ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 8, Issue 4, 2019

How Sustainable Agriculture Helps In Maintaining The Biodiversity And Agro Eco-System?

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Abstract:

To maintain and preserve the natural resource base of soil, water and atmosphere ensuring future generations the capacity to feed them with an adequate supply of safe and wholesome food is called “Sustainable Agriculture”. Biodiversity is key to food security and nutrition. If managed sustainably, agricultural sectors can contribute to important ecosystem functions. These include maintenance of water quality, nutrient cycling, soil formation and rehabilitation, erosion control, carbon sequestration, resilience, habitat provision for wild species, biological pest control and pollination. The main objectives are to describe the meaning of Sustainable Agriculture, Bio diversity and Agro Eco System., to explore how sustainable agriculture helps in maintaining the biodiversity and Agro eco-system? ,to evaluate the impact of biodiversity and Agro eco system in the field of sustainable Agriculture. The study uses secondary data of research methodology. The importance of biodiversity for agriculture involves: _ facilitating the functioning of ecosystems and life-support systems, such as nutrient cycling, protection and enrichment of soils, pollination, regulation of temperature and local climates, and watershed filtration. Finally the paper shows that sustainable agriculture helps in maintaining the biodiversity and agro eco-system in the field of agriculture.

Key Words: Sustainable Agriculture, Biodiversity, Agro Eco System

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INTRODUCTION:-

Sustainable agriculture is a system of agriculture that is committed to maintain and preserve the natural resource base of soil, water and atmosphere ensuring future generations the capacity to feed them with an adequate supply of safe and wholesome food (Gracet, 1990). Sustainable agriculture recommends a range of practices, which addresses many problems that arise due to the problems of modern agriculture such as loss of soil productivity, impacts of agricultural pollution, decreased income due to high production costs, and minimal or uneconomic returns (PGDAEMMOOCS, 2019). Biodiversity is key to food security and nutrition; it is needed to sustainably produce enough nutritious food in the face of challenges, such as climate change and growing populations with changing diets. Production should address not only the quantity of food or calories but high nutrient values such as vitamins, minerals and other micronutrients as well. In agricultural ecosystems, maintenance of biological diversity is important both for food production and to conserve the ecological foundations necessary to sustain life and rural livelihoods. Agricultural sectors are major users of biodiversity but also have the potential to contribute to the protection of biodiversity: The agricultural sectors together manage the largest terrestrial, freshwater and marine areas on Earth. If managed sustainably, agricultural sectors can contribute to important ecosystem functions. These include maintenance of water quality, nutrient cycling, soil formation and rehabilitation, erosion control, carbon sequestration, resilience, habitat provision for wild species, biological pest control and pollination. Good governance, enabling frameworks, and stewardship incentives are needed to facilitate mainstreaming of biodiversity. As part of its commitment to agricultural biodiversity and the interaction between biodiversity and agriculture, FAO contributes through its policies, programmes and activities to the conservation and use of biodiversity for food and agriculture. Aiming at transformative change, FAO, acting as Biodiversity Mainstreaming Platform will facilitate, in collaboration with its partners, the integration in a structured and coherent manner of actions for the conservation, sustainable use, management and restoration of biological diversity across agricultural sectors at national, regional and international levels. The ultimate goal of the Platform is the adoption of good practices across all agricultural sectors that will support biodiversity conservation thus increasing the productivity, stability and resilience of production systems and reducing ressure on natural habitats and species. This will also

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require better coordination among the different agricultural sectors as none of the sectors will successfully address biodiversity conservation in isolation. (FOOD AND AGRICULTURE ORGANISATION, 2019)

Agro ecology the application of ecological concepts and principles to the design and management of sustainable agro ecosystems. Agro ecosystems Agricultural ecosystems including bio physical and human components and their interactions. Biodiversity The variation of life in all forms from genes, to species ,to communities ,to whole ecosystems. Ecosystem service providers Organisms, guilds, and ecological communities that are biological mediators of ecosystem services, providing services through their functions and interactions. Ecosystem services Functions ofecosystems – including agroecosystems – that are useful to humans or support human well-being:(1)provisioning services include the production of food, fuel, fiber, and other harvestable goods; (2) regulating services include climate regulation, flood control, disease control, waste decomposition, and water quality regulation;(3)supporting services include the foundational processes necessary for production of other services, including soil formation, nutrient cycling, and photosynthesis (primary production); and(4) cultural services provider e creational ,esthetic, spiritual, and other nonmaterial benefits. Human well-being A context-and situation-dependent state that comprises basic material for a goodlife, freedom and choice, health, good social relations, and security. Millennium Ecosystem Assessment An international synthesis released in 2005, created by more than 1000of the world's leading scientists, that a analyzed the state of the Earth's ecosystems. Payment for ecosystem services Market-based instruments used to channel investment in ecosystem services. Resilience The capacity of a system to absorb disturbance and retain structure and function; this includes the human capacity to anticipate and plan for the future (e.g.,in managing agricultural systems). Scale Geographical extent; relevant scales for agro ecosystems often include units commonly used in management and decision making, such as field (local and on-farm cultivated area),farm(including cultivated and non cultivated areas),landscape, regional, and global.

