

Cropping patterns: some points need to be noted

Editorial

There are many methods to design a cropping pattern. The method which is used is dependent on the scale of the performance. For example, If we want to design just for a given field, the method is completely different than when you want to design a cropping pattern for a large scale (for example those areas are covered by a dam to provide needed water). When designing a project, we must bear in mind the following points:

- i. CPD should be done based on the limiting factor (s). In this case, the success of each pattern will assess firstly base on its limiting factor use efficiency. For example, if the arable lands are limited, the pattern with the highest yield per unit area will be selected as the best pattern. This will be assessed base on water use efficiency, if water is scarce.
- ii. CPD should distribute the labor force throughout the year. This will help to employ the people in the agriculture section with a favorable distribution during different growing stages. In well-designed patterns, plants will cover the land with different percentages throughout the year. Figure 1 shows a 3-crop pattern with different sowing dates. Winter wheat, cotton and soybean (summer crop) have overlaps during their growth, with various percentages of vegetation has been made. Undoubtedly, cultivation percentage of each crop is pattern dependent and will be affected by different factors.
- iii. CPD should be done based on the machinery facility availability. We should consider all facility availability. Some of the products are damaged if not harvested in time. Tuber crops such as sugar beet or potato can be cited. Therefore, if we cannot harvest the tubers in time, the technological value of the product will decrease in warm nights with high tuber respiration.
- iv. During the CPD, cash crops should be considered as possible. For economic security of the farmers, cash crops, especially those crops that are supported by government subsidies should be considered in the pattern.
- v. In a CPD plan, the number of plants should not be too high (normally 4-8). The large number of plants can be problematic. Rotation scheduling is a complicated process for the projects at the fifth stage of CPD, especially when flexible rotations are designed.
- vi. Food process industries should be matched with harvesting value. Farmers should be able to sell their products or process them. Therefore, post-harvest processing of many products could be a concern when there is an imbalance between demand and supply. This should be considered as an important note by designers.
- vii. The project must be economically feasible.
- viii. Returning time of each crop rotation should be considered. For example, returning time of cereals to each cropping pattern should be done every three or four years. Therefore, cereals can only occupy 25 percent of the land area in each cropping pattern (the ideal state).
- ix. Those plants are supported by governments should not be eliminated as possible. Because farmers tend to cultivate them (Because the sale of these products is guaranteed).
- x. 10-In a CPD, extreme climate factors taken into consideration. As a CPD is designed for long-term, the extreme events such as freezing temperatures, extreme heats, and so it should be predicted in the project to prevent system failure. These events may happen once every few years, which is a serious threat especially for orchards.
- xi. In a CPD, land Management Units (LMUs) should be identified well to direct decisions about selecting the crops or fallow as needed. In this case, remote sensing and geospatial-based methods (such as Geospatial Information System, GIS) in large scales and geostatistical interpolation methods along with ground control points (GCPS) in small scales could be helpful.
- xii. Seasonal and permanent water resources should be well identified and their capabilities to provide the water for a given CPD should be assessed precisely. This is so important for those plants that are sensitive to water quality (for example, those crops are sensitive to salinity).
- xiii. Water quality (with seasonal intervals) should be considered. For example, if the water volume decreases during a season (for example summer), water quality also will also be affected. This may limit or restrict the presence of a given crop in the CPD.
- xiv. The general aim of the projects also should be considered. For example, if a project has aimed to phytoremediation of heavy metals from the soil, all CPD design will differ than a CPD with the aim of soil fertility improvement.
- xv. Political aspects (if is needed) should be considered in the design. For example, a country may not be interested in the import of sugar from sugar exporting countries. Therefore, designers must consider the need for sugar in the country.

It should be noted that the tips can have a different weight depending on the circumstances and may be not applicable in the case of some projects. But, these points can be used as a general guide for designers. These are outlines of a CPD project, but there are many details that the designer must have information about them.

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Behnam Kamkar

Department of Agronomy, Gorgan University of Agricultural Sciences and Natural Resources (GUASNR), Iran

Correspondence: Behnam Kamkar, Associate Professor, Department of Agronomy, Gorgan University of Agricultural Sciences and Natural Resources (GUASNR), Iran, Tel +98-9112734153, 98-98-17-32427060, Email kamkar@gau.ac.ir

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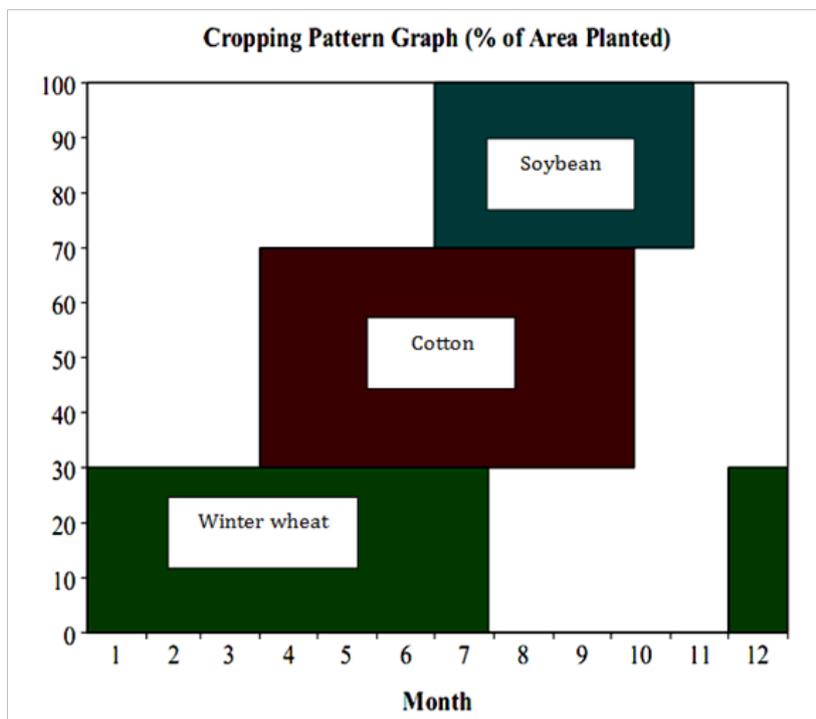


Figure 1 A given cropping pattern including winter wheat, cotton and soybean during a year.

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Conflict of interest

The author declares no conflict of interest.