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Sustainability Agriculture Development

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Abstract

Modern agriculture, plant breeding, and agrochemicals such as pesticides, fertilizers, and technological improvements have increased agricultural productivity sharply, but at the same time these technological improvements have caused widespread environmental damage and an increased negative impact on human health associated with organic organic consumption. The agricultural practice is a foundation for all global development. Increasing its production and productivity may affect the land capacity in the future if not managed sustainably. Sustainable agriculture could be one way to preserve land use potential. Agriculture could become sustainable with careful management of its components. The major components of sustainable agriculture are building healthy soil and preventing erosion, managing water wisely, increasing carbon sequestration, increasing resilience to extreme weather, and promoting biodiversity. Food and nutrition security could result from sustainable agriculture without harming the environment for future generations. Sustainable agricultural development seeks not only to conserve and conserve natural resources, but also to develop them, because future generations will demand more in quantity and quality in terms of agricultural and food products. Hence, challenges and opportunities were discussed to support decision-making related to land and water resource management as a prerequisite for sustainable development. In the Indian agriculture sector, the challenges facing sustainable agricultural development. So, improving agricultural productivity, while preserving and enhancing natural resources, such as water, is a prerequisite for farmers to increase global food supplies on a sustainable basis. The role of small farmers and their families in sustaining sustainable agricultural productivity growth will be crucial.

Keywords: *Agriculture, Fertilizers, Organic, Productivity.*

I. Introduction

Sustainable agriculture has a significant role to play in feeding the growing worldwide population and reducing the impact of climate change. Today, agriculture accounts for up to 30% of the world's greenhouse gas emissions, according to the World Bank. The agriculture infrastructure churns out emissions through transportation; the planting, harvesting, and processing of crops; and the production of livestock. Agricultural sector in Indian economy can be seen through its contribution to Gross Domestic Product and employment. The role of agriculture, which supplies all of the world's food and occupies 40% of the available land, is both the largest industry in the world and a major land use. The economic growth of the world is dependent on the agricultural sector. Developing countries continue to face the most pressing difficulties due to the increasing population and related food security. In the twentieth century, enhancing food production was only possible by increasing agricultural output with outside inputs like mineral fertilizers and pesticides. Modern agricultural techniques built on the green revolution have led to a significant increase in grain productivity at the expense of depleting natural resources. Soil fertility and environmental resilience suffered significantly because of agriculture's externalization. Thus, it calls for different strategies that should train farmers to use their traditional knowledge to produce more grains with fewer outside inputs. The integrated usage of a variety of soil, nutrients, and pest management techniques including manure, crop residue, mixed cropping, and crop rotations has been encouraged in sustainable agriculture systems. By minimizing soil degradation, these approaches increased soil quality, nutrient pools, climatic resilience, and ecosystem restoration, increasing the socioeconomic status of farmers.

Currently, conventional agriculture practices are contributing to the degradation of important ecological processes that support life on Earth. These practices are responsible for climate change, the degradation of the biosphere, the destruction of the land system, and the eutrophication of the oceans as a result of mineral fertilizers application.

The Importance of Sustainable Agriculture

The world population is expected to grow from 7.7 billion today to 9 billion by 2050, and, at the same time, agricultural land is being lost to expanding urban areas and climate change. The World Bank estimates that food production will have to increase by 70% by 2050 to make up the difference. Department of Agriculture defines it as practices intended to protect the environment, expand Earth's natural resource base, and maintain and improve soil fertility.

The desired outcomes are to:

- Satisfy human food and fibber needs
- Enhance environmental quality and the natural resource base upon which the agriculture economy depends.
- Make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls.
- Sustain the economic viability of farm operations
- Enhance the quality of life for farmers and society as a whole

Most of the traditional and conventional farm practices are not cost-effectively sustainable. They misuse natural resources, reducing soil fertility causing soil erosion and contributing to global climatic change. But sustainable agriculture has some major advantages over traditional practices. Two of the various possible practices of sustainable agriculture are crop rotation and soil modification, every designed to make targeted that vegetation being cultivated can acquire the important vitamins and minerals for healthful expand. Soil amendments would encompass utilizing locally to be had compost from neighbourhood recycling facilities. These neighbourhood recycling facilities aid produce the compost wished by way of the regional organic farms.

