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AN OVERVIEW ON CROPS MANAGEMENT PRACTICES

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ABSTRACT

Food is essential for human life, and it is grown in fields and distributed to restaurants via agricultural techniques. It now depends on how much food is made available to eaters in order to meet local and national demands, but it can also be transferred to meet the demands of other countries where that particular quality of diet is not available due to an unsuitable atmosphere for its manufacturing, but it also depends on different of other factors. Cover crops, agricultural crop, intercropping, high-yielding seed types, and the use of high-quality fertilizers and pesticides are among the agricultural production management methods discussed in this article. This kind of management also guarantees that crops are grown in a sustainable way to meet the requirements of future generations while yet yielding excellent yields. Mass crop production is needed for the nation's food security; therefore, management techniques must be addressed.

KEYWORDS: *Agricultural, CropRotation, Fertilizers, High Yielding Seeds, Pesticides.*

1. INTRODUCTION

Crop production must be maximized to ensure the world's population's sustenance and food security. In developing nations, where agricultural production is vital to the survival of the people, the most advanced crop management methods must be used at all times. This is essential for such communities' long-term economic sustainability. Globally, it is estimated that by 2050, the human population would have risen to 9.1 million people, requiring vast agricultural production to feed this growing population. Crop management must be effective and long-term in order to provide a continuous supply of food. This is necessary in order to minimize agricultural crop damage across the food supply chain[1].

Any approach or technique that is technically and environmentally sound and that, when used in the growing of agriculture, avoids or reduces the usual problems associated with general agricultural production is described as best management practice. Because agro ecosystems are interconnected and dynamic, every agricultural crop management activity must be carefully managed to prevent compromising crop-to-crop interactions. Environmental expenses or the urge to throw off the board, as well as conservation and ecosystem preservation, must not affect management methods. Short- and long-term goals must improve the land's buoyancy and biodiversity while also taking into account the advantages to nearby people.

Crop management methods have been agreed upon on a worldwide scale. Efforts like these in

agricultural crop management yield results. Cover crops, crop rotation, intercropping, agro forestry, soil testing, record keeping, proper water and irrigation management, pesticide and/or fertilizer management, and tillage techniques are a few examples. It will increase crop yield, improve soil quality, ensure biodiversity protection, and lower overall environmental costs by paying close attention to these important issues in agricultural crop management. Cover crops, crop rotation, and intercropping, as well as pesticide and fertilizer management, are three of the most effective crop management methods discussed in the next section[2].

Cover crops are plants that are grown to remain low to the ground during the off-season in order to prepare the ground for cash crop planting. White, on the other hand, believes the cover is a cropping operation since it is a second planting of an unharvested crop alongside the cash crop. They are essential in rural areas for the preservation of agricultural goods. They increase soil fertility and quality, reduce soil erosion, and limit nitrogen leaching or runoff while improving water quality and preserving soil microbial biodiversity. They provide vital nitrogen, which helps to regulate pH levels and prevent soil compaction. Cover crops are 'fraudulent crops,' designed to keep predators away from the farm's cash crops. Cover crops are one of the safest and most sustainable crop management techniques, according to many farmers.

Crop rotation and intercropping are two of the most efficient agricultural crop management methods, which have been used in organic farming for a long time and are now being used in conventional farming. Crop rotation is an agricultural technique that involves planting different or dissimilar crops on the same area at different periods of the year. Intercropping, on the other hand, is a multiple cropping method that involves growing two or more crop species on the same area during the same planting season. Agricultural crop planting activities help to vary the amount of nutrients in the soil, reducing the risk of soil erosion. Crop rotation, according to Ball et al., allows for the gathering of high-quality crop yields while reducing the overall agro ecosystem’s environmental effect. They also help to maintain soil structure, which helps to prevent pests, weeds, and other diseases from spreading on agricultural land. Crop rotation and intercropping decrease dependence on chemical fertilizers, reduce agricultural crop production hazards, and increase crop yield when compared to monoculture techniques. This theory is supported by a 50-year field experiment in Moldova's Northern Region. Bornean claims that agricultural rotation, rather than monoculture, improved crop output at the study site[3].

