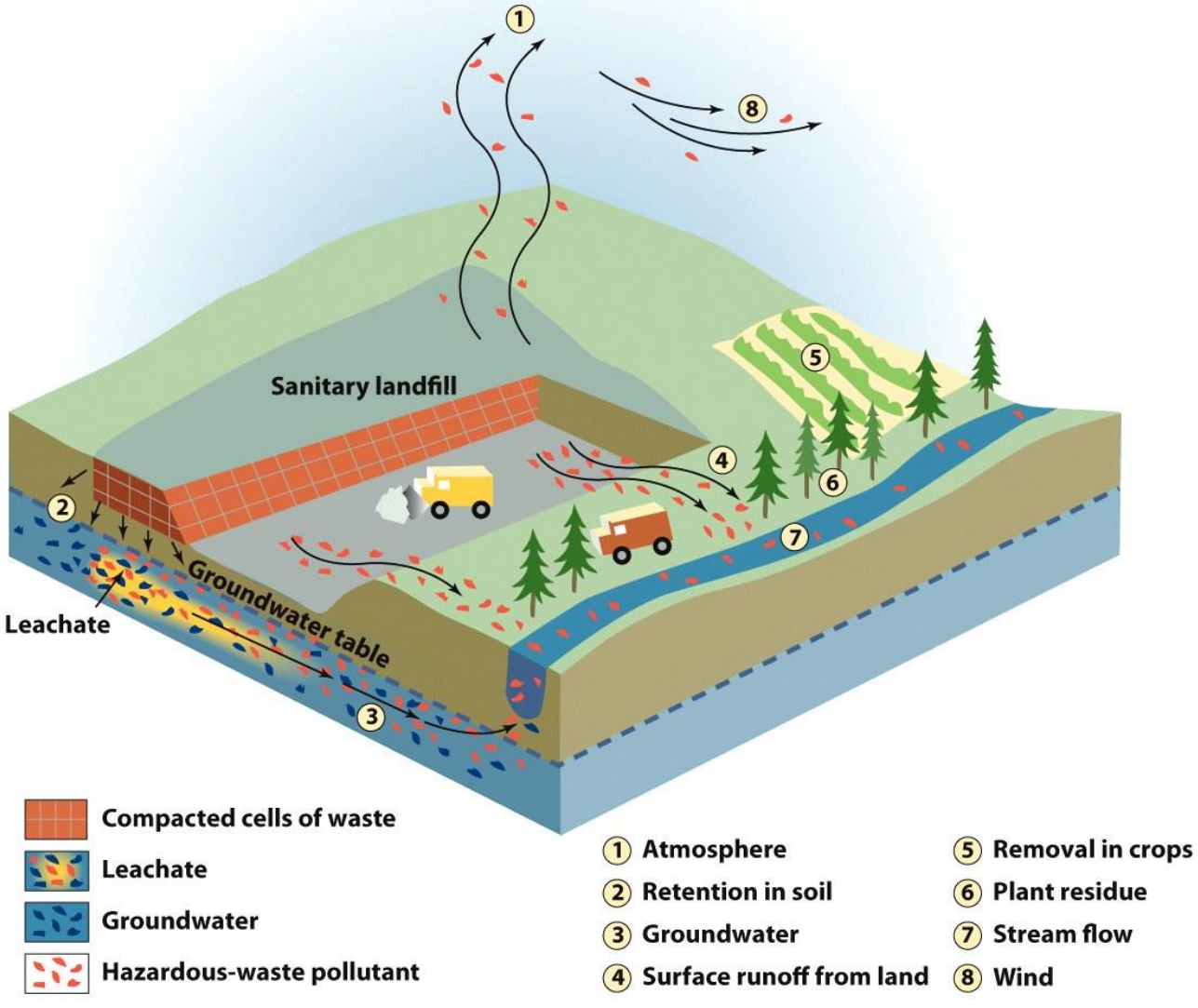
3. materiais solúveis, tais como cloreto, nitrato e sulfato, podem facilmente passar através do solo para as águas subterrâneas.

4. escoamento superficial pode arrastar lixiviados e transportá-lo em córregos e rios.

