NCDC Sample Item – Agriculture Paper 1

Question:

Napek district is one of the agricultural areas in Uganda. It is a lowland area with high temperature, shallow soils that have limited organic matter and very low moisture. Farmers grow both native and non-native crops; however, they often get low yields from the non-native crops unlike the native crops.

The farmers invited Agricultural Extension workers to study the situation and propose strategies to improve the yields. The study showed that native crops such as sisal, aloe vera, and wild millet have thick cuticles, fewer stomata mostly on the lower epidermis, and better drought adaptation. Non-native crops such as amaranthus, avocado trees, and wild peas have thinner cuticles and many stomata on the upper epidermis.

Task: Account for the difference in the yields between native and non-native crops grown in the district, and propose strategies to enhance productivity and resilience.

Answer

1. Adaptation to Dry Conditions

Native crops are better adapted to the hot and dry conditions of Napek district. They survive with little water and continue producing yields even during drought.

2. Thick Cuticle in Native Crops

Native crops have thick cuticles that reduce water loss through transpiration. This helps them conserve water under high temperatures.

3. Fewer Stomata on Lower Epidermis

The stomata of native crops are fewer and mainly found on the lower epidermis where there is less exposure to sunlight. This reduces excessive evaporation of water.

4. Thin Cuticle and Many Stomata in Non-native Crops

Non-native crops lose a lot of water because they have thinner cuticles and many stomata on the upper epidermis. This causes wilting and poor growth.

5. Soil Conditions

The soils in Napek district have little organic matter and low water-holding capacity. Native crops tolerate

poor soils better than non-native crops.

6. Root Adaptations

Many native crops have deep or extensive root systems that absorb water from deeper layers of soil.

Strategies to Improve Productivity and Resilience

- Grow drought-resistant and native crop varieties.
- Apply manure and compost to improve soil fertility.
- Practice mulching to conserve soil moisture.
- Introduce irrigation and rainwater harvesting systems.
- Practice agroforestry to reduce evaporation and improve soil fertility.
- Use early-maturing and drought-resistant hybrid crops.
- Train farmers in climate-smart agriculture and water conservation methods.

Conclusion

Native crops perform better because they are adapted to the harsh environmental conditions of Napek district. Improving soil fertility, conserving water, and growing drought-resistant crops can increase agricultural productivity and resilience.