1. Crop rotation: Crop rotation is likely one of the most effective procedures of sustainable agriculture. Its rationale is to maintain away from the consequences that include planting the equal plants throughout the equal soil for years in a row. It allows deal with pest troubles, and chooses distinctive crops. If the pests have a consistent ingredient, they may be able to widely broaden their population dimension.

2. Cover crops: Many farmers select to have crops planted in a discipline always and by no means depart it barren, this can purpose accidental results. By way of planting cowl plants, which include clover or oats, the farmer can achieve his desires of stopping soil erosion, suppressing the increase of weeds, and improving the great of the soil. Using cowl vegetation also reduces the want for chemicals consisting of fertilizers.

3. Natural pest predators: So as to maintain powerful control over pests, it's far vital to view the farm as surroundings as opposed to a factory. Coping with your farm in order that it is able to harbour populations of these pest predators is an effective as well as a complicated method. The usage of chemical insecticides can result in the indiscriminate killing of pest predators.

4. Integrated pest management: This is an approach, which simply relies on organic instead of chemical techniques. IMP also emphasizes the importance of crop rotation to fight pest control. Once a pest problem is recognized, IPM will mean that chemical solutions will most effective be used as a closing resort.

5. Soil Fertility: Continuous fall in soil fertility is one of the major problems in many parts of India. Sustainable agriculture improves fertility and soil structure.

6. Biodiversity: Sustainable agriculture practices involve mixed cropping, thus increasing the diversity of crops produced and raising the diversity of insects and other animals and plants in and around the fields.

7. Climate: Conventional agriculture contributes to the production of greenhouse gases in various ways like reducing the amount of carbon stored in the soil and in vegetation, through the production of Methane in irrigated field and production of artificial fertilizers etc. By adopting sustainable agriculture system, one can easily overcome this problem.

III. Sustainable agriculture in India

The sustainable agriculture can be described as any set of agronomic practices which can be economically viable, environmentally safe, and socially proper. If a cropping device calls for big inputs of fertilizer that leak from the device to pollute ground water, drinking components and remote coastal fisheries, the device can be sustainable economically because the long-time period supply of fertilizer is stable and the economic price of fertilizer is without difficulty borne with the aid of large grain manufacturing however it isn't sustainable environmentally or socially, because it does not cover the cost of environmental harm or social prices . The organic agriculture makes a specialty of "living soil", on optimizing using organic techniques and on keeping off using synthetic chemicals and fertilizers. The Indian authorities' rules have always emphasized meals grain self-sufficiency, which has no longer always coincided with agricultural sustainability. A few viable moves of sustainable agriculture in India are:

1. Advent of regenerative branches of enterprise (e.g. horticulture or aquaculture).
2. Advent of a new manufacturing detail in current businesses (which include fru trees to stabilize terraced fields, fish-farming in rice fields).
3. Optimization of put up-harvest structures (e.g. garage).
4. Boom the cost of agricultural merchandise through in addition processing (e.g production of yoghurt from milk).
5. Improvement of channels of distribution (e.g. marketplace get admission to, transport).
6. Get right of entry to loans and different monetary services.