In many countries, chemical pesticides are often employed on fields to enhance agricultural crop yields. However, they should only be used in moderation. To protect agricultural crops against parasites, they should only be used as a last option. Organic fertilization, such as the use of compost and animal manure to enhance soil fertility, must be preferred over the use of chemical pesticides in the overwhelming majority of cases. Agriculturalists must carefully evaluate whether or not to use a pesticide that has little or no negative effect on the environment. The chemical solubility, volatility, and degradation characteristics must be scientifically examined to see whether it will harm the environment or leak from the soil. "The mark is the law" when it comes to the use of chemical pesticides. This usually means that the chemical must be applied to the latter according to the instructions on the label. They must be administered properly and in the appropriate quantities. Pesticide treatments should not be done before rainfall in general because they are more prone to leak or cause runoff, contaminating freshwater quality. Chemical fertilizers must be properly labeled and stored in dry, well-ventilated areas with easy access to fire-fighting equipment[4].

1.1. Increased Crop Production Through the Green Revolution:

With at least 20 different climatic zones and 157.35 million hectares of land under cultivation, India ranks second in the world in terms of arable land. Despite the fact that agriculture employs almost half of India's rural population, the country's economy is not based on agriculture. The crop year 2017-18 generated about 279.51 million tonnes, according to a research on agricultural production. However, between 1947 and 1960, the country's agricultural output capacity was at an all-time low, and famine was a real possibility. The Green Revolution was started in 1960 to address this situation, with the aim of boosting food production, relieving poverty and hunger in the country, and fulfilling the needs of a large population.

The most significant crops produced during this period were rice, wheat, millets, barley, maize, and sorghum. Other crops that were no longer consumed became fodder crops after the revolution, while traditional rice varieties were virtually extinct even before the revolution, with a total of 7000 kinds available, not all of which are cultivated. A total of 1 lakh rice varieties that were formerly indigenous have been lost. All of this happened as a result of the government's focus on monoculture and the availability of subsidies for particular crop varieties with high yielding qualities. India became self-sufficient in the production of certain crops as a consequence. Large-scale production of such crops, on the other hand, has had certain negative effects, including the overuse of fertilizers, pesticides, and groundwater resources. Due to misuse of pesticides and a lack of crop rotation, the soil became infertile. As a consequence of these adverse effects, farmers had a major difficulty in overcoming long-term deficits[5].

The above-mentioned components are likely to be well-understood. Farmers in India were accustomed to keeping fields fallow for a period of time, crop rotation, and organic farming to compensate for nutrient shortages and maintain soil balance since their land was restricted in size and well protected by windbreaks and tree cover. The main reason for the neglect of indigenous crops and the adoption of HYVs was because indigenous crops, while being high yielding, could not withstand chemical fertilizers and pesticides. The new cultivars provided great yields when combined with fertilizers and irrigation.

The misuse of fertilizers caused physical and chemical deterioration of the soil, changing the microbiological nature of the soil and increasing its alkalinity and salinity. Second, excessive groundwater usage for agricultural production has led the water table to drop in several areas of the country. Monotype crops have developed as a result of the decrease in the number of HYVs in crops, eliminating other indigenous crop types. However, although HYV crops produced well, they also damaged the environment as a consequence of their cultivation, and their yielding capacity was also reduced as a result of the negative impacts of fertilizers on the soil and environmental degradation. IR-8 and ADT-27, for example, were formerly high-yielding rice types, but their yields have decreased with time. In a nutshell, the Green Revolution resulted in the following important outcomes[6].

- Native crop kinds have become extinct as a consequence of the introduction of HYVs.
- A lack of nutrients in the soil.
- Pesticides remained in the soil due to excessive use.
- It led to the adoption of non-sustainable farming practices by the farmers.

The green revolution resulted in a rise in agricultural cultivation from 97.32 million hectares in 1990 to 126.04 million hectares in 2014. The output of food grains is expected to increase to 301 million tons by 2020. In the 1950s, arable area for coarse cereals fell from 37.67

million hectares to 25.67 million hectares. Sorghum agriculture dropped from 15.57 million hectares to 5.82 million hectares, while pearl millet farming decreased from 9.02 million hectares to 7.89 million hectares. It was raised from 30.81, 9.75, 19.09, and 3.18 million hectares to 43 million hectares for rice, wheat, pulses, and the maize, respectively. these changes had an impact on the availability of food grains in both rural and urban families. It also influenced rice availability, which increased from 58 kg per year in 1951 to 69.3 kg per year in 2017. From 1951 to 2017, the net availability of rice increased from 24 to 70.1 kg/year. The availability of millets and pulses, on the other hand, has decreased. As can be seen in Figure 3, this shifted the population's intake from minor grains and pulses to wheat and rice, as well as major cereals. The current state of consumer spending. Cereals were important in daily consumption in 1987, but as time went on, they became less so, with a drop of 14% and 8% in rural and urban families, respectively. In rural regions, consumption of coarse grains and millets remained constant at 0.1 percent, whereas in urban areas, consumption was nil.