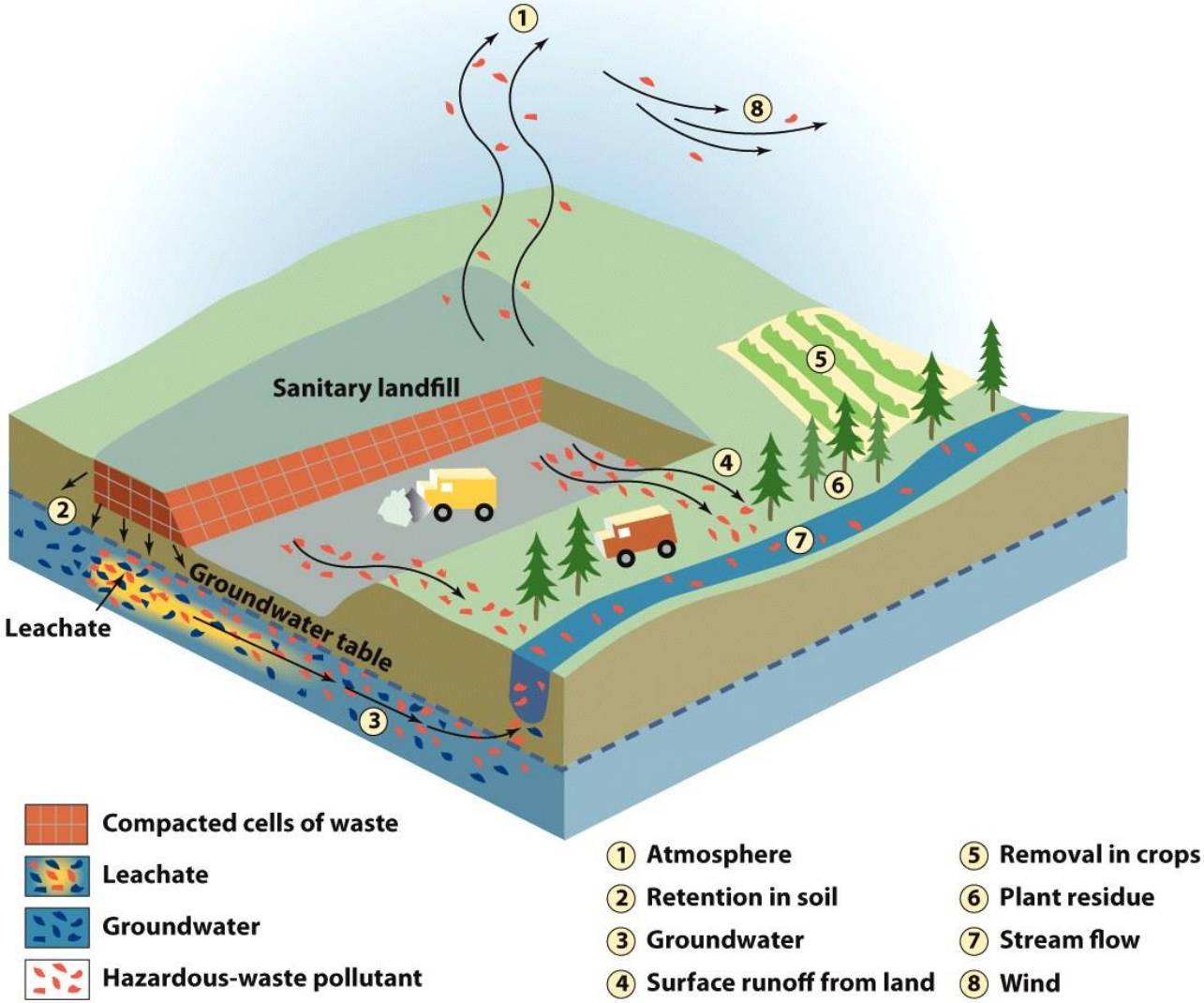
Como Poluentes passar de aterros sanitários para o ambier

5. Plantas que crescem na área de descarte podem assimilar seletivamente alguns metais pesados e outros materiais tóxicos, que passam pela cadeia alimentar para as pessoas e os animais que comem as plantas.

