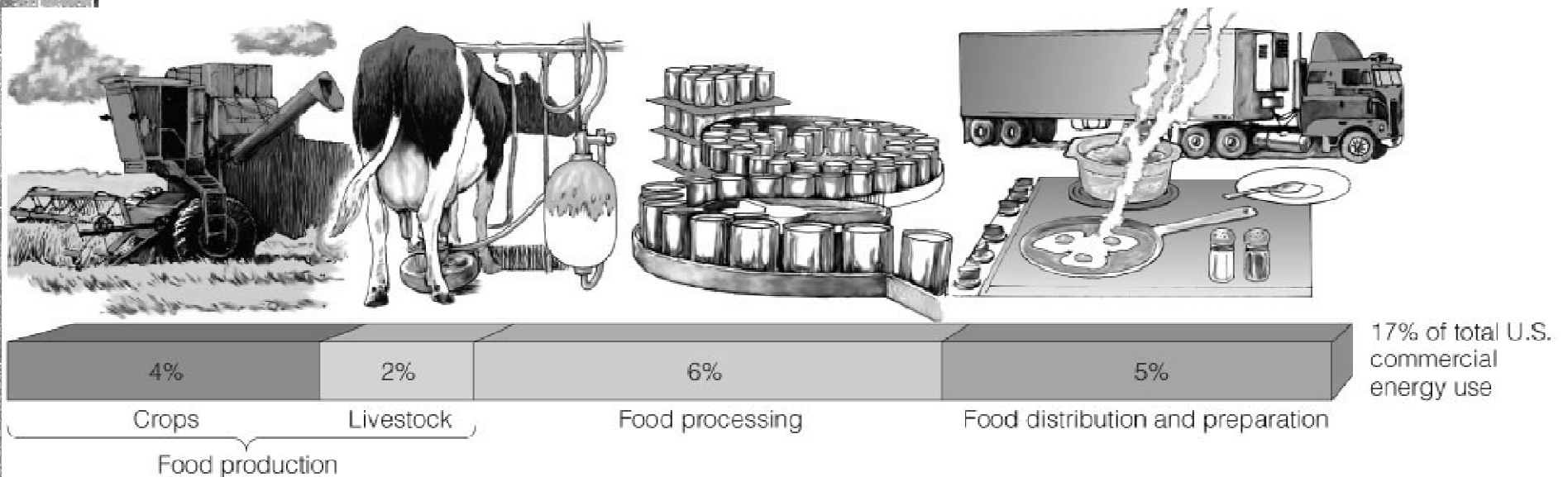


# Case Study: Industrialized Food Production in the United States

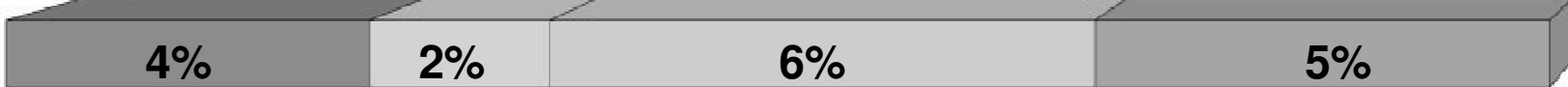


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- ✦ Industrialized agriculture uses about 17% of all commercial energy in the U.S. and food travels an average 2,400 kilometers from farm to plate.

Figure 13-7

# Food production



**4%**  
**Crops**

**2%**  
**Livestock**

**6%**  
**Food  
processing**

**5%**  
**Food distribution  
and preparation**

**17%**  
**of total U.S.  
commercial  
energy use**

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Fig. 13-7, p. 277



# Traditional Agriculture: Low Input Polyculture

◆ Many farmers in developing countries use low-input agriculture to grow a variety of crops on each plot of land (interplanting) through:

- ◆ ***Polyvarietal cultivation***: planting several genetic varieties.
- ◆ ***Intercropping***: two or more different crops grown at the same time in a plot.
- ◆ ***Agroforestry***: crops and trees are grown together.
- ◆ ***Polyculture***: different plants are planted together.



