

Agronomy: Cropping Patterns

Introduction

We have sorted these Agronomy materials into nine bite sized components. This is somewhat different to the other areas of study – which will be considerably more intense and encompass a more detailed discussion.

These agronomy modules begin to explore the complexity inherent in modern farming. In many countries, farmers are dealing decisions about crop and animal husbandry, purchasing and stock management, labor coordination, financing, grain trading, environmental/climate variability & uncertainty, etc. Their choice of crops, or whether they plant a crop at all, often depends on:

- Timing of Rainfall
- Costs of Production
- Commodity Prices
- Anticipated Gross Margins
- Disease, Insect and Weed Management
- Crop Rotation Considerations
- Sustainability Objectives

The cropping system is an important component of any farming system. It is the proportion of area under various crops at a point of time. Crop rotation is the process of growing different crops in succession on a piece of land in a specific period of time, with the objective of getting maximum profit using minimum investment, without impairing the soil fertility.

Growing Seasons

The ability to grow specific crops in certain areas, at specific times, is largely determined by the seasons. The period of time during which a specific crop can be grown in a certain area is called the “growing season”. In agronomic terms, the growing season is primarily determined by patterns in:

- Rainfall
- Temperature
- Humidity
- Sunlight
- Winds

As we look across the globe, we find a wide range of growing seasons. In some areas we have winter-spring-summer-autumn seasons, each with different rainfall, temperature and sunlight patterns. Some crops are better suited to various seasons. For example, in the cotton belt of Australia, cereal grains are better adapted to growing over winter and spring, whilst cotton and corn are better suited to summer and autumn growth.

In tropical areas, seasons are often classified as "wet" or "dry", depending on the monsoon patterns. In these areas, the season for growing certain crops is more dependent on rainfall. Many of the suitable annual crops (like corn) for these tropical areas can only be grown in non-irrigated areas during the wet.

Types of Cropping Pattern

Cropping patterns can be of various kinds. The important cropping patterns are:

- Sole cropping (monoculture) is when a single crop is grown during a season,
- Double cropping refers to the practice of growing two crops in a year,
- Rotational cropping is when cropping is done in a definite sequence,
- Mixed cropping refers to a process of growing two or more crops together in the same piece of land. Mixed cropping is widely practiced in India, particularly during the kharif season ([Click here for more information](#)), and
- Intensive cropping is the process of growing a number of crops on the same piece of land during the given period of time. The aim is to increase the income per unit area within a specified period of time. Intensive cropping can be of two types:
 - i. Multiple cropping - This is a cropping system in which two or more crops are grown in succession within a year. An example of multiple cropping is Rice-Potato-Sunflower followed by Rice-Wheat-Moong.
 - ii. Inter cropping - This is a process of growing subsidiary crops between two widely spaced rows of main crop. Examples are Sugarcane-Soybean, Moong or Urd-Maize, and Urd, Moong or Cotton-Pigeonpea.

Principles of Crop Rotation

Crops are selected for rotation based on certain accepted guidelines. These factors should be kept in mind while considering any cropping pattern. Broadly speaking, these guidelines are:

- Crops with tap roots should be followed by crops with a fibrous root system as this helps in the proper and uniform use of nutrients from the soil. In addition, roots do not compete with each other for the uptake of nutrients,
- Legumes should be grown after non legumes as they fix atmospheric nitrogen into the soil and add more organic matter to the soil,

- Exhaustive crops (crops which need more inputs like more fertilizer, irrigation, insecticide etc.), should be followed by less exhaustive crops, which require less care (i.e., Potato or Maize should be followed by leguminous crops),
- Selection of crop should be demand-based (that is, crops needed by the market should be chosen as it can be sold at a higher price), and
- Crop selection also depends on land type, irrigation facilities, soil and climatic considerations. Financial constraints of the farmer should also be kept in mind.

Depending on the country, and the cropping system, other considerations can include:

- The use of different herbicides to control a range of weeds throughout the crop rotation
- Minimization of disease and pest build up
- Diversification of risk
- Spread of in-season farming operations, and
- Other benefits (e.g. soil fumigation from canola or mustard)

Thus, an ideal crop rotation is one which makes possible maximum return to the farmer, effective usage of equipments and timely agricultural operations.

Local Considerations

In addition to the general principles mentioned earlier, local considerations that affect the choice of cropping systems depend on the certain local factors such as:

- Which crops are well-suited to the soil and climatic factors prevailing in the region,
- What crops are practicable with the present pest and disease control methods,
- What influence does each crop have on the other and is the combination of crops profitable for the farmer,
- How can land, climatic and input resources be put to the best use in the short and long term,
- How do operational factors affect the size and method of cropping, and
- The management skills of the farmer, his health and age.

Advantage of Crop Rotation

Any cropping pattern, if followed correctly, will have several advantages. These advantages are:

- Agricultural operations can be done on time, for all the crops because of less competition,
- Soil fertility is restored by fixing atmospheric nitrogen, encouraging microbial activity.
- Weeds, disease and insects can often be more easily managed
- Proper utilization of all resources and inputs is made as the farmer, his labour, power, equipment and machines are well employed throughout the year,
- As a result of crop demand, the farmer gets a better price for his produce, and
- Growing crops of different nature ensures best utilization of residual moisture, fertility and organic residues. It also improves percolation, soil structure and reduces chances of creation of hard pan in sub-soil zone.

Sources and Links

- Department of Primary Industries, Victoria, Australia. Available online at:
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