IV. Indian agriculture

Agriculture in India is livelihood for a majority of the population and can never be underestimated. Although its contribution in the gross domestic product (GDP) has reduced to less than 20 per cent and contribution of other sectors increased at a faster rate, agricultural production has grown. This has made us self-sufficient and taken us from being a begging bowl for food after independence to a net exporter of agriculture and allied products. Total food-grain production in the country is estimated to be a record 291.95 million tonnes, according to the second advance estimates for 2019-20. This is news to be happy about but as per the estimates of Indian Council for Agricultural Research (ICAR), demand for food-grain would increase to 345 million tonnes by 2030. Increasing population, increasing average income and globalization effects in India will increase demand for quantity, quality and nutritious food, and variety of food. Therefore, pressure on decreasing available cultivable land to produce more quantity, variety and quality of food will keep on increasing. India is blessed with large arable land with 15 agro-climatic zones as defined by ICAR, having almost all types of weather conditions, soil types and capable of growing a variety of crops. India is the top producer of milk, spices, pulses, tea, cashew and jute, and the second-largest producer of rice, wheat, oilseeds, fruits and vegetables, sugarcane and cotton. In spite of all these facts, the average productivity of many crops in India is quite low. The country's population in the next decade is expected to become the largest in the world and providing food for them will be a very prime issue. Farmers are still not able to earn respectable earnings; also India has upgraded their rank in global hunger index from 97 to 100 in last year. Hunger is serious problem in India, out of 119 countries India is behind the North Korea, Bangladesh and Iraq. India's requirement for food grains in order to provide for population is projected to be 345 million tunes by 2030. The estimate of food grains production in 2017-18 is 277.5 million tonnes. This implies that the crop output needs to grow more than its annual average. There is marginally increase in the area under food grain production compare to change in total food grain production in India. The average yield agriculture increases because of productive capacity of agriculture sector has uplift during the study period. The following table describes the actual situation of food grain production and area under food grain production in India.

Table 1: **The actual situation of food grain production and area under food grain production in India during the years of 2000-01 to2023-24**

Si. No.	Year	Total food grain production (Million Tonnes)	Area under Food production (Million Hectares)
1	2000-01	196.87	121.05
2	2001-02	212.85	122.77
3	2002-03	174.87	113.87
4	2003-04	213.19	123.45
5	2004-05	198.36	120.08

6	2005-06	208.60	121.60
7	2006-07	217.28	123.70
8	2007-08	230.78	124.06
9	2008-09	234.47	122.83
10	2009-10	218.11	121.33
11	2010-11	244.49	126.67
12	2011-12	259.28	124.75
13	2012-13	257.13	120.70
14	2013-14	265.04	126.04
15	2014-15	252.0	124.3
16	2015-16	251.6	123.2
17	2016-17	275.68	129.2
18	2017-18	285.0	127.5
19	2018-19	285.2	124.8
20	2019-20	297.5	127.0
21	2020-21	310.7	129.8
22	2021-22	315.6	130.2
23	2022-23	329.7	132.2
24	2023-24	328.9	130.2

Source: Economic survey of India 2001 to 2017 &2023-24.

The first and second green revolution has largely influenced on food grain availability in India. In 2001, the total food grain availability was 196.87 mt. The bad monsoon session adversely influenced on availability of food grain in year like 2002-03, 04-05, and 2014-15. After 2015 the trend became positive and gradually increased. In the present year 2020-21 expected total food grain availability will be 300 MT. The area under food grain production has shown 6.63% increase in total area under food grain production in India. This fact explores the need and opportunity of agriculture sector to expand.

V. Sustainable agriculture benefits

There are many blessings of sustainable agriculture, and standard, they may be divided into human fitness benefits and environmental benefits. Some elemental sustainable agriculture methods can help reduce the environmental impact of farming. Benefits include the following:

a. **Keeping carbon in the soil.** A method called no-till farming maintains carbon in the soil instead of releasing it into the air. No-till farming calls for the farmer to leave crop detritus in the field after harvest instead of ploughing it under. It can extend to planting, when the farmer drops seed on the ground rather than submerging under the soil surface. It also reduces the number of passes through a field with machinery.

