

UNIT 4

SOIL POLLUTION

1. WARMING UP

1.1. Match the terms on the left with the statements on the right:

1. fertilizer
2. pesticide
3. irrigation
4. waste
5. nutrient

- A. used, damaged or unwanted matter
- B. supply of water to (dry land)
- C. (a chemical or food) providing for life
- D. a chemical substance used to kill pests
- E. chemical or natural substance, put on the land to make crops grow better

1.....2.....3.....4.....5.....



2. DEVELOPING LANGUAGE - Soil Pollution

The increasing amounts of fertilizers and other agricultural chemicals applied to soils since World War II ended in 1945, plus industrial and domestic waste-disposal practices, led by the mid-1960s to increasing concern over soil pollution. Soil pollution is the buildup in soils of persistent toxic compounds, chemicals, salts, radioactive materials, or disease-causing agents, which have adverse effects on plant growth and animal health. As of now, soil pollution is not widespread. Although the application of **fertilizers** containing the primary nutrients, nitrogen, phosphorus, and potassium, has not led to soil pollution, the application of trace elements has. The **irrigation of arid lands** often leads to pollution with salts. **Sulfur from industrial wastes** has polluted soils in the past, as has the accumulation of arsenic compounds in soils following years of spraying crops with lead arsenate. The application of **pesticides** has also led to short-term soil pollution.

Fertilizers

While fertilizers are essential to modern agriculture, their overuse can have harmful effects on plants and crops and on soil quality. In addition, the leaching of nutrients into bodies of water can lead to water pollution problems such as eutrophication, by causing excessive growth of vegetation.

Problems Arising from Irrigation

The chief problem caused by continuous irrigation is that of salt accumulating in the upper layers of the soil and stunting or preventing plant growth. Nearly all irrigation water, whatever its source, contains some salt, which percolates down to the water table and makes it increasingly brackish. Where drainage is bad and the water table approaches root level, the concentrated salt makes plant growth impossible. Good drainage systems, therefore, which keep the water table well below the root level and allow water to flush salts through the topsoil, are now understood to be a crucial aspect of a successful irrigation system.

Pesticide Residues

The effectiveness of a pesticide, as well as the hazards of harmful residues depend largely on how long the pesticide remains in the soil. For example, DDT, a chlorinated hydrocarbon, has a half-life of three years in cultivated soils, while organophosphorus insecticides persist for only days or months. Chlorinated hydrocarbons persist longer in soils having a large amount of organic matter, although more of the chemical must be applied to these soils to kill pests. Insecticides persist longer if worked into the soil than if left on the surface. Herbicides applied to soils may not persist at all or may persist up to two years or longer, depending on the compound. Simiazine is one of the most persistent herbicides. Eventually, all pesticides disappear because of evaporation and vaporization, leaching, plant uptake, chemical and microbial decomposition, and photodecomposition.

Pest Control or Pollution?



“Soil Management,” “Irrigation” , “Fertilizers” , Microsoft (R) Encarta. Copyright (c) 1998 Microsoft Corporation. Copyright (c) 1998 Funk & Wagnall’s Corporation.



3. SCANNING

3.1. Read the text and check which of the statements below are TRUE and which FALSE.

1. There is increasing concern over soil pollution, due to industrial and domestic wastewater practices . ☐
2. Soil pollution is widespread. ☐
3. The application of fertilizers containing the primary nutrients, nitrogen, phosphorus, and potassium, has to soil pollution. ☐
4. The irrigation of arid lands often leads to pollution with salts. ☐
5. Sulfur from industrial wastes has polluted soils in the past, as has the accumulation of arsenic compounds in soils following years of spraying crops with lead arsenate. ☐
6. The application of pesticides has also led to long-term soil pollution. ☐

7. Fertilizers are not essential to modern agriculture. ☐
8. The chief problem caused by continuous irrigation is that of salt accumulating in the upper layers of the soil and stunting or preventing plant growth. ☐
9. The effectiveness of a pesticide as well as the hazards of harmful residues depend largely on how long the pesticide remains in the soil. ☐
10. All pesticides have the same life-cycle. ☐



4. PRACTISING LANGUAGE

4.1. Match the synonyms below.

1. persistent
2. widespread
3. short-term
4. essential
5. crucial
6. persist

- A. continue to exist
- B. of deciding importance
- C. continuing to exist for a long time
- D. found, placed in many places
- E. concerning a short period of time
- F. necessary

1.....2.....3.....4.....5.....6.....