OBJECTIVES OF THE ASSIGNMENT:

- To describe the meaning of Sustainable Agriculture, Bio diversity and Agro Eco System.

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- To explore how sustainable agriculture helps in maintaining the biodiversity and Agro eco-system?
- To evaluate the impact of biodiversity and Agro eco system in the field of sustainable Agriculture

RESEARCH METHODOLOGY:

The study uses secondary data of research methodology.

DETAILS WITH SUBTOPICS REVIEW OF LITERATURE:

Sustainable agriculture is a system of agriculture that is committed to maintain and preserve the natural resource base of soil, water and atmosphere ensuring future generations the capacity to feed them with an adequate supply of safe and wholesome food (Gracet, 1990).

Biodiversity for sustainable Agriculture:

Definition of Bio-diversity: Biodiversity refers to rich and diverse energy of living organisms of all species, the genes they contain and the ecosystem they constitute. "Biological diversity means the variability among living organisms from all sources including, interiliac, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, this includes diversity within species, between species and of ecosystems". Biodiversity is considered at three levels: a) genetic diversity b) species diversity c) ecosystem diversity a) Genetic diversity refers to the variation of genes between different populations of a species as well as between species. b) Species/organismal diversity refer to the variety of living species. c) Ecosystem biodiversity relates to the variety of habitats, biotic communities and ecological processes and the enormous diversity present within ecosystems in terms of habitat differences and the variety of ecological processes.

Importance of biodiversity: Biodiversity is recognized as the most important natural resources, it directly and indirectly influences and regulates the functioning of the other natural resources of soil, water and air in the ecosystem. Humans derive all of their food almost 40 percent of their medicines, and industrial products from the wild and domesticated components of biological diversity. (Emile A. Frison *, 2016)

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Human Impact on Biodiversity: Human interventions can alter biodiversity directly and indirectly through changes in land, water and atmosphere. Human impact is greater than that of most natural processes that lead to a decline in biodiversity. The most significant human impact on biodiversity and also the earliest was the domestication of plants and animals for food which started more than 10,000 years ago. The root cause of human-induced biodiversity loss is actually the manner in which human society functions in the present global context with respect to its natural resources, trade and economic systems, and human and social values.

Human activities change biological diversity globally in two fundamental ways.

1) By affecting a globally dynamic system such as the atmosphere directly.

2) Through the collective consequences of individual effects in various places and at various times building up to globally significant impact. For instance, global warming is due to direct excessive emission of greenhouse gasses from burning fossil fuels as well as to the cumulative effect of deforestation, land clearance and faulty agricultural practices in various parts of the world. (Petina L. Pert, 2013)

What is Agri-biodiversity?

The effects of agriculture on biodiversity are of considerable importance because farming is the human activity occupying the largest share of the total land area for many OECD countries. Even for countries where the share of agriculture in the total land area is smaller, agriculture can help by increasing the diversity of habitat types. The expansion of agricultural production and intensive use of inputs over recent decades in OECD countries is considered a major contributor to the loss of biodiversity. At the same time certain agricultural ecosystems can serve to maintain biodiversity, which may create conditions to favour species-rich communities, but that might be endangered by fallowing or changing to a different land use, such as forestry. Agricultural food and fiber production is also dependent on many biological services. This can include, for example, the provision of genes for development of improved crop varieties and livestock breeds, crop pollination and soil fertility provided by micro-organisms. The importance of biodiversity for agriculture involves: _ facilitating the functioning of ecosystems and life-support systems, such as nutrient cycling, protection and enrichment of soils, pollination, regulation of temperature and local climates, and watershed filtration; (OECD Expert Meeting Zurich, November 2001)

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What is the Need for Agri-biodiversity Assessment?

