

Water Dynamics in Plant Production, 2nd Edition

Multiple Choice Questions

Chapter 18 – Controlling Water Use by Crop Management

1. Crop rotations (i.e. planned, temporal, cyclical sequences of crops) have developed because of perceived benefits to yield. Which of the following are established benefits that accrue from adopting crop rotations?
 - (a) enhances the chemical and physical fertility of the soil
 - (b) reduces the level of fungal disease transfer between successive crops
 - (c) reduces the level of animal pests of plants, such as nematodes, within the soil, especially ahead of planting susceptible crops
 - (d) enhances the ability to control weeds
 - (e) all of the above
 - (f) none of the above

2. A fallow has been incorporated into crop rotations in many areas where rainfall cannot be relied on to allow a substantial grain yield in each year. Although fallowing can be efficient, in a number of regions much effort has gone into the development of systems that allow crops to be grown in each year. Which of the following statements best summarizes the arguments against a fallow?
 - (a) It is better to have a crop growing to protect the soil.
 - (b) An annual harvest, however small, is commonly more acceptable.
 - (c) Growing crops increases the probability of rainfall events.
 - (d) The efficiency of water retention through the fallow period is often very poor.
 - (e) Modern techniques make fallowing unnecessary.

3. One approach to improving the efficiency of water use in some regions is to grow a crop during the rainy season. Which statement best explains why this solution can be difficult to implement on the Vertisols of India?
 - (a) The soils are difficult to till at the end of the dry season.
 - (b) Such soils need to have subsoil drainage systems for efficient management but these are too costly.
 - (c) When these swelling soils imbibe water, they commonly cause damage to plant roots and plant growth is impaired.
 - (d) When they are fully wetted, the infiltrability and the preponderance of fine pores in these soils are so small that crops can be lost because of waterlogging and poor aeration.

4. Solutions to the dilemma of what crops to grow in semi-arid regions include (a) double cropping, (b) intercropping and (c) opportunistic cropping.
 - (i) Which of these systems involves more than one crop forming the canopy in a field?
 - (a) double cropping
 - (b) intercropping
 - (c) opportunistic cropping
 - (d) none of the above

(ii) Which of the systems allows farmers to buy seeds well ahead of seeding time in every year? (There may be more than one correct answer.)

- (a)** double cropping
- (b)** intercropping
- (c)** opportunistic cropping
- (d)** none of the above

(iii) Which system requires the greatest technical support to farmers for successful application?

- (a)** double cropping
- (b)** intercropping
- (c)** opportunistic cropping
- (d)** all of the above

(iv) Which system may not result in the most profitable crop being grown as frequently as when a fallow is included in the rotation?

- (a)** double cropping
- (b)** intercropping
- (c)** opportunistic cropping
- (d)** all of the above

5. A number of approaches to crop management have been developed for drought-prone regions.

(i) One such approach is to reduce stand density. What is considered to be the most important risk factor with this solution? (There may be more than one correct answer.)

- (a)** increased risk of weed infestation
- (b)** effects of diseases can be more severe when fewer plants are present
- (c)** increased soil evaporation
- (d)** increased non-productive transpiration

(ii) Another approach suitable for row crops is to maintain the density in the row but increase inter-row width. What is considered to be an important beneficial feature of this approach?

- (a)** Soil evaporation does not occur in the rows.
- (b)** Weed competition is less critical.
- (c)** Harvesting is more efficient.
- (d)** Competition between plants encourages deeper rooting and increases the amount of stored water that the plant can access.