5. EXPANDING LANGUAGE

5.1. Fill in the table below with derivatives of the words given.

	NOUN	ADJECTIVE	ADVERB
dispose			
concern			
persist			
accumulate			
overuse			
harm			
drain			
effective			

uptake			
microbe			
decompose			
evaporate			
vaporize			
near			
increasing			

6. INFORMATION TRANSFER

6.1. Decide which word. (A, B, or C) best fits each space.

Soil is a¹ of mineral, plant, and animal materials that forms during a long process that may take thousands of.....². It is necessary for most³ growth and is essential for all agricultural production. Soil⁴ is a buildup of toxic chemical compounds, salts, pathogens (disease-causing organisms), or radioactive materials that can affect plant and animal.....⁵

.....⁶ soil management methods have seriously degraded soil quality,⁷ soil pollution, and enhanced erosion. Treating the soil with chemical fertilizers, pesticides, and fungicides interferes with the natural⁸ occurring within the soil and destroys useful⁹ such as bacteria, fungi, and other microorganisms. For instance, strawberry farmers in California fumigate the soil with methyl bromide to¹⁰ organisms that may harm young strawberry plants. This process indiscriminately¹¹ even beneficial microorganisms and leaves the soil sterile and dependent upon fertilizer to support plant.....¹². This results in heavy fertilizer use and¹³ polluted runoff into lakes and streams.

Improper¹⁴ practices in areas with poorly drained soil may result in¹⁵ deposits that inhibit plant growth and may lead to crop failure. In 2000 BC, the ancient Sumerian cities of the southern Tigris-Euphrates Valley in Mesopotamia depended on thriving.....¹⁶. By 1500 BC, these cities had collapsed largely because of crop failure due to high soil.....¹⁷. The same soil pollution problem exists today in the Indus Valley in Pakistan, the Nile Valley in Egypt, and the Imperial Valley in California.

- | | | | |
|-----|----------------|---------------|----------------|
| 1. | A. mixture | B. result | C. practice |
| 2. | A. months | B. days | C. years |
| 3. | A. plant | B. animal | C. product |
| 4. | A. management | B. pollution | C. development |
| 5. | A. cycle | B. life | C. production |
| 6. | A. healthy | B. unhealthy | C. proper |
| 7. | A. caused | B. developed | C. formed |
| 8. | A. plants | B. materials | C. processes |
| 9. | A. organisms | B. plants | C. animals |
| 10. | A. destroy | B. help | C. develop |
| 11. | A. develops | B. supports | C. kills |
| 12. | A. growth | B. deposit | C. pollution |
| 13. | A. increases | B. decreases | C. supports |
| 14. | A. irrigation | B. management | C. pollution |
| 15. | A. soil | B. salt | C. plant |
| 16. | A. agriculture | B. pollution | C. production |
| 17. | A. salinity | B. pollution | C. development |

6.2. Decide which word. (A, B, or C) best fits each space.

Increased salinity due to poorly-drained¹ began to ruin rich lands of the southern Tigris-Euphrates Valley in Mesopotamia as early as 2100 BC. By 1700 BC yields from these² dwindled to one-fourth of their once abundant harvests, and the great Sumerian³ that depended on them went to ruin. Pakistan's huge⁴ project in the Indus Plain has the same problem, with one-fifth of the land severely affected by 1960.⁵ have been taken to lower the water tables by means of tube wells and allowing⁶ to flush the salts through the topsoil. Some⁷ has been made. Since completion of the Aswan High Dam in the 1960s, the Egyptian⁸ has had to spend increasing amounts of⁹ to prevent salt from building up in Nile Valley fields. For previous millennia the Nile waters removed¹⁰ from the land with annual floods, a process that now must be done by constructing artificial.....¹¹. No less severe is the problem of some¹² in the rich Imperial and Coachella valleys in California, who have suffered crop failures largely due to the increased salt¹³ of the water of the lower Colorado River. Although the world's

.....¹⁴ grew by 3 percent a year in the third quarter of the 20th century, this rate is expected to¹⁵ to 1 percent in the last quarter, largely because most of the economically feasible opportunities of large-scale irrigation¹⁶ have already been exploited. Also, as greater demands are now being made on limited.....¹⁷, efficient use of available surface and¹⁸ supplies is becoming crucial. Irrigation, therefore, which used to be a matter of a farmer's¹⁹ the land, is becoming highly technical, calling for the gathering of vast amounts of information about overall water resources, the²⁰ of the soil, and the condition of the water table beneath it—a task that often lies beyond the means of private farming. A major thrust of research today is to develop²¹ to conserve land that is already under irrigation.