1.2. The Impact of the Food Price Crisis on Food Security:

Food security entails not only the availability of food to fulfill people's need, but also the proper selection of nutrients to prevent malnutrition and eliminate health problems. It may occur at both the national and individual levels as a result of idiosyncratic shock. In 1970, the primary emphasis of the World Food Conference was on shortfall and production levels. Now the emphasis is on food because, despite the fact that food is available in huge quantities, impoverished people are still unable to get adequate amounts of food. In a similar vein, Amartya Sen concentrated on demand-side problems rather than supply-side threats. According to a study published by the World Bank in 2007, 850 million people are still hungry despite the availability of adequate food. As a result, in developing nations, the problem of food security is not so much about availability as it is about poor people's access to food, which is influenced in part by food supply. The food crisis was caused by a rapid increase in food costs, which eventually resulted in the poor being unable to get food owing to their inability to do so. Figure 4 displays a graph of the trend of food prices. There was a full spike in food costs in 2008 against a steady increase in food prices, and there is now a continuous decline, but still above a secular trend, as can be seen in Figure 4 which shows a graph of the trend of food prices[7].

1.3.Management Of The Soil:

Soil management techniques including drainage, tillage, and traffic control may directly or indirectly change soil structure. Many of these modifications are temporary and reversible. Changes in soil amount and characteristics caused by management may also result in long-lasting changes in soil structure. Sustainable management methods must preserve soil structure in a condition that is optimal for a variety of agricultural production and environmental quality activities over the long term.

Many ecosystems rely on soil surface biological communities to regulate infiltration and therefore guarantee enough water availability for crops, soil biota, nutrient cycles, and vascular plants. By fixing atmospheric carbon (C) and nitrogen (N), they enhance biodiversity, speed up soil formation, and contribute to the biogeochemical cycle of nutrients. As a result, addressing the soil surface should be a major consideration when developing management methods.

Water logging pressures may be mitigated via a variety of soil management techniques. We'll go through various soil management techniques, with a focus on the method utilized in

waterlogged regions.

1.4. Farming With Controlled Traffic:

Controlled traffic farming (CTF) is a management technique that aims to reduce indiscriminate soil change by controlling extensive unsystematic trafficking by agricultural machinery/vehicles. CTF is a crop production system with a clearly defined crop area and transportation lanes. It establishes two separate zones: a non-trafficked agricultural area and a non-trafficked traffic region. As a result, CTF systems always keep the crop area free of wheel tracks, while the traffic zone becomes compacted for equipment draught efficiency. By decreasing the frequented region, CTF differs from traditional traffic techniques such as random traffic farming (RTF).

Because food costs account for three-quarters of the money spent on purchasing basic foods, they have a significant impact on the poor. According to Ivanic and Martin, the crisis swept 105 million people into poverty, necessitating additional measures to reduce poverty for another 7 years. Due to the crisis, there was a 2.5 percent rise in the Sub-Saharan African region. Even if we ignore buying power, it has a long-term effect on the household's food security owing to the lower calorie intake value of Bangladesh's underweight children, which is related to the money spent on rice purchases. With a mathematical example, if the price of rice per kg was previously 40 Rs. per kg and has now risen to 60 Rs. per kg, there would be a nearly 50% reduction in the purchase of rice while maintaining the same income. The family will now get used to the same quantity of rice. It will also have an impact on children's schooling and the sale of family cattle to fulfill their needs. As a result, a temporary increase in food costs resulted in people's persistent impoverishment. It all happened because of several factors involved in raising food prices, such as an increase in fuel prices, which led to an increase in agricultural production costs due to an increase in the cost of fertilizers, and an increase in the international market due to a decrease in the value of the rupee in India and vice versa in other countries. Increased use of alternative fuels such as bio-diesel reduced the amount of land available for food production, resulting in higher demand and lower supply. It may also be as a result of floods and droughts.

