Unit 1: Introduction to Crop Production

1.1 Definition of Common Terms Used in Crop Production

Agriculture is defined as the deliberate cultivation of crops and the rearing of animals. It is a practice that has evolved over thousands of years and has become the primary means of survival for many societies around the world.

Shifting cultivation is a traditional form of agriculture where an area of land is cleared of vegetation, cultivated for a few years, and then abandoned for a new area. This practice was common in early agricultural societies and required the clearing of trees and cultivating land for only one or two seasons before moving on to a new location.

Settled agriculture refers to the practice of continuously using the same plot of land over a long period to grow crops or rear livestock. This type of agriculture involves more advanced practices, such as the use of manure, fertilizers, and soil conservation techniques to enhance crop yields.

Subsistence farming is the practice of growing crops and raising livestock sufficient only for one's own use, without any surplus for trade. This type of farming is often characterized by the use of simple techniques and tools and aims primarily to provide food for the farmer's household.

1.2 The Origin of Domesticated Crops

The exact place and time that agriculture began is unknown, but it is clear that the transition from hunting and gathering to agriculture was a gradual process. Over time, wild plants were transformed into domesticated crops through human selection. This process likely involved selecting plants that were easy to harvest, widely available, and could be easily transported. Characteristics like climatic tolerance, good flavor, and suitable grain size were also important in the selection process.

Hunter-gatherers relied on wild plant species such as wild rice, oats, and legumes, as well as root crops like wild onions and sweet potatoes. These early societies had to develop methods to detoxify certain plants, a skill that was likely learned through trial and error.

1.3 Status of Crop Production

Agriculture provides essential food and other goods for society. The type of crop and the environment in which it is grown are key factors that determine crop

production. Modern agriculture has evolved significantly from its primitive origins, with the introduction of improved seeds, better production practices, and advanced technologies such as machinery, irrigation, and biotechnology. These advancements have greatly increased agricultural productivity, particularly in industrialized regions.

In Ethiopia, crop agriculture is diverse and complex, with a wide range of crops grown across different agro-ecologies. However, only about 20% of the country's arable land is cultivated, mostly by smallholders. The major crops grown include teff, wheat, maize, sorghum, and barley. Despite the increase in cultivated area and some use of agricultural inputs, crop yields in Ethiopia remain low compared to international standards due to factors such as soil degradation, traditional farming systems, and unpredictable rainfall.

1.4 Classification of Crop Plants

Crop plants can be classified into four major categories: food crops, oil crops, fiber crops, and forage crops.

1. **Food Crops:** The most important food crops globally are wheat, rice, and maize. In Ethiopia, the top five major crops are teff, wheat, maize, sorghum, and barley.
2. **Oil Crops:** These crops are grown primarily for the extraction of oil from their seeds. Major oil crops include olive, linseed, sesame, sunflower, soybean, and peanut.
3. **Fiber Crops:** These plants are used to produce fibers for making clothing and other textile products. Cotton is the most important fiber crop, but fibers can also be obtained from plants like flax, jute, and hemp.
4. **Forage Crops:** These plants are grown to provide food for livestock. Major forage crops include alfalfa, clovers, elephant grass, and various types of grasses.

Additionally, crop plants can be classified based on their photosynthetic pathways into **C3** and **C4** plants. C3 plants include crops like wheat and barley, which have a photosynthetic process that produces a three-carbon compound. C4 plants, such as maize and sorghum, have a more efficient photosynthetic process that produces a four-carbon compound, allowing them to thrive in hot, sunny environments.

By understanding these concepts and classifications, students can gain a deeper insight into the complexities of agriculture and the factors that influence crop production.

Cropping Systems

Definition: A cropping system refers to the way crops are grown and managed over time on a piece of land. It includes the types of crops, the order in which they are planted, and the farming practices used. Different cropping systems have their own benefits and challenges.

Types of Cropping Systems

1. **Mono Cropping**:
    - **Description**: This system involves growing a single type of crop on a piece of land at a time.
    - **Advantages**: It allows for uniform management practices, making planting and harvesting more efficient.
    - **Disadvantages**: It can lead to soil fertility loss and increases the risk of crop failure due to pests and diseases.
2. **Mixed Cropping**:
    - **Description**: This involves planting two or more crops together on the same land.
    - **Advantages**: It reduces the risk of total crop failure since different crops are grown. It also makes better use of soil nutrients, water, and sunlight, and helps prevent the spread of pests and diseases.
    - **Intercropping**: Planting crops in rows next to each other, such as maize with beans, to improve soil cover and reduce erosion.
    - **Relay Planting**: Planting a second crop before the first one is fully harvested, allowing for continuous crop production and reducing the risk of failure.
3. **Crop Rotation**:
    - **Description**: Growing different crops in sequence on the same land, such as planting maize one season, beans the next, and teff after that.
    - **Advantages**: It helps maintain soil fertility, especially when legumes are included, and can control pests and diseases.
    - **Challenges**: Crop rotation can lead to the development of resistant diseases and weeds, and changing climates can make it difficult to implement.

Indigenous Knowledge in Crop Production

Definition: Indigenous knowledge is the traditional understanding developed by local communities over generations. This knowledge is unique to each culture and is crucial for managing natural resources and farming practices effectively.

- **Examples**:
    - The Gumuz people believe that conserving natural resources improves soil fertility and crop productivity.
    - The Konso people use terracing and traditional irrigation to prevent soil erosion and enhance soil quality.

Summary

- Agriculture has evolved from hunting and gathering to settled farming, with various developments over time.
- Ethiopia's low crop yields are due to issues like soil degradation and climate change.
- Crops can be categorized by their use (food, oil, fiber, forage) and their photosynthetic processes (C3 and C4).
- Various cropping systems like mono cropping, mixed cropping, and crop rotation are important, along with indigenous knowledge that plays a significant role in sustainable agriculture.