- | | | |
|------------------------|---------------|---------------------|
| 1. A. soil | B. water | C. salt |
| 2. A. systems | B. lands | C. waters |
| 3. A. substances | B. conditions | C. cities |
| 4. A. irrigation | B. growth | C. development |
| 5. A. information | B. measures | C. consequences |
| 6. A. systems | B. lands | C. waters |
| 7. A. progress | B. growth | C. development |
| 8. A. country | B. government | C. land |
| 9. A. money | B. time | C. people |
| 10. A. soil | B. salt | C. water |
| 11. A. dams | B. techniques | C. drainage systems |
| 12. A. farmers | B. engineers | C. people |
| 13. A. water | B. use | C. content |
| 14. A. irrigated area | B. land | C. resources |
| 15. A. grow | B. fall | C. increase |
| 16. A. irrigation | B. growth | C. development |
| 17. A. water resources | B. techniques | C. drainage systems |
| 18. A. groundwater | B. soil | C. land |
| 19. A. digging | B. watering | C. developing |
| 20. A. condition | B. quality | C. development |
| 21. A. techniques | B. conditions | C. tables |



Glossary

abundant	άφθονος
accumulation	συσσώρευση/σωρός
adverse	δυσμενής/ενάντιος/αντίθετος
agent	παράγοντας
annual	ετήσιος
arid	άνυδρος/ξηρός
aspect	όψη/άποψη/πλευρά
brackish	υφάλμυρος/γλυφός
buildup	διάπλαση/οικοδόμηση
chief	κύριος/πρωτεύων/πρώτος
concentrate	συγκεντρώνω
construct	κατασκευάζω/φτιάχνω/κτίζω
crucial	κρίσιμος/αποφασιστικός
cultivated	καλλιεργημένος
decomposition	αποσύνθεση
disease-causing	ο προκαλών ασθένειες
domestic	οικιακός/κατοικίδιος
drainage	αποχέτευση/αποστράγγιση
dwindle	μικραίνω σιγά-σιγά/φθίνω
effectiveness	αποτελεσματικότητα
evaporation	εξάτμιση
excessive	υπερβολικός
feasible	εφικτός/δυνατός
fertilizer	λίπασμα
flood	πλημμύρα
flush	καθαρίζω με άφθονο νερό
fumigate	θειαφίζω
fungi	μύκητες
fungicide	μυκητοκτόνο
harvest	σοδειά/συγκομιδή
herbicide	ζιζανιοκτόνο
huge	πελώριος/τεράστιος

increased	αυξημένος
insecticide	εντομοκτόνο
irrigation	άρδευση
leaching	διύλισμός
overuse	υπερχρησιμοποιώ
percolate	φιλτράρω-ομαι/ διεισδύω/διυλίζω
persist	επιμένω/μένω σταθερός
persistent	επίμονος
pesticide	παρασιτοκτόνο
photodecomposition	φωτοαποσύνθεση
plus	συν
poorly	άσχημα/κακά
residue	υπόλειμμα,κατάλοιπο/κατακάθι
root	ρίζα
salinity	αρμυράδα/περιεκτικότητα σε αλάτι
short-term	βραχυπρόθεσμος
simazine	σιμιαζίνη
stunt	εμποδίζω κάτι να αναπτυχθεί/ κασιιάζω
topsoil	χούμος
trace element	ιχνοστοιχείο
vaporization	εξάτμιση/αεροποίηση
waste	απόβλητα
waste-disposal	διάθεση αποβλήτων
water table	υπόγεια στάθμη νερών
well	πηγάδι
widespread	πλατιά διαδεδομένος
yield	παραγωγή/απόδοση/εσοδεία