6. Os resíduos de plantas podem retornar substâncias tóxicas para o solo.

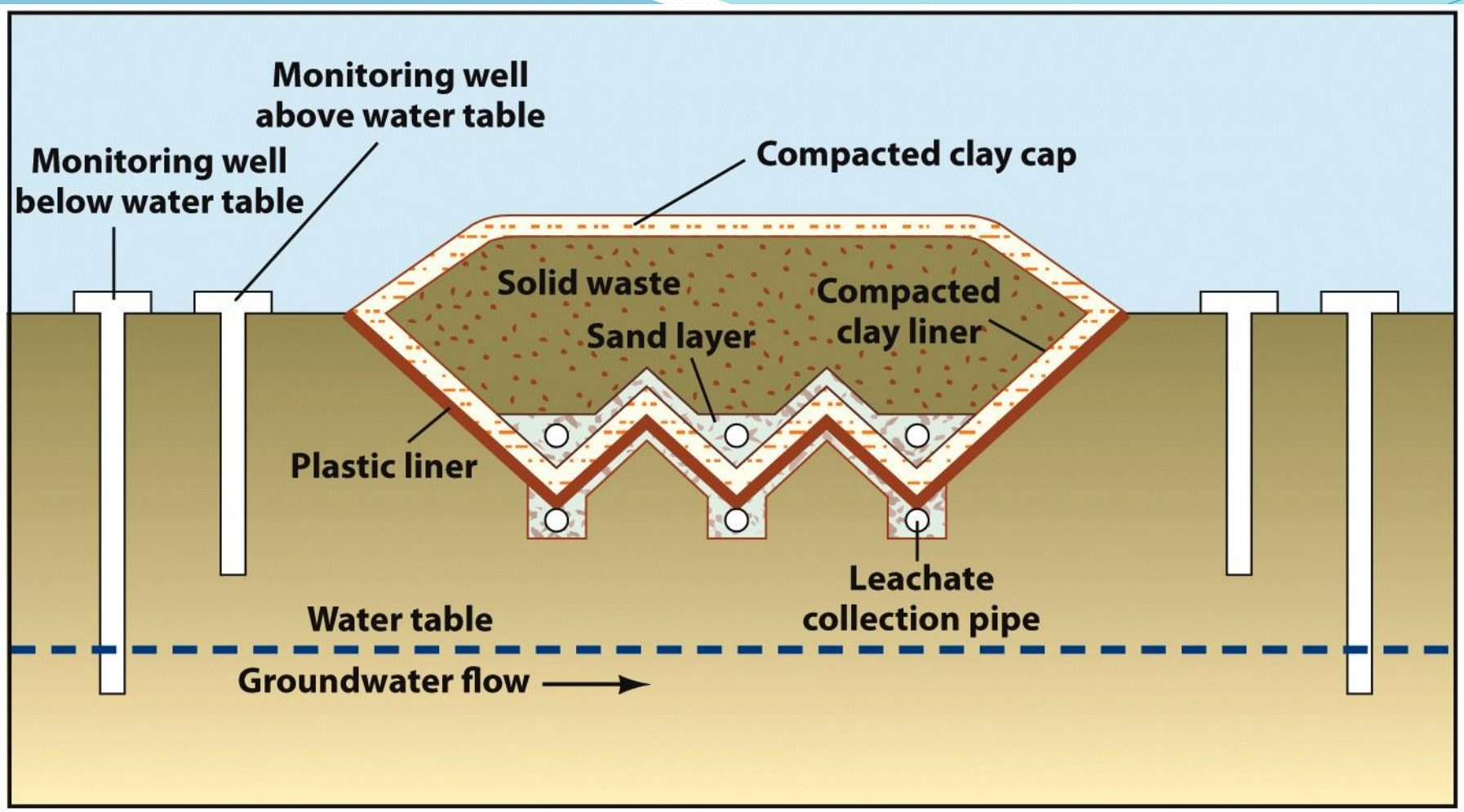


Como Poluentes passar de aterros sanitários



7. córregos e rios podem ser contaminados por resíduos da água subterrânea que escoa para o canal (3) ou por escoamento superficial (4).