The preservation and enhancement of biodiversity poses a major challenge for agricultural policy decision makers, as world population and demand for food increase. It is estimated that, with current population trends, food production will have to increase over 20% by the year 2020 just to maintain the existing levels of food consumption and without any significant expansion of agricultural area. A challenge for policy makers in many OECD countries is to match the apparent imbalance between the demand for, and supply of, biodiversity on agricultural land. That is to say there is an increasing public demand for biodiversity conservation linked to rising disposable incomes. (FOOD AND AGRICULTURE ORGANISATION, 2019)

Utilization of alternative crops in farming system as a source of organic matter, as catch crops and for the increase of biodiversity:-

Twenty-seven commonly grown as well as non-traditional plant species were tested in field experiments (Research Institute of Fodder Plants, Troubsko near Brno) in different conditions as catch crops. Experiments were sown in August, after the harvest of the main crop. Following characteristics were estimated: over-ground biomass, root biomass, root/shoot ratio and rate of biomass decomposition in soil. The yield of next crop in rotation, the influence of catch crops and subsequent crops on soil structure and the nitrogen content were also investigated as well as the influence of catch crops on humus content and quality. Cultivars of Sinapis alba L , Malva verticilata L., Phacelia tanacetifolia Benth and several other species were selected for further evaluation. (Emile A. Frison *, 2016)

Analytical Tools for Measuring Trends in Biodiversity

_ *Overview of Biodiversity Indicators Related to Agriculture in Belgium — Visi Garcia Cidad (Catholic University of Louvain), Jean-François Maljean and Alan Peeters (Institute of Nature Conservation), Geert De Blust (Institute of Nature Conservation), Belgium. _ Automated Classification of Habitats — Rasmus Ejrnæs, National Environmental Research Institute, Denmark. _ *Eco-Fauna Database: A Tool for Both Selecting Indicator Species for Land Use and Estimating Impacts of Land Use on Animal Species — Thomas Walter and Karin Schneider, Swiss Federal Research Station for Agroecology and Agriculture, FAL, Switzerland. _ New Opportunities for Habitat Monitoring: Linking Plant Species and Remote Sensing Techniques — Andreas Grünig and Erich Szerencsits, Swiss

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Federal Research Station for Agro-ecology and Agriculture, FAL, Switzerland. _ From Scientific Analysis to Agri-environmental Measures — Riccardo Simoncini,
University of Florence, Italy, representing IUCN.

Ecosystem/Habitats Impacted by Agricultural Activities: *Estimating Wildlife Habitat Trends on Agricultural Ecosystems in the United States — Stephen J. Brady and Curtis H. Flather, US Department of Agriculture, United States. _ *Monitoring Habitat Change in Japanese Agricultural Systems — David Sprague, National Institute for Agro-Environmental Sciences, Japan. _ Agriculture and Biodiversity: Reporting on Trends at European Level — Dominique. Richard, European Topic Centre on Nature Protection and Biodiversity (EEA), France. _ Constraints in Land Use by Agriculture, Nature Protection Issues, Rural Development and Biodiversity in Various Regions of Austria — An Analytical Approach Based on Spatial Information Techniques — Peter Aubrecht, Bettina Götz and Gerhard Zethner, Federal Environmental Agency, Austria.

Classification and Coverage of OECD Agri-Biodiversity Indicators and Their Compatibility with the Convention on Biological DiversityConvention on Biological Diversity (CBD)

Biodiversity (all living organisms)Genetic Diversity Species Diversity Ecosystem Diversity

Notes: The CBD is developing its work under the ecosystem approach, which it has defined as meaning “a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit". (Article 2 of the Convention). The CBD Conference of the Parties, at its Fifth Meeting (Nairobi, Kenya, May 2000), endorsed the description of the ecosystem approach and operational guidance and recommended the application of the principles and other guidance on the Ecosystem Approach (decision V/6). (see full text at: http://www.biodiv.org/doc/decisions/cop-05-dec-en.pdf).

OECD Agri-biodiversity Indicator Coverage and Compatibility with the CBD

Biodiversity Related to Agriculture

Genetic Diversity Species Diversity Ecosystem Diversity

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i. Commercial crops, pasture and livestock	X	X1
ii. Habitat and wild species	2	X X
iii. Alien invasive species	3	3 3

Notes: X denotes the areas covered by OECD ABIs. Source: (OECD Expert Meeting Zurich, November 2001)

State of Agricultural Genetic Resources: Each country should be responsible for maintaining their own plant/animal genetic resource programmes and for delivery of information (passport, characterisation, diversity indicators) on their own crop and livestock genetic resources.

