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EXTENSION
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Fact Sheet 21-07

Basics of Crop Management

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Importance of Crop Management
Adoption of best crop management practices improves crop productivity and can contribute to greater yields with improved quality. Crop management is the set of agricultural practices performed to improve the growth, development and yield of crops. It begins with a seedbed preparation, sowing of seeds and crop maintenance; and ends with crop harvest, storage and marketing. The timing and sequence of agricultural practices depend upon several factors, such as winter or spring crops; harvested products such as grain, hay and silage; sowing methods-broadcast and row-crops; and, plants age, soil, climate and weather conditions.

Seedbed Preparation
Seedbed preparation is the first step to improve crop growth and development. The ideal seedbed is uniformly firm, has adequate soil moisture near the surface, and is free from competing weeds. "Good seed-to-soil contact required" is a phrase commonly seen on seeding documents. Seed germination is improved if seeds have good contact with soil. However, too firm a seedbed makes it challenging to get the seed into the ground.

The two primary methods of seedbed preparation are conventional tillage and reduced or no-tillage. The traditional conventional tillage involves turning over the entire plow depth and exposing large quantities of soil organic matter to oxidation. However, reduced or no-tillage practices can lead to an accumulation of soil carbon, which can ultimately benefit soil health and improve crop yields in the long run.

Planting
After the seedbed has been prepared, seed should be sowed 1.5 to 2.0 inches deep to ensure proper moisture availability for good seed germination. The seed requires optimum moisture and temperature conditions to germinate, so always pay close attention to soil temperature and moisture requirements for proper seed germination.

Fertilization
Fertilization may be an important component of crop management. Soils should be tested for available plant nutrients before adding fertilizers to any crop. The addition of appropriate fertilizers determined from the soil and/or plant analysis can ensure the planted crop's nutritional requirement.

The amount of fertilizer, type (bulk-blended or mixed), forms (gas, dry solids or liquid), timing, and method of application (broadcast, deep placement, dribble, foliar, starter, post-emergent,

row, strip and variable rate), are all determined by a variety of factors, such as crop and fertilizer type, soil and weather conditions. The previous crop (legume) and past manure applications also influence crop nutrient needs. So, past manure applications should always be accounted for in determining crop needs.

Pest Management

Pest management is another important aspect of crop management. Pesticides can be powerful tools for controlling pests in most crops, mainly if used correctly based upon specific pest species. Additionally, integrated pest management (IPM) practices can provide growers with an economical option that is safer and often more beneficial to human and natural resources. This IPM approach incorporates mechanical, biological and chemical (labeled pesticides) pest control methods.

Using the same active ingredient repeatedly on the same piece of land, regardless of the product name, will cause pests to develop resistance over time. This makes the chemical less useful or even useless over time. Thus, to avoid the development of resistance among pests, limit using the same pesticides and choose products from different chemical classes, or vary modes of action. It is best to include some cultural practices (crop rotation, companion crops) and biological controls (predators, parasitoids) to avoid the development of pest resistance to pesticides. Generally, diverse cropping systems tend to decrease the probability of widespread crop failures and pest pressure, while improving soil quality and crop yields. The crop should also be monitored regularly for any specific needs, such as nutrient deficiencies, pest outbreaks, etc., throughout the growing season.

Irrigation

Irrigation is another critical factor for crop production that influences the final crop yields and quality, especially in our dryland region. Over-irrigation results in leaching of nutrients to the groundwater and/or wasting water and soil erosion via surface runoff. These losses will reduce the efficiency of fertilizers, especially nitrogen.

Before you plant any crop, obtain information regarding water needs and the critical growth stages of that crop, and then determine the irrigation system efficiency to schedule irrigation. If feasible, use irrigation systems that give improved water use efficiencies, such as micro-sprinklers, low-elevation sprinklers and drip (85-95% efficient), or low- and high-pressure center pivots (75-90% efficient). In general, the flood irrigation system is less efficient (20-50%) than other methods. Additionally, if possible, schedule your irrigation during the early morning or late evening to avoid water losses via evaporation.

Harvesting

Finally, the yield and quality of crops depend upon the harvest management strategy. Too wet or snowy conditions can delay the harvest of the crop. High moisture content delays the mechanical harvesting (windrowing or swathing, direct combining) of the crop/seed. Most of the grain/seed crops should be harvested when they have reached the harvest maturity stage. This timing reduces the yield loss via shattering and lodging. Therefore, missing the right time to harvest often results in severe yield loss.

The maturity stage at forage harvest is a critical factor influencing the forage quality and end-use. If the forage harvest is delayed for maximum yields (for instance, alfalfa), then forage quality will deteriorate or fall below the needed optimal quality. The maximum yield of alfalfa forage is achieved at the full flowering stage; however, forage quality is highest before flowering.

Post-Harvest Storage

The post-harvest storage conditions also influence the crop's forage and grain quality. The harvested crop should be stored at the proper recommended moisture content for each crop to maximize the quality, reduce pest infestation, and avoid deterioration during storage. For example, cereals stored at 14.5 percent moisture content are highly susceptible to quality loss, mold growth and insect infestation. Alfalfa forage should be baled when the moisture content is 18-20% for better quality.

Additional Practices

Some additional best practices to increase crop productivity and farm profitability are:

A. Increase crop diversity
B. Enhance beneficial pollinators population
C. Use better weed control measures to increase harvest efficiency, crop quality and yield
D. Improve soil quality by following the best soil management practices
E. Add nutrients based upon availability from soil and crop needs
F. Manage labor and input costs
G. Keep track of all expenses and profits
H. Keep good records to help manage a profitable farm business
I. Engage in creative marketing

Conclusion

The consideration of recommended crop management practices may produce greater yields and an excellent marketable product. Adopting a consistent crop and soil management system on a farm will develop a more resilient crop production system and provide more sustainable crop yields. Managing and reducing input costs is critical to profitability.

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