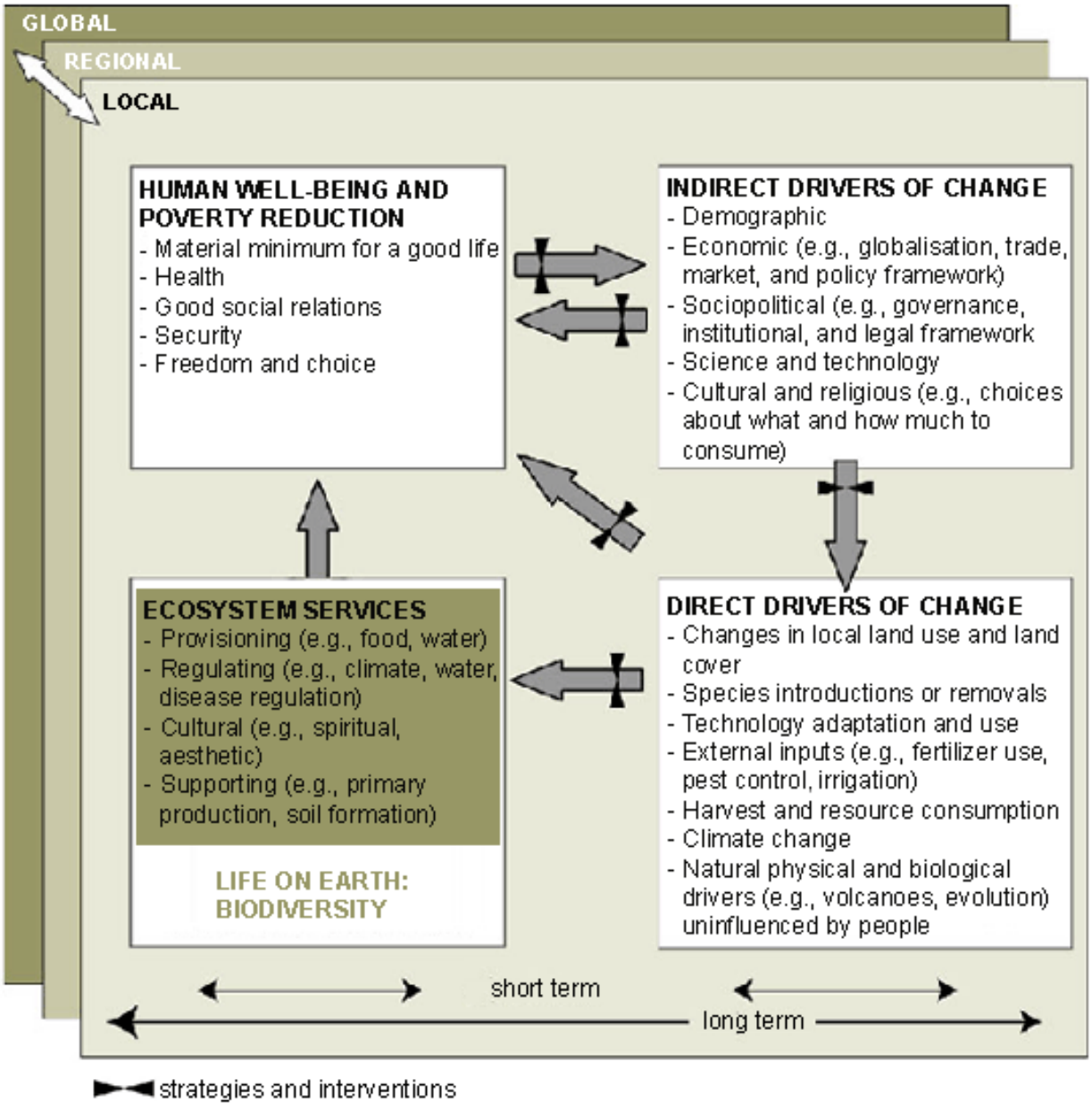
8. materiais tóxicos podem ser transportados para outras áreas pelo vento.



Aterros sanitários modernos são projetados para incluir várias barreiras:
Argila e revestimentos de plástico para limitar o lixiviamento
Drenagem superficial e subsuperficial para recolher os lixiviados
Sistemas para coletar o gás metano
Monitorização das águas subterrâneas para detectar vazamentos de lixiviamentos por baixo e pelas laterais do aterro sanitário.