b. **Reducing the use of pesticides, herbicides, and fertilizers.** The practice of alternating different crops in the same field, called crop rotation, helps keep the soil healthy and productive, developing a mix of nutrients in the soil. This can help reduce the use of fertilizer and chemicals to kill weeds and insects.

c. **Maintaining pastureland. Rotating grazing livestock** from field to field builds up soil from the animals' manure, boosting the robustness of different pastures since the livestock doesn't strip one field of its grass. It also enables the soil to store more carbon.

d. **Reducing fuel consumption**. Planting crops that come up every year, called perennials, reduces the number of times farmers must take machinery into the field to plant and apply chemicals. These basic practices are important for sustainable agriculture because they can be implemented on small farms in the U.S. and other developed nations as well as in agricultural settings in developing countries. The up-front costs are low and the payoff can be realized.

e. **Crop production:** Crops grown through sustainable agriculture are better for human fitness because of the shortage of chemical insecticides and fertilizers, humans are not being exposed to or eating synthetic materials.

f. **Conserving the environment and preventing pollution:** By adopting sustainable practices, farmers will reduce their reliance on non-renewable energy, reduce chemical use and save scarce resources. Keeping the land healthy and replenished can go a long way when considering the rising population and demand for food.

g. **Reducing costs and focus on profits**: Farming smarter and moving food from farm-to-fork in a more efficient manner will be beneficial for anyone involved with the agriculture industry. IoT data from sensors installed in everything from seed drills, sprayers, and spreaders to drones, satellite imagery, and soil make it so surprises become rarities.

h. Improving food production without being wasteful: As we have explained, the anticipated population increase is cause for concern. Today, there is an opportunity to develop agricultural practices from a pure production. Standpoint and sustainable agriculture is the route with the most opportunity.

VI. Challenges to Indian agriculture and sustainability

The agriculture sector has the most challenging sector in respect of economically, environmentally and socially. The Indian agriculture sector faced various traditional as well as new global challenges the key challenges addressed as follows

1. The 80 percent farmers in India having small size of land. They are not economically sound and lack of market attachment.

2. The net income from agriculture of small and marginal farmer's quite low or some time it become negative. Because of large increase in production cost in agriculture sector.

3. The contribution of private sector in agriculture investment quite low and declined trend of public investment in agriculture after 2000.

4. The agriculture productivity is very low and hampers income of the farmers. The per unit area productivity also low in case of major crop producing in countries.

5. The fall in the ground water level generate more pressure on other irrigation facilities and create hurdles in the way of agriculture development in India.

6. Lack of competitiveness in Indian farmers is another hurdle rise in between improve agriculture development. The farmers are less risk bearing and unskilled which adversely impact on their income from agriculture.

7. Natural risk in agriculture is a common phenomenon but most of the farmers not get benefits of crop insurance scheme. The agricultural insurance schemes are inefficient to overcome various risk in agriculture sector.

8. Low profitability is a main cause behind the farmer's indebtedness and suicide problem existed in many states of India in the last few years.

9. The spending on agriculture subsidy has increased year by year but problem remains same and continuously grow-up.

10. Climate change is often regarded as one of the most profound global problems which is mainly due to the sheer scale of climate change impacts - both in terms of its global and temporal spread and of the variety of sectors affected by it. It has potential to impact global water supplies, agricultural production, and human health.

In the Indian context, Indian agriculture is a vast industry and has a significant impact on every citizen, directly or indirectly. This sector also plays a very important role in sustainable economic development of the country. The sustainable development of agriculture of any country rests upon the sensible balanced use of the available natural resources. Agriculture governs the fate of a nation like India where more than 60% of the population still resides in rural areas with agriculture as its major livelihood source, although industrialization has been gaining good pace in the past few decades. These three challenges – feeding a growing population, providing a livelihood for farmers, and protecting the environment – must be tackled together if we are to make sustainable progress in any of them. But making progress on this "triple challenge" is difficult, as initiatives in one domain can have unintended consequences in another.