The number of registered cultivars within national programmes has been increasing across all OECD countries and throughout the rest of the world. _ Genetic erosion is taking place at an accelerated level with the number of landraces and endangered breeds being particularly affected. The effective population size for threatened plants or animals remains a contentious issue in need of scientific input as differences in estimates exist among species from a theoretical population genetic level and at a practical level. (FOOD AND AGRICULTURE ORGANISATION, 2019)

Positive Aspects of Bio Diversity: Modern Agriculture • High yield / high and fast returns / profit oriented • Increased mechanization • Scope for intensive cropping • New varieties of crop plants (pest/disease tolerant) • Maximum utilization of land and water • Meeting the need of sufficient and fast food production • Immediate and direct supply of nutrients to the plant through chemical fertilizers (NPK). • Better pest, disease and weed control Package of practices for different locations, situations, crops, Agro climatic regions B) Sustainable Agriculture • Affordability by any farmer • No sophisticated/imported and special technology is necessary • Environmental conservation and protection • Healthy atmosphere/healthy food • Prevent / avoid ecological degradation. • Prevent/avoid ecological degradation • Security more through higher levels of disease and pest resistance • Sustain soil fertility through organic recycling • Greater Bio-diversity • Efficient use of natural resources • Self sustaining. (PGDAEMMOOCS, 2019)

Negative Aspects of Bio Diversity: A) Modern Agriculture • Short term benefit, operates law of diminishing returns • Depletion of nutrient base of the soil, water and atmosphere

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quality • Environmental(water, soil and air)pollution due to use of chemicals • Health hazards due to entry of pesticides, toxins, antibiotics, heavy metals in to food chain • High cost of production • Increasing dependency on external inputs • Less diversification manifested through disappearance of genetic races because of monoculture leading to risks such as loss of biodiversity, pest and disease resistance and resurgence. • Poor quality of produce • Economic disparity in the society widens • Operates against principles of nature and ecology. Natural parasites, predators and beneficial insects are adversely affected and totally disappear over a period. B) Sustainable Agriculture • Takes longer time to realize the benefits of regenerative farming • The change is gradual • Relatively difficult to motivate farmers for change initially; once convinced, the adoption is easy. • Comparatively labour intensive • Needs proper planning for allocation/use of available resources • Initial yield is low. (PGDAEMMOOCS, 2019)

Principles of Sustainable Agriculture

- Basic principles of sustainable agriculture are as follows.
- Inter relatedness of all the farming systems including the farmer and the family
- Need to maximize desired biological relationships in the system and minimize the use of materials and practices that disrupt these relations.
- Application of prior experience and latest scientific advances to create integrated, resource conserving, equitable farming systems.
- Reduce environmental degradation, maintain agricultural productivity, promote economic viability in both short and long term, and maintain stable rural communities and quality of life.
- No overburden on natural resource base and its carrying capacity. (PGDAEMMOOCS, 2019)

Elements of Sustainable Agriculture Sustainable: Agriculture consists of elements, which are common in many regions. The methods to improve their sustainability may vary from one Agro ecological region to another. However, there are some common sets of practices among farmers trying to take a more sustainable approach by use of on farm or local resources. However, each of them contributes to a greater extent to realize long term farm profitability, environmental stewardship and quality of life. (K Garbach, 2018)

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Soil Conservation: Soil conversation methods including contour cultivation, contour bunding, graded bunding, vegetative barriers, strip cropping, cover cropping, reduced tillage etc. help prevent loss of soil due to wind and water erosion. 2. Crop diversity: Increased crop diversity on farm can help reduce risks from extremes in weather, marketing conditions, pest and disease incidences. The increased diversity of crop and other plants such as trees, shrubs and pastures also contribute to soil conservation, habitat protection and increase populations of beneficial insects. 3. Nutrient management: Integrated management of essential nutrients can improve and sustain soil fertility and protect environment. Increased use of on farm (low cost) inputs such as organic manures, compost, green manures and crop residues not only reduces cost of production but also rejuvenates soil health. 4. Pest management: It is a sustainable approach to manage pests by integrating the available plant protection methods like cultural, physical, mechanical, biological and chemical methods, which optimizes the production costs, besides maintaining environmental balance. 5. Water quality & water conservation: Practices like zero tillage, deep ploughing, mulching and micro irrigation techniques help to optimize the water consumption or requirement besides conserving and augmenting the soil moisture on long term basis. It is also helpful in protecting the quality of drinking water and surface water. 6. Agro forestry: A combination of silvic-pastoral, agri-Silvi-pastoral, agri-horticulture, horti-silvi pastoral, alley cropping, ley farming help conserve soil and water, and profitability. Also lead to supply of fuel wood, horticultural products and achieve balanced nutrition to rural people. 7. Marketing: Improved marketing facilities can ensure remunerative and sustainable return to farmers. Direct marketing of produce can exclude intermediaries and ensure higher returns. (K Garbach, 2018)