Avaliação Ecossistêmica do Milênio (ONU)

http://www.millenniumassessment.org/



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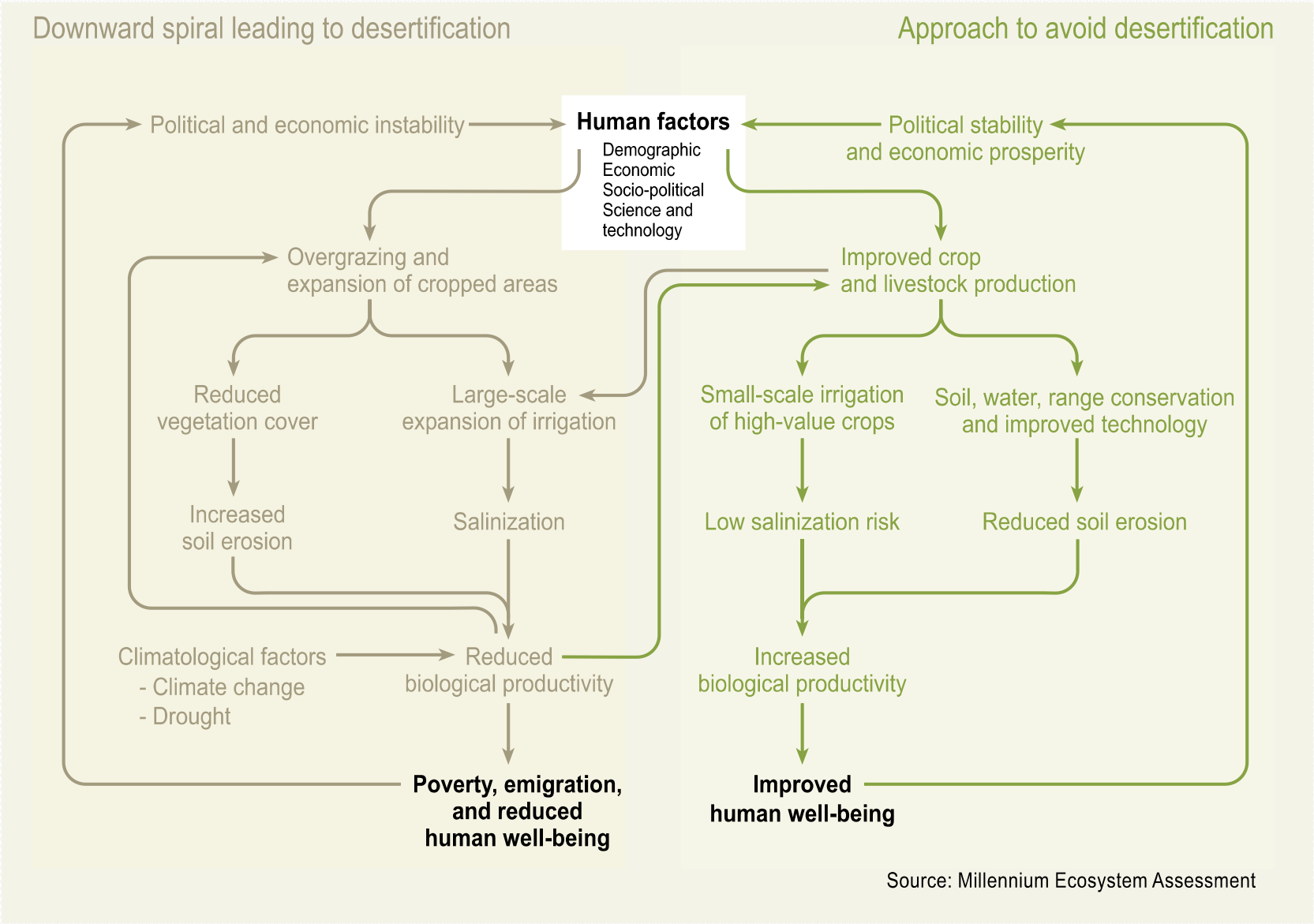
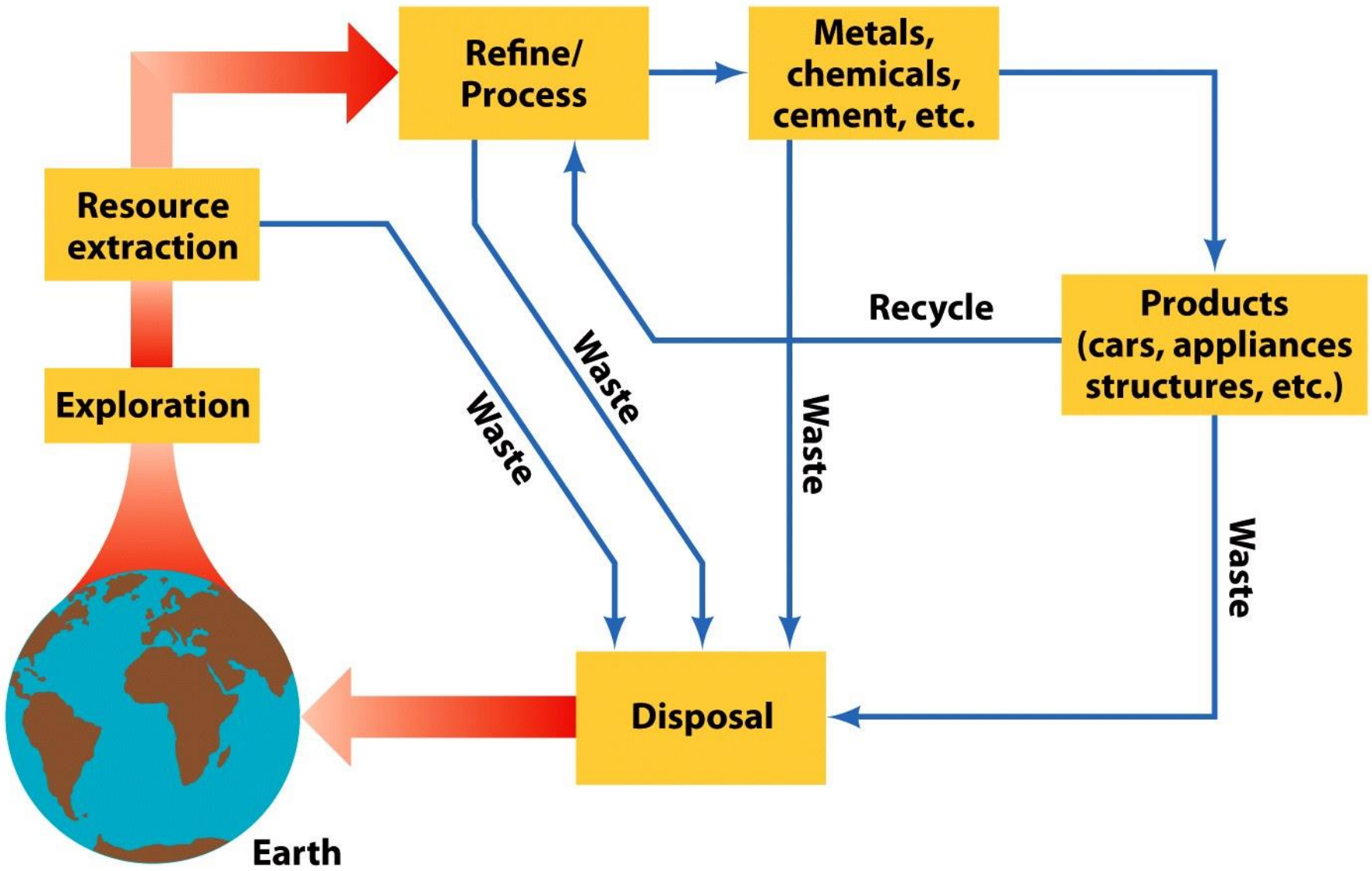
http://www.millenniumassessment.org/