# Erosion

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✦ 6.4 billion tons of soils are eroded from the U.S. each year; this would fill 320 million average-sized dump trucks that, if parked end-to-end, would extend to the moon and  $\frac{3}{4}$  of the way back!



# Definition

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✦ Erosion is the movement of soil components, especially surface litter and topsoil, from one place to another.

# Importance

- ✦ In undisturbed ecosystems, the roots of plants help anchor the soil, and usually soil is not lost faster than it forms.
- ✦ But, farming, logging, construction, overgrazing by livestock, off-road vehicles, deliberate burning of vegetation etc. destroy plant cover and leave soil vulnerable to erosion. This destroys in a few decades what nature took hundreds to thousands of years to produce.



# SOIL EROSION AND DEGRADATION

- 
- ✦ Soil erosion lowers soil fertility and can overload nearby bodies of water with eroded sediment.
    - ✦ **Sheet erosion:** surface water or wind peel off thin layers of soil.
    - ✦ **Rill erosion:** fast-flowing little rivulets of surface water make small channels.
    - ✦ **Gully erosion:** fast-flowing water join together to cut wider and deeper ditches or gullies.

# SOIL EROSION AND DEGRADATION



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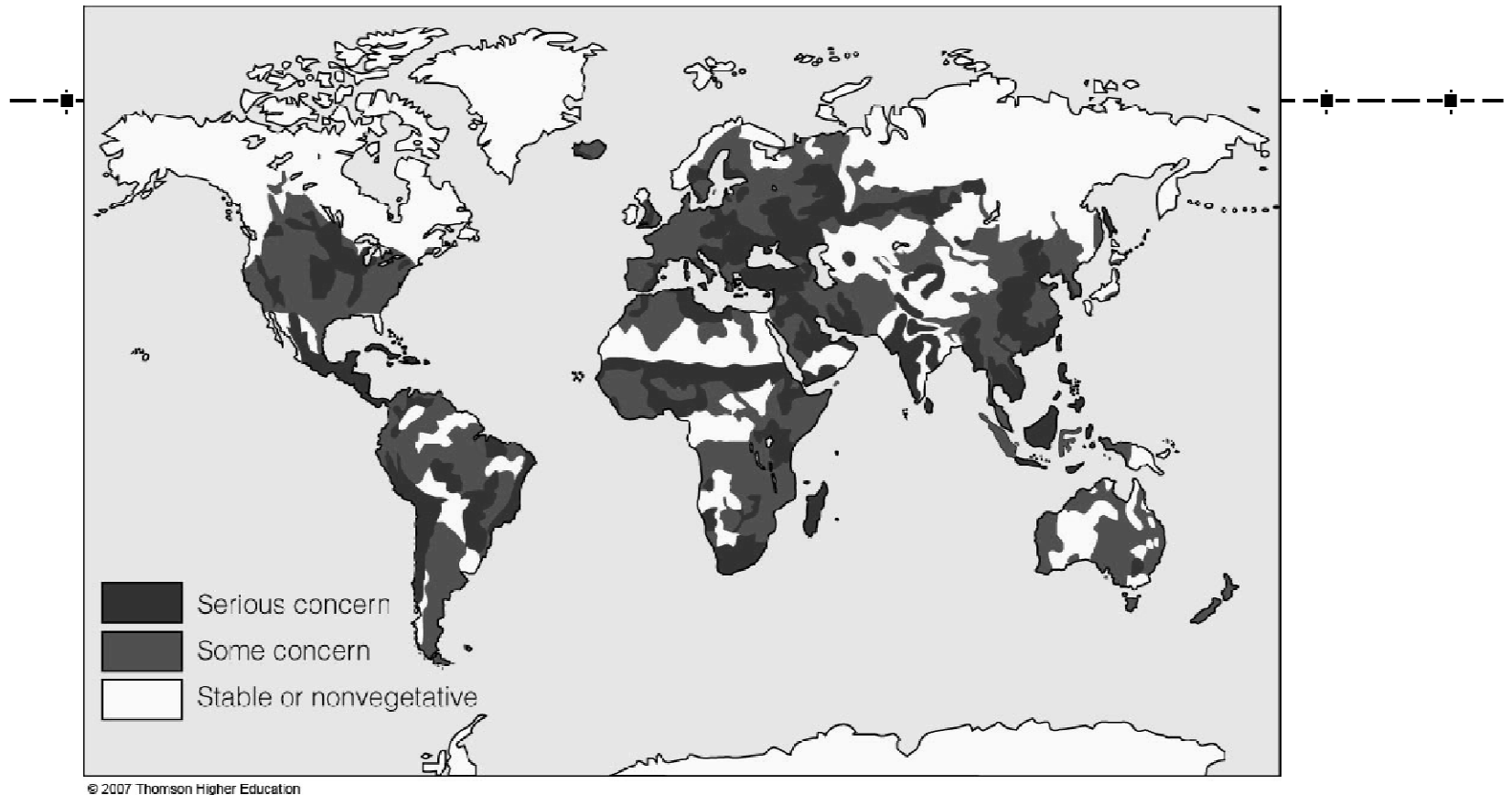
✦ Soil erosion is the movement of soil components, especially surface litter and topsoil, by wind or water.