Reduction in Biodiversity and its ecological Implications: The truly irreversible nature of the loss of species and genetic diversity is the most serious cause for concern for human beings. The high intensity and rate of human intervention increase the threat of a decrease in species populations, which can eventually lead to their extinction. A decline in biodiversity can result in a perceptible deficiency in the quality and amount of ecological services provided by nature. Over exploitation of both natural and man-made resources, such as timber extraction from natural forests and over utilization of crop lands, can lead to the disruption of ecosystem services and increased costs. (K Garbach, 2018)

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lmportance of Agricultural Bio diversity: Bio Diversity importance can be explained the following below; Recycling of nutrients, Control of microclimate , Regulation of local hydrological processes ,Detoxification of waste and toxic chemicals, Regulation of the abundance of desirable and undesirable organisms, Soil structure Infiltration and run off Soil erosion, Natural pest and disease control , Pollination and Genetic introgression and hybridization. (Petina L. Pert, 2013)

Agricultural Intensification on Biodiversity:

Agricultural activities have three types of impacts on biodiversity. They alter the characteristics of natural ecosystems and their constituent species. They impact the species and genetic variability of the chosen cultivated species themselves and also their nonfood components. The effect on and off farm nonfood biodiversity through such adverse physiochemical effects as erosion, salinization and pesticide pollution. The magnitude of these impacts varies with the intensity of the intervention. Population pressure and the concomitant decline in per capita land availability have made productivity-oriented, chemically intensive, high-yielding-variety, monoculture and irrigated agriculture unavoidable in large parts of the world. This has caused an incalculable loss of biodiversity both on and off-farm and at all levels. Thus, modern agriculture has evolved as a major threat to biodiversity in general and to diversity of importance to agriculture itself.

Impact of biodiversity reduction on modern agricultural systems:

Products of plant origin make up 93 percent of the human diet and 3000 species are regularly exploited for food. However modern agriculture has drastically shrunk the vast food basket provided by nature and put to use by humans over thousands of years. Only 103 species contribute 90 percent of the world's plant food supply. Just three crops rice, wheat and maize- account for 90 percent of the calories and 56 percent of the proteins people derive from plants. The other thousands of species contribute the remaining 10 percent of the plant food supply, though they have considerable importance in the diet of poor people confined to more isolated areas.

Analysis Supplemented With Case Illustrations/ Field Examples:

The government of India established an agriculture system. Being a part of the study, the paper goes to field study directly and observed the following points; Biodiversity is recognized as the most important natural resources; it directly and indirectly influences and

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regulates the functioning of the other natural resources of soil, water and air in the ecosystem. Humans derive all of their food almost 40 percent of their medicines, and industrial products from the wild and domesticated components of biological diversity. Today's key challenge is how to increase production to meet the growing demand for food, feed and bioenergy while conserving biodiversity and reducing the pressure on natural resources (K Garbach, 2018) and ecosystems. Human interventions can alter biodiversity directly and indirectly through changes in land, water and atmosphere. Human impact is greater than that of most natural processes that lead to a decline in biodiversity. The most significant human impact on biodiversity and also the earliest was the domestication of plants and animals for food which started more than 10,000 years ago. The root cause of human-induced biodiversity loss is actually the manner in which human society functions in the present global context with respect to its natural resources, trade and economic systems, and human and social values.

Human activities change biological diversity globally in two fundamental ways. 1) By affecting a globally dynamic system such as the atmosphere directly. 2) Through the collective consequences of individual effects in various places and at various times building up to globally significant impact. For instance, global warming is due to direct excessive emission of greenhouse gasses from burning fossil fuels as well as to the cumulative effect of deforestation, land clearance and faulty agricultural practices in various parts of the world.