1. Computer—Includes gold, silica, nickel, aluminum, zinc, iron, petroleum products and about thirty other minerals.
2. Pencil—Includes graphite and clays.
3. Telephone—Includes copper, gold and petroleum products.
4. Books—Includes limestone and clays.
5. Pens—Includes limestone, mica, petroleum products, clays, silica and talc.
6. Film—Includes petroleum products and silver.
7. Camera—Includes silica, zinc, copper, aluminum and petroleum products
8. Chair—Includes aluminum and petroleum products.
9. Television—Includes aluminum, copper, iron, nickel, silica, rare earth, and strontium.
10. Stereo—Includes gold, iron, nickel, beryllium and petroleum products.
11. Compact Disc—Includes aluminum and petroleum products.
12. Metal Chest—Includes iron and nickel. The brass trim is made of copper and zinc.
13. Carpet—Includes limestone, petroleum products and selenium.
14. Drywall—Includes gypsum clay, vermiculite, calcium carbonate and micas.
15. Geologic Map—Includes clays, petroleum products, mineral pigments.
16. Concrete Foundation—Includes limestone, clays, sand and gravel
17. Paint-mineral Pigments—Includes pigments (such as iron, zinc and titanium).
18. Cosmetics—Includes mineral chemicals.


Refine/
Process
Metals,
chemicals,
cement, etc.
Resource
extraction
Recycle
Products
(cars, appliances
structures, etc.)
Exploration
Waste
Waste
Waste
Waste
Disposal
Earth