✦ Soil erosion increases through activities such as farming, logging, construction, overgrazing, and off-road vehicles.

Figure 13-9



# Global Outlook: Soil Erosion



✦ Soil is eroding faster than it is forming on more than one-third of the world's cropland.

Figure 13-10



# Case Study: Soil Erosion in the U.S. - Some Hopeful Signs

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- ✦ Soil erodes faster than it forms on most U.S. cropland, but since 1985, has been cut by about 40%.
  - 1985 Food Security Act (Farm Act): farmers receive a subsidy for taking highly erodible land out of production and replanting it with soil saving plants for 10-15 years.



# Water Erosion

✦ Splash – water hits the soil at a severe angle  
(based on slope)

➤ This can erode soil.

✦ Sheet – when surface water moves down a slope or across a field in a wide flow and peels off fairly uniform sheets of soil.

➤ Because the topsoil disappears evenly, sheet erosion may not be noticeable until too much damage has been done.



## Water Erosion (Cont.)

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- ✦ Mass Slippage – (like in California) where it is very wet and large amounts of soil slip away in large chunks (mud slides).
- ✦ Rill – concentrated flow across the surface of soil. Leaves rivets (micro channels).

❖ Gully – rivulets of fast-flowing water join together and, with each succeeding rain, cut the channels wider and deeper until they become ditches or gullies. Gully erosion usually happens on steep slopes where all or most vegetation has been removed.



# Wind Erosion

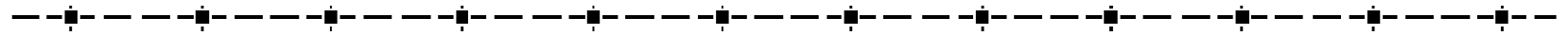
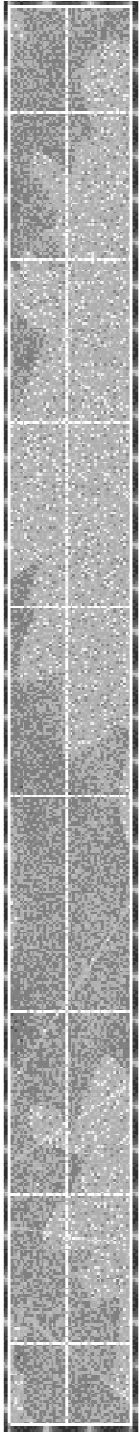
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✦ Saltation – one particle hitting another and being blown across the surface of the soil.



✦ Suspension – airborne soil. Ex. soil from Lubbock is found in Temple, Texas.





\*Surface Creep – mountains/sand dunes; surface creeping slowly across. Landslides are an example of a very fast surface creep.