1-Climate Change, protecting Environment and revive biodiversity

It is well known that agriculture productivity is directly influenced by climate change and weather. Crop development, growth, water use efficiency and crop yield under normal circumstances are determined by climate conditions during the growing season. Even a small deviation in normal conditions can seriously impair crop productivity. Global warming has been altered the hydrological cycle, affecting the magnitude and frequency of rainfall in India. India is experiencing increased frequency of extreme events, challenges to Agricultural Sustainability and has already experienced large-scale droughts every year on an average in 1/3 area, the frequency of droughts is increasing. Availability of water becomes the most crucial factor for agriculture as most of the cultivable land lacks irrigation facilities. This affects the arid regions of the country, where the soil moisture scarcity limits agricultural production.

2-Population Dynamics:

Growing population is a major concern for India, as availability of water and other natural resources are declining with population growth. The study predicts negative impacts on water resources as the increase in population will cause a rise in water demand further causing faster withdrawal of water, which in turn will reduce the recharge time window of water tables.

3-Poor Technology and Lack of Knowledge -Fostering global knowledge exchange:

A majority of Indian farmers are smallholders who still rely on traditional resource-intensive farming techniques. Improved technology and awareness can increase agriculture productivity, prevents soil degradation, reduces chemical application in crop production, change in suitable cropping pattern, efficient use of water resources, disseminates modern farm practices to improve the quality, quantity and reduced cost of production and changes the socio-economic status of farmers.

4-Fragmented Land Holding and degraded soil:

High population growth is the main cause of pressure on land, forest degradation, and land fragmentation. For example, high population makes families in most areas over cultivate their plots to maximize crop yield and reduce the size individual farmers. Small holding force to face a cycle of low investment, poor productivity, low value addition, weak market orientation and low margins.

5-Social Sustainability and Women led Agriculture:

Social sustainability in farming techniques is related to the ideas of social acceptability and justice. Development cannot be sustainable unless it reduces poverty. The government must find ways to enable the rural poor to benefit from agriculture development. Social injustice is where some section of the society is neglected from development opportunities.

6-Agricultural Marketing and protect farmer's interest

Agricultural marketing focuses on grading, packaging, storage, assembly, and distribution. Government has established regulated markets like APMC, Mandis etc. It regulates transport, Storage, minimum support prices etc. But small and marginal farmers are facing challenge because of less produce. Now GOI have been promoting farmers collectivization scheme in form of FPO (10000 FPO across the country). Its implementation is also very challenging as the social mobilization, rapport building and transition into social capital are the complex system.

7-Policy and Management Issues:

A good national-level policy to manage micro agriculture can prove to be of great help and will tackle a whole lot of problems related to sustainable agriculture management. Credit relief for marginal and small farmers is necessary and should be the first priority before moving ahead. Other problems such as irrigation and electricity can be tackled by the government at various levels under a single dedicated framework. Although forcing any individual to growing a particular crop is not advisable, educating them about the various pros and cons of using different crops could be a good idea. A good water management plan (Rain water harvesting) in combination with a good crop management policy at the regional to national level will surely be a key to the betterment of both farmers and consumers. Suggesting a well-researched conventional crop will not only help in increasing productivity but will also motivate farmers to shift their agriculture pattern from traditional crops to cash crops with marketing support which will further help the nation to ease the stress on importing such materials.

Road to Sustainable Agriculture

The agricultural technology needs to move from production oriented to profit oriented sustainable farming. The conditions for development of sustainable agriculture are becoming more and more favourable. New opportunities are opening the eyes of farmers, development workers, researchers, and policymakers like agriculture related businesses, dairy farming, poultry farming, castle farming and fisheries. Now the time is to see the potential and importance of these practices not only for their economic interest but also as the basis for further intensification and ecological sustainability.