2. LRTERATURE REVIEW

Machado et al. studied about Salinity is a significant issue that affects agricultural productivity throughout the globe, with 20 percent of cultivated land and 33 percent of irrigated area impacted and degraded by salt. Climate change, inappropriate use of groundwater (especially near the sea), increased use of low-quality water in irrigation, and widespread irrigation associated with intensive farming may all exacerbate this process. Increased soil salt affects the yield of many agricultural crops, such as most vegetables, which seem to be especially vulnerable throughout their life cycle. The majority of vegetable crops have a low salinity threshold range from 1 to 2.5 ds m1 in saturated soil extracts), and their salt tolerance diminishes when salty water is used for irrigation. The goal of this study is to explain how salt affects vegetable development and how management techniques (irrigation, drainage, and fertilization) may avoid soil and water salinization and reduce salinity's negative impacts[8].

Wani et al. studied about in order to better understand how integrated crop management (ICM) techniques influence soil characteristics, crop productivity, and economics under the Hochelaga (soil rejuvenation) initiative in Karnataka, India, a research was performed from 2009 to 2012. The results of 3776 crop-cutting experiments on diverse crops (cereals, pulses, and oilseeds) showed that there is a great deal of spatial heterogeneity in soil nutrients

throughout Karnataka's taluks. Crop yields were directly affected by balanced fertilizer application in both rainfed and irrigated regions. Oilseeds outperformed traditional farming methods in terms of net income and benefit–cost ratio, whereas grains and legumes also showed substantial yield increases when compared to conventional farming practices. The comprehensive results on soil characteristics, crop yields, and economics indicated that ICM techniques may increase agricultural production over a wide range of soil types and rainfall zones in Karnataka, India[9].

Person et al. studied Ethanol produced from different plant resources, particularly maize, is increasingly being utilized as a fossil fuel replacement. The amount of ethanol that may be produced from maize depends on weather and climatic conditions, as well as crop management techniques. On the basis of its effect on greenhouse gas emissions, economic feasibility, and national energy security, the benefits as well as prospects of ethanol production have been assessed. Crop management methods have a direct impact on ethanol's NEV. Furthermore, the NEV is influenced by both crop management techniques and climatic variability via grain yield. The goal of this research was to see how crop management techniques and climatic variability affected maize grain yield and ethanol NEV under circumstances that were representative of the southern United States. The NEV of ethanol generated from irrigated maize was more than twice as high as that of ethanol produced from rainfed maize, and it fluctuated less. In both rainfed and irrigated circumstances, the NEV of ethanol generated from maize grown during La Nia years was substantially greater than maize cultivated during El Nio years. According to the NEV, crop management techniques and climatic variability have a significant impact on ethanol feedstock yield and long-term energy sustainability. We talk about how to put the results of this research into practice, such as via market processes and government efforts[10].

3. DISCUSSION

Crop management starts with seed planting, continues with crop care as it grows and develops, and concludes with harvest, storage, including distribution. A mechanical planter typically creates a furrow in the prepared soil seed bed, puts the seed in the exposed wet soil, covers the planted seed, and then compresses the soil down to provide strong seed-soil contact during seed sowing. The crop is planted (“drilled”) directly into the soil in no-till systems using leftover from the preceding crop.To provide nutritional adequacy for plant development, soil fertilization is an important part of crop management. A number of factors influence the kind, quantity, time, and technique of fertilizer application, including the crop type, the nature of the fertilizer, soil conditions, including weather.Growing appropriate salt-tolerant crop production, managing seedbeds, as well as grading fields to minimize local salt accumulation, soil management, improving irrigation efficiency, but also soil, water, as well as salinity monitoring for assessing leaching but instead drainage requirements are all part of crop management practices for the safe use of salt-affected soils and saline water. Crop management considerations include the following:

4. CONCLUSION

Implementation of sustainable agriculture management techniques, such as those discussed, is a smart route to follow in the future years to guarantee global food security. Although the general development and structure of soil differs from one geographical structure to the next, these crop management operations, on the other hand, provide significant economic advantages to both emerging and developing nations. Farmers and extension officers must make it a priority to educate farmers, particularly rural farmers, on how to effectively implement these sustainable as well as essential agricultural crop management practices in

order to maximize crop yields while preserving the natural beauty of agricultural ecosystems. The green revolution was intended to boost the production of agricultural products such as wheat and rice to satisfy the nation's need, but it was so successful that it also resulted in the export of such commodities.

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