Economia dentro do ecosistema

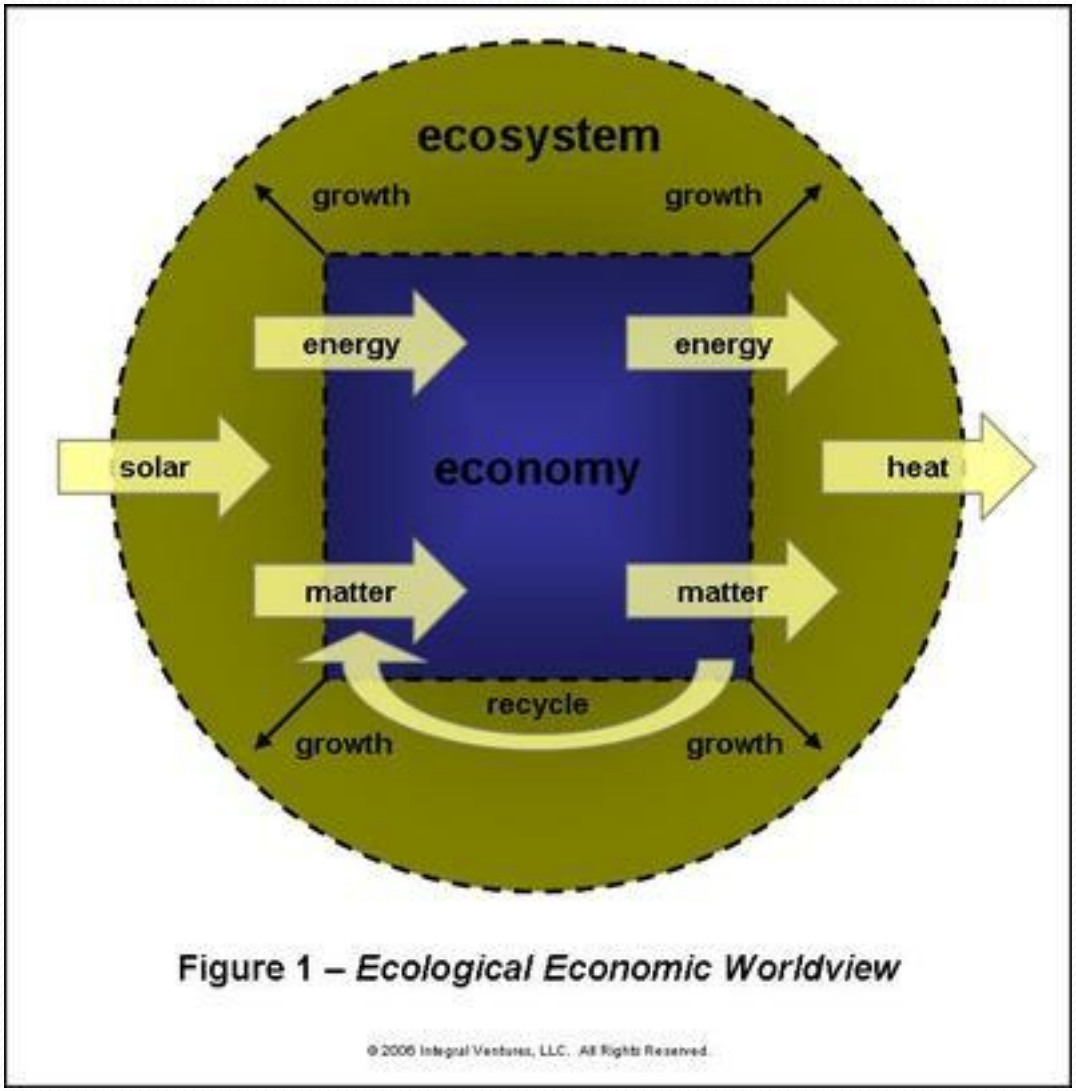


Figure 1 – *Ecological Economic Worldview*

Valor econômico dos serviços ecossistêmicos

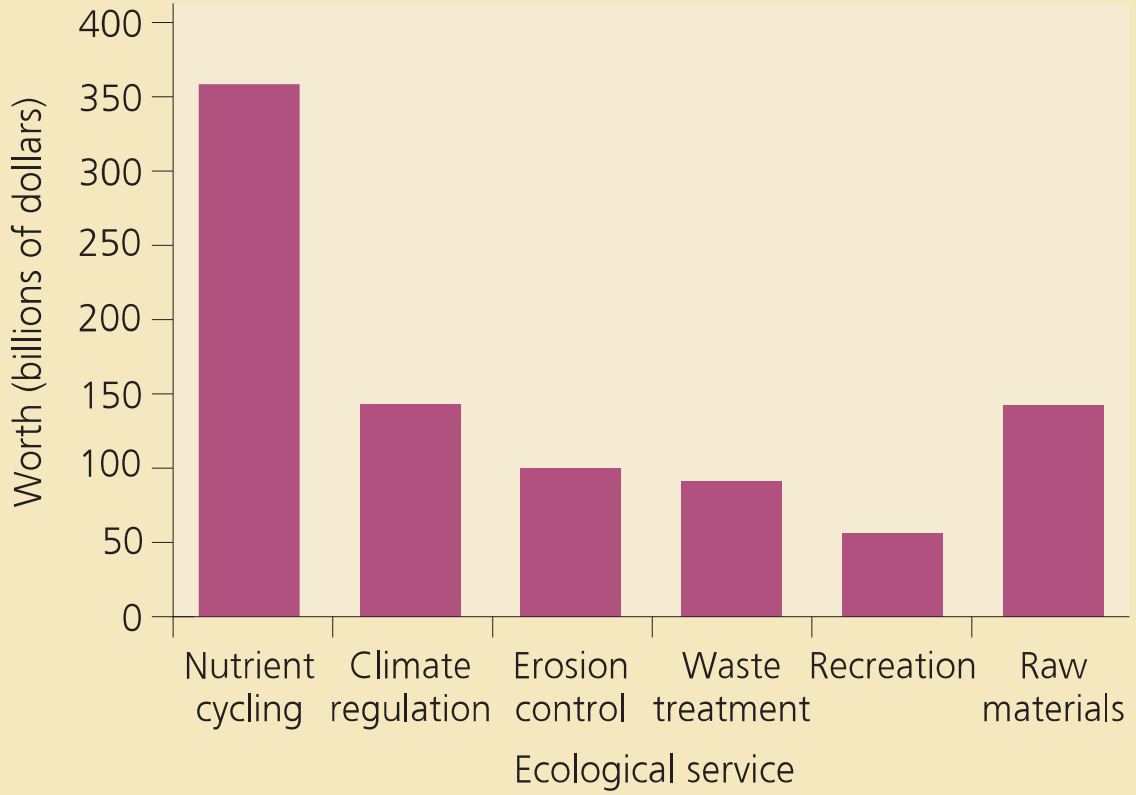


Figure 10-A Estimated annual global economic values of some ecological services provided by forests compared to the raw materials they produce (in billions of dollars).

Serviços ecossistêmicos, serviços econômicos

NATURAL CAPITAL

Forests

Ecological Services

- Support energy flow and chemical cycling
- Reduce soil erosion
- Absorb and release water
- Purify water and air
- Influence local and regional climate
- Store atmospheric carbon
- Provide numerous wildlife habitats

Economic Services

- Fuelwood
- Lumber
- Pulp to make paper
- Mining
- Livestock grazing
- Recreation
- Jobs

Figure 10-4 Major ecological and economic services provided by forests (**Concept 10-1A**). **Question:** Which two ecological services and which two economic services do you think are the most important?

Principais impactos em ecossistemas terrestres

Figure 7-20 Major human impacts on the world's deserts, grasslands, forests, and mountains. **Question:** Which two of the impacts on each of these biomes do you think are the most harmful?

Avaliação Ecossistêmica do Milênio (ONU)

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