To conclude, a small-farm management to improve productivity, profitability and sustainability of the farming system will go a long way to ensure all round sustainability. To reduce the threat of climate change is the very critical issue, can be minimize through adoption of rain water harvesting system, suitable cropping pattern, mix farming, revival and promotion of indigenous and local varieties, millets as nutrition foods, precision farming, agroforestry and minimize the area of more water consuming crops like Rice except in low land area. More thrust should be given on quality of produce, market driven production system (Fork-to-Farm) and market acceptability.

VII. Opportunities to enhance sustainable agriculture

There are numerous potentials to expand sustainable agriculture worldwide. Some of the opportunities are region-specific, while others can be applied everywhere. To feed the world's growing population without depleting the land's capacity and transfer for future generations, SA must be adopted. Some of them include focusing on INM, expanding the use of small-scale irrigation, and promoting the adoption of locally accessible organic nutrients like compost, vermicompost, biofertilizer, and biochar application.

1. Focusing on locally available organic resources

a. Compost application

Compost is a plant- and animal-derived organic material aerobically digested by mesophilic and thermophilic bacteria. Compost application in agriculture can enhance nutrients and organic matter in the soil. The improvement of SOM, soil humus, soil microbial biomass, enzyme activity, and resistance to pests and diseases are among the outstanding benefits of compost application. Applying compost to the ground can boost the soil's capacity to store carbon, which in turn reduces the impact of global warming. Additionally, adding compost to soil can increase the cation exchange capacity of the soil and improve the availability of both macro and micronutrients for plant uptake. It can enhance the soil bulk density, porosity, and water-holding capacity, increasing plants' tolerance to water shortages. Due to a number of positive impacts, compost application may be suggested as a practical tool in sustainable agriculture. For instance, farmers could obtain compost more easily than inorganic fertilizer because they could make it by themselves from locally available waste resources; it could enhance all soil properties (i.e., physical, chemical, and biological) and could provide all essential plant nutrients for plants. Compost has numerous advantages; therefore, farmers should combine it with other soil-management techniques to ensure sustainable crop production.

b. Vermicompost application

Earthworms are employed in the vermicomposting process to turn organic waste into a humus-like substance known as vermicompost. It is a mesophilic technique that makes use of bacteria and earthworms that are active between 10°C and 32°C. The process is faster than composting; because the material goes through the earthworm gut, thereby leading to the creation of earthworm castings. Vermicomposting, or worm composting, produces a rich organic soil amendment containing a diversity of plant nutrients and beneficial microorganisms. Vermicompost improves soil physicochemical properties of the soil and hence increases crop yields to improve the livelihood of the community. In recent years, various research studies have reported the significant role of vermicompost in crop production in different agroecological conditions. Economically, it is affordable for poor farmers, and it is environmentally suitable, making it efficient for sustainable crop intensification. Studies have

shown that applying vermicompost leads to enhanced nutrient availability and positive effects on soil properties, productivity, profitability, and resilience.

2 Integrated nutrient management

which is a comprehensive strategy, including maintaining and continuously adjusting soil fertility and plant nutrient delivery to an optimum level. In order to achieve and sustain maximum production without threatening the soil ecology, adopting INM is a must. It is based on the integration of biological, inorganic, and organic nutrient sources in a specific cropping system while considering regional variables. In addition to having a good impact on the soil nutrient condition, INM can improve SOM and improve water retention and storage. As a result, it can strengthen agricultural systems and enhances soil carbon sequestration. Using INM instead of applying mineral fertilizer in Nitisol increased maize production by up to 18%. Thus, it strongly supports the concept of sustainable agriculture anywhere. Combining applications could boost a farm's economic resilience, particularly for poor farmers in developing countries who cannot afford enough mineral fertilizer.

3 Adopting small-scale irrigation

The adoption of small-scale irrigation farming as a sustainable agricultural practice could significantly influence ensuring food security. Adopting small-scale irrigated farming as a SA practice is crucial for dry-land farming systems because it guarantees crop production during the dry season. The production of various crops twice or three times a year and boosting the income of rural farm-households are two significant goals that can be achieved by small-scale irrigation. However, the use of small-scale irrigation farming is significantly influenced by the availability of irrigation equipment, access to quality water sources, and awareness of water-saving techniques like rainwater harvesting.

