Crop rotation pdf download

Flooded and Frozen. A frozen flooded field of grass in winter The crop rotation in agriculture. Corncob on field and green plants Crop rotation text written on highlighted pattern Green bed in the garden. Crop rotation 1. Crop Rotation Introduction Crop rotation is a common practice used in both arable farming and mixed farming systems. The practice of crop rotation has been in use for over a thousand years and has proven to be an effective soil management technique. Crop rotation refers to the practice of planting different crops on the same plot in a sequential order over a period of years or cropping seasons to avoid depletion of soil nutrients and to combat weeds, pests, and diseases. It is a technique of growing several different crop types (or no crop at all) on the same piece of land and in successive seasons with the objective of maximizing yield without impairing the soil fertility. Crop rotation is different from mixed cropping which refers to the practice of growing two or more crops together on the same piece of land. Crop rotation can be simple or complex. A farmer that alternates two crops have a remarkably simple rotation. Simple crop rotation plans are however, usually for three to four years and often involves growing three to four crops successively. The higher the number of years and crops involved, the more complex the crop rotation system becomes. A five to eight crop rotation plan involving more than half a dozen crops becomes overly complex for most small farmers. Why Rotate Growing the same crop in the same plot year after year (monoculture) inevitably unbalances the soil nutrient composition as certain nutrients gets depleted while others build up depending on the requirements of the crop. Pest and diseases also build up with the continual growth of a single crop over a period of years. An understanding of these facts led to the practice of planting different crops every year commonly known as crop rotation. Crop rotations are an important part of any sustainable agricultural system. It is widely acknowledged that crop rotation is necessary for improving soil quality and maintaining farm productivity. Arable crop farmers generally develop a crop rotation system over time. Effective crop rotations are a foundation of organic cropping systems. Crop rotation plans and records are a necessity for organic certification of a farm. Principles of Crop Rotation There are principles that farmers must adhere to in the practice of crop rotation to achieve the intended objectives. These principles include the following: 2. 1. Allow a minimum of three to four years before replanting the same crop on the same plot of land. 2. The crops with deep roots should be followed by those which have shallow root system. Planting a deep-rooted crop after a shallow rooted crop allows the deep rotted crop to tap nutrients while the shallow part of the soil replenishes and vice versa. This gives the soil sufficient time to replenish the lost nutrients at different soil level. 3. A leguminous crop should follow high nitrogen-demanding crops. This is important because the leguminous crop will replenish the soil with atmospheric nitrogen and increase the soil organic matter content. Legumes use less nitrogen and more phosphate while non-legumes have high demand for nitrogen and low demand for phosphorus. Alternating these crops helps maintain the soil nitrogen and phosphorus levels. 4. Exhaustive crops which take up high amount of soil nutrients should be followed by less exhaustive crops with lower demand for soil nutrients. 5. Crops with high demand for inputs use (better care, better tillage, more insecticide) should be followed by crops with relatively less demand for the above-mentioned inputs. For example, crops like maize or wheat should be followed by crops like chickpeas, runner beans and kidney beans. 6. Crops of different families should not be grown in succession to minimize the possibility of shared pests, and diseases becoming a problem. For example, potatoes should not follow tomatoes because they suffer from the same type of blight capable of wiping out the entire crop. 7. Consider planting non-host plants for a year or two if nematodes become a problem. 8. For sloppy plots, crops which promote erosion (maize) should be followed by crops that are erosion resistant (cow peas). 9. In regions with limited rainfall and irrigation facilities, high-water demanding crops should be followed with low water demanding crops. 10. Weed susceptible crops should be followed by weed suppressing crops. Approaches to Crop Rotation. There are two main approaches to crop rotation. • Rotating crops by edible parts: Farmers can rotate their crops according to edible parts, but this approach has one major drawback. Plants of the same family but different edible parts tend to suffer from the same soil-borne pests and diseases and absorb same nutrient from the soil. For example, tomatoes and potatoes are both from the Solanaceae family but have different edible parts. Under this system, tomatoes will be classified as fruit and potatoes 3. as roots. Being from the same family, both are susceptible to same types of pests and diseases. Planting one after the other on the same plot will not only create problems for the farmers but will give a poor yield because of lack of nutrient. • Rotating crops by crop families A more common approach of crop rotation is rotating by crop families. This allows grouping of plants with similar maintenance requirements together and