Regulating and Supporting Ecosystem Services : Agricultural production depends on the operation of a range of regulating and supporting ecosystem services that include nutrient cycling, regulation of water flow and storage, regulation of soil movement and properties and regulation of biological populations (including pest and disease control as discussed above). To a large extent these services have been replaced in simplified agricultural systems by human-supplied inputs. The importance of agricultural biodiversity in respect of these ecosystem services has been reviewed by Swift et al. [65] and, with respect to crop diversity, more recently by Hajjar et al. [66]. Considerable debate remains on the amount of diversity that is needed within agro-ecosystems for different functions. Some evidence suggests that while diversity is necessary, saturation is reached at relatively low levels of species diversity; other evidence has suggested that reducing diversity often has a negative effect on specific functions. (Emile A. Frison *, 2016) (FOOD AND AGRICULTURE ORGANISATION, 2019).

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Policies and Programs to Conserve and Enhance Ecosystem Services in Agricultural Landscapes: Growing interest in them an augment of ecosystem services has been matched, in recent years, by ap proliferation of policy and programmatic strategies to promote the conservation or enhancement of these services in agricultural landscapes. Traditionally, environmental management policies were often described interns of dichotomy my between regulatory instruments ('command and control' requirements put for the by governments) and market-based instruments focused on shifting incentives and price signals for farmers, businesses, and other market actors. Biodiversity and Ecosystem Services in Agro ecosystems all the way to crop yields and profits, but some have reported positive effects (These andTscharntke,1999; Karp et al., 2013). Like pollination, the relevant scale for pest management can vary from predator to predator and from pest o pest, such that distant are as may determine the abundance of highly mobile animals (Werling andGratton,2010).

The concept of diversified or multifunctional agro ecosystems is a relatively recent response to the decline in the quality of the natural resource base. Today, the question of agricultural production has evolved from a purely technical issue to a more complex one characterized by social, cultural, political and economic dimensions. Multifunctional agroecosystems carry out a variety of ecosystem services, such as the regulation of soil and water quality, carbon sequestration, support for biodiversity and socio cultural services, as well as meeting consumers' needs for food. In turn, these systems also rely on ecosystem services provided by adjacent natural ecosystems, including pollination, biological pest control, maintenance of soil structure and fertility, nutrient cycling and hydrological services. However, poor management practices in agroecosystems can also be the source of numerous disservices, including loss of wildlife habitat, nutrient runoff, sedimentation of waterways, greenhouse gas emissions, and pesticide poisoning of humans and non-target species. (Petina L. Pert, 2013) Agriculture and ecosystem services are thus interrelated in at least four ways: (i) agro ecosystems generate beneficial ecosystem services such as soil retention, food production and aesthetic benefits; (ii) agro ecosystems receive beneficial ecosystem services from other ecosystems, such as pollination from non-agricultural ecosystems; (iii) ecosystem services from non-agricultural systems may be affected by agricultural practices; and finally (iv) the biological diversity within agricultural ecosystems provides regulating and supporting ecosystem services in addition to production services. (Petina L. Pert, 2013)

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Managing Ecosystem Services in Agriculture: Swinton et al. (2006) suggest that incentivizing a systems approach to agricultural management (rather than a problem-response approach) could support sustainable production as well as ecosystem services such as climate regulation, wildlife conservation, and biological pest control and pollinator management. Bennett et al. (2005) note that the ways in which ecosystems produce services are insufficiently understood, and that this uncertainty needs to be accounted for in the decision-making process. They advise that future management questions will have to address the complexity of ecosystems in their social context in order that ecological services can be maintained, and also to assess the degree to which technology can substitute for ecological services.

Summary & Conclusion: Sustainable agriculture is a system of agriculture that is committed to maintain and preserve the natural resource base; Biodiversity refers to rich and diverse energy of living organisms of all species, the genes they contain and the ecosystem they constitute. "Biological diversity means the variability among living organisms from all sources including, interlace, terrestrial, marine and other aquatic ecosystems. The study includes describe the meaning of Sustainable Agriculture, Bio diversity and Agro Eco System. To explore how sustainable agriculture helps in maintaining the biodiversity and Agro eco-system? To evaluate the present biodiversity and Agro eco system in the field of sustainable Agriculture. Etc.,

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Acknowledgements:- I am deeply express my sincere thanks to my research supervisor, parents and friends to all over those who are supported, encouraged and motivated me in back end for successful accomplishment of this research work.

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