X. Future of Sustainable Agriculture

Farmers, if not early adopters of technology, have been consistent in bringing tech to the field. Today, farmers Plow fields with the aid of satellites, get information about their soil from sensors, and manage operations with the aid of sophisticated software.

Farm technologies help make crops more productive by providing more accurate and timely field and weather data, decreasing the need for fertilizers and pesticides, increasing efficiency, and reducing fuel use.

The technologies that are important to sustainable agriculture include the following:

a. Artificial Intelligence

Artificial intelligence (AI) systems analyse data to help farmers determine when and where to plant crops and feed livestock or even when to sell to get the best prices. Data can help farmers apply fertilizers in a more timely and accurate manner. The more farmers know before they grow, the better they can allocate resources and, ultimately, use less chemicals and fuel.

b. Biotechnology

Biotechnology is one of the oldest tools that farmers have for improving crops. Over eons, crossbreeding has produced hardier plants with better yields as well as heftier livestock. Sophisticated modern methods developed in the lab have decreased the time it takes to crossbreed plants, adding or deleting characteristics to adapt to conditions.

Although these methods are controversial — opponents fear that modified crops could introduce unforeseen and potentially devastating effects — proponents point to how crops can be made more productive and resistant to insects and disease and better able to respond to local conditions, such as more severe droughts or higher amounts of moisture.

The new gene editing CRISPR technology can also be used to increase productivity and disease resistance by altering specific traits.

c. Drones

Farmers continue to find more uses for drones that help them manage crops more efficiently. At first, drones were deployed to spray crops with chemicals. Other emerging uses include taking aerial photos to assess crops and capture data from sensors that can be mined to determine the health of crops as well as weed populations. In some cases, drones drop tree seeds for reforestation projects.

Conclusion

Sustainable agricultural development seeks not only to conserve and conserve natural resources, but also to develop them, because future generations will demand more in quantity and quality in terms of agricultural and food products. These goals must ensure balance with the development of the livelihoods of the individuals concerned. Livelihoods should not be limited to an indicator of adequate income levels but should also include public health concerns and education standards. The goal of sustainable development may be achieved by comprehending its components and managing them appropriately. However, significant reliance on mineral fertilizers, a lack of innovative technologies, and climate change and variability are likely to have an impact on sustainable agriculture. Both developed and developing countries are impacted by the same variables. However, the intensity of the impact is high in developing countries due to low adaptation capacity. Focusing on locally available organic resources and increasing the use of small-scale irrigation can help to enhance the SA everywhere. These could increase agriculture productivity and ecosystem sustainability due to their high input use efficiencies, reduced use of synthetic fertilizers and pesticides, and improved soil resilience and quality in a changing climate. Effective agricultural policies based on locally developed sustainable agricultural practices, a review of extension services for better information dissemination, and farmer training are required to increase the adoption of sustainable agricultural practices in both developed and developing countries. Environment has emerged as a dominant force influencing development planning efforts. Sustainable development is the process of judicious use and conservation of natural resources for the overall improvement in the quality of life for the present and future generation on long term basis. It should be based on principles like Development for all which must be within the limits of environment, having respect for quality of life, taking into account the socio cultural and traditional knowledge base which promote collectiveness global diversity, people's participation in natural resources management and need for future generations. It should be placed at the top priority while formulating plans for development. Principles of sustainable development require the current generations to meet their own needs without compromising the ability of future generations to do the same toward a more sustainable future. Now it is time for humans to proceed with the remaining steps to truly achieve sustainability for both current and future generations. In the context of sustainable agriculture development is based on the performance of farmers and government efforts. Then only the sustained the agriculture sector future days.

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