helps reduce the risk of unintentionally passing on crop-specific soil-dwelling pests and diseases to the next crop. The crop families are listed as follows: 4. Steps in Crop Rotation Benefits of Crop Rotation 1. Reduces dependence on fertilizer use: Rotations that include legumes provides the next crops with sufficient amount of this crucial soil nutrient. Nitrogen from legumes remain in the soil longer than the nitrogen from synthetic fertilizers. Crop rotation also minimizes the rate of nitrate leaching. All these improves the availability of nitrogen in the soil thereby reducing dependence on use of fertilizer. List all the crop types and the numb er of crops you want to grow. Sort the crops according to their botanical families Divide the growing area into equal sections. sections should be equal to the number of yers for the planned rotation Plot where you will plant each selected crop each year. Keep records of what happened in a year, use the information for next year. 5. 2. Enhances soil fertility: crop rotation practices like green manuring, cover cropping, planting leguminous crops, and alternating deep rooted and shallow rooted crops all aim at improving overall soil fertility. Carefully planned rotation takes into consideration the previous year's crops ensuring the availability of sufficient nutrients for the next crops. 3. Increases crop yield and variety: crop rotation increases yield from a single seasonal harvest for the farmer in addition to increasing the variety of crops produced. That increase in soil nutrient because of crop rotation provides sufficient nourishment to the plants ensuing increased productivity. 4. Less fallow periods: one of the aims of allowing land to fallow is soil nutrient replenishment and this can be achieved through crop rotation. Fallow periods are replaced with the planting of different crops to replenish soil nutrients thereby improving farmers productivity. 5. Enhances productivity of successive crops: when crop compatibility is taken into consideration in crop rotation, some crops have beneficial interactions and enhances the yield of successive crops 6. Resource utilization: Adding diversity to crop rotation, especially for large scale farmers helps to reduce fixed machinery and labour costs. Crop rotation ensures proper utilization of all farm resources and inputs. Farm labour, power and machineries are well employed from one cropping season to the other. Crop rotation also reduces dependence on external inputs through internal nutrient recycling and ensures long-term productivity of the land. 7. Better soil structure: crop rotation affects the root structure over time. The diversity in planting deep rooted/tap root followed by shallow rooted/ fibrous roots overtime enhances the physical and biological structure of the soil creating a better soil structure. This also increases the soil nutrient pool and the water-holding capacity of the soil. 8. Improves overall soil quality: Crop rotation practices like green manuring, composting, and cover cropping helps improve soil quality by maintaining or increasing the organic matter content of the soil which is the primary food source of soil organisms. Consequently, the healthy presence of soil microorganisms in the soil is beneficial in holding soil particles together, loosening compacted soil, releasing minerals for plant uptake, enhancing air and water movement in the soil, and providing pathways for healthy root growth 9. Means of erosion control: soil stability increases when deep rooted crops are alternated with shallow rooted crops and this helps protect the farm against forces of erosion. The associated improvement in soil tilth and microbial communities improves the soil structure and helps to 6. minimize soil erosion. Crop rotation involving cover crops also helps to minimize surface water runoff. 10. Natural pest and disease control: Crop rotation play a big role in breaking the cycle of pests and diseases caused by plant pathogens taking a foot hold in the farm. Diversifying the cropping sequence eliminates the food source of the pests and disrupts the life cycle of the pests. This in turn minimizes the use of pesticides, insecticides and nematicides. 11. Reduces weed stress: Crop rotation serves as a traditional weed control technique. Field conditions under crop rotation allows crops to crowd out weeds as they compete for soil nutrients. The population of weeds are reduced and in the long run, farmers depend less on tillage and use of herbicides for weed management. 12. Diversification of risks: crop rotation helps farmers to spread their weather risk and diversify economic risks as well improve overall farm productivity and income of producers. Other benefits include improvement in overall farm productivity, diversification of economic risks, biodiversity of crops and animal habitats, lower greenhouse gas emission from lower use of fertilizers and pesticides, decreased negative environmental impact. Limitations of Crop Rotation 1. Does not allow specialization: crop rotation makes it difficult for farmers to specialize. Farmers cannot produce a single crop in a large scale over a long period of time. 2. Higher investment in machinery: some crops require specific types of equipment and machinery, so farmers may have to invest in different types of machinery causing initial cost to be high. 3. More demand on time: crop rotation involves investments by farmers in different planting techniques unique to the crops. Each crop needs different type of attention and this can cost the farmer a lot of time as well as money to implement. 4. Opportunity cost: by rotating different crops yearly, farmers lose out on the chance to plant the crops that may give them the highest profit in a crop year. With crop rotation, farmers may not plant their most valuable crop every year, so they earn less profit from planting the crops with lower market value. 5. Risky: There is no guarantee that all the crops planted in a season will do well. farmers run the risk of making a loss after investing money in farm inputs for each different crop planted. 7. Challenges of crop rotation A major challenge with crop rotation is that the choice of crops depends on several fixed factors (soil type, topography, climatic conditions, and availability of water) and variable factors (demand, labour). This makes planning crop rotation difficult for many farmers. Improper implementation of crop rotation can lead to more harm than good such as excessive nutrient depletion or build up that will take years to be noticed and even long time to correct. One must understand the principles of crop rotation for it to be successfully implemented. Farm Machineries for Arable Crop Production Arable crop production has a variation of distinct processes which makes it nearly impossible to carry out without the use of machineries. With increased commercialization of farming, the use of machineries and tools have become essential. Farm machineries refers to technologies, equipment and appliances used on a farm. Different stages of farming require the use of different type of machinery. In general, the following types of machineries are required in arable crop farming; 1. Soil cultivation machineries 2. Planting machineries 3. Fertilizing and pest control machineries 4. Irrigation machineries 5. Harvesting and threshing machineries It is important to note that the tractor which is the most common machinery used in the farm do not fall into any of these categories. The tractor is used for pushing other farm machineries that cannot propel themselves in carrying out specific task such as ploughing, tilling, planting, and others. Tractors come in different sizes depending on the machine to be coupled to it. Preparing or getting the ground ready for arable crop production involves clearing unwanted vegetations and weeds, ploughing to dig up and overturn the soil, harrowing to break up soil and incorporate plant residues, and leveling and smoothing the soil surface. These activities entail the use of the tractor and different soil cultivation machineries and they include the following: 8. 1. Tractor: used to propel the plough, harrow and other soil preparation implements. 2. Plough: The Plough is a primary tillage implement used to cut, granulate, and invert the soil, creating furrows and ridges. Plowing brings fresh nutrients to the surface and make the ground softer to allow easy penetration of plant roots, better aeration, and improved soil moisture content. A ploughed field is often allowed to dry out before planting. There are different types of plough: mould board plough, disc plough, ridge plough, and chisel plough. 3. Harrow: harrows are used to break up soil lumps and improve soil granulation and surface uniformity to make it suitable for seeding and planting operations. Harrowing is carried out after ploughing which creates furrows and surface ridges to provide a finer finish and good soil structure. There are three types of harrow: disk, spike and drag harrow. 4. Cultivator: cultivators are secondary tillage implements used for pulverizing the soil before planting. The cultivator stirs the soil to a greater depth than the harrow. 5. Cultipacker: this is used to crush dirt clods, removes pockets of air and press down stones to form a smooth firm seedbed. 6. Rotary tiller: this is a form of motorized cultivator with rotary blades used for tilling the soil. It is also known as a rotavator. Soil preparation is essential for the success of all other activities involved in arable crop production and therefore should be carried out with utmost care. Group work Plot a four-year crop rotation plan for a small vegetable farm taking into consideration the principles guiding crop rotation. Further reading 1. Pichardo V. M. (2015). Soil Preparation: Tools and Implements. Available at 2. Watch the video on crop rotation by GrowVeg.com. Available at 3. Read the attached Word document provided for this topic. 4. Study the table for the crop botanical families attached to the word document note. 9. REFERENCES Farmers weekly (2019). Understanding Crop Rotation. [Online]. Available at GrowVeg (2019). Easy crop rotation using colours of the rainbow. [Online]. Available at [Accessed 24th May 2020]. Jagdish Reddy. 2019. Farm Machinery; type, uses and importance. [Online]. Available at [Accessed 26th May 2020]. Miller B. (2016). 8 Pros and Cons of Crop Rotation. [Online] Available at pros-and-cons-of-crop-rotation [Accessed 24th May 2020]. Pichardo V. M. (2015). Soil Preparation: Tools and Implements. [Online] Available at [Accessed 24th May 2020]. Richmond Vale (2017). 9 benefits of crop rotation for the environment. [Online] Available at [Accessed: 25th May 2020] The Seasonal Homestead. (2019). Crop rotation idea for an organic vegetable garden.[Online] Available at organic-vegetable-garden/. [Accessed 26/05/2020]. Sustainable Agriculture Research and Education (SARE). (2019). [Online]. Available at Version/Crop-Rotations/Rotation-Examples 10. APPENDIX

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