Agriculture smart environment approach for agricultural sustainability

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Abstract:

Agriculture is one of the most vulnerable areas of climate change. To alleviate some of the complex challenges posed by climate change and agriculture (including forests and fisheries), we must switch to the so-called "Climate Smart" or "Agriculture Smart Environment" (ASE). Smart agriculture is an approach aimed at improving the farming system. More efficient use of less land, water and inputs, in order to produce more food sustainably, along with the need for individuals to be more resilient to changes and shocks. Agriculture -smart Environment (ASE) is an approach that helps to guide actions needed to transform and reorient agricultural systems to effectively support development and ensure food security in a changing climate. The Agriculture -Smart Environment (ASE) Profiles bridge a knowledge product is a methodology for assessing a baseline on climate-smart agriculture at the national and sub-national that can guide climate smart investments and development. This abstract discusses the role of Climate-smart Environment to make agriculture more sustainable and climate-resilient and a viable source of livelihood and food security for millions of farmers in the country.

The concept of Agriculture Smart Environment:
Climate-smart environment is an approach used in agriculture with the aim of achieving the highest agricultural productivity of horticultural and field crops while preserving agricultural natural resources of land, water and others for future generations, as well as working to reduce greenhouse gas emissions, especially carbon dioxide and methane. The minimum possible level with adapting to future climate changes and mitigating their direct and indirect effects. Hence, the primary objective of applying the climate smart environment approach is to improve the farming system in developing and developed countries alike.

Climate Smart Agriculture Environment Approach:
Climate Smart Agriculture Environment is an approach that "helps guide the actions needed to transform and reorient agricultural systems to effectively support development and ensure food security in a changing climate". The goals of climate smart agriculture are:
- Increasing agricultural productivity and income in order to increase food security.
- Building resilience to climate change and enabling climate change adaptation.

Climate-smart agriculture, including the use of traditional technology and modern advanced technology, is of the utmost importance in achieving a sustainable agricultural system by building on three main pillars, namely, increasing agricultural productivity through the optimal use of natural resources and limiting the emission of greenhouse gases. The phenomenon of global warming and work to adapt to future climate changes as well as mitigate its severity. The application of climate smart agriculture will bring many benefits to the agricultural system in terms of improving horticultural and agricultural productivity, obtaining safe and high-nutritional agricultural products, and it will reduce agricultural inputs such as pesticides and chemical fertilizers, which are considered a burden on the environment through pollution and reduce emissions.

The application of climate-smart agriculture depends on some transactions that will end or reduce to the greatest extent the greenhouse gases, and the carbon footprint means identifying the amount of emissions for any product during the production process of this product in different stages and thus will provide a greater opportunity to increase the volume of our exports from Agricultural products, especially horticultural crops, of vegetables and fruits

Sustainable agriculture pays more attention to the protection of environmental resources, the rational and sustainable use of resources and hence the preservation of the potential according to demand.

Agricultural environmental sustainability depends on relying on the appropriate exploitation of agricultural ecological resources and not depleting the resources to preserve them for future generations and obtaining a sustainable agricultural environment. Also, agricultural systems that maintain sustainability must be followed, such as organic farming

systems and agricultural practices systems. Good as well as adopting the climate smart agriculture approach of the Global Alliance for Climate Smart Agriculture, which is an integrated approach to develop technical conditions and agricultural and investment policy to achieve sustainable agricultural development for food security in light of climate change.

It consists of three main pillars, which are:
- Sustainable increase in agricultural productivity and incomes
- Adaptation and building resilience to climate change
- Reducing and / or removing carbon emissions

Around the world, investment in research and technology in smart agriculture has increased dramatically over the past decades. Advances in agricultural research, along with the application of smart agriculture to fields and pastures, can provide significant economic and environmental benefits.

Expert systems in agriculture:
The expert system is one of the applications of artificial intelligence in many fields such as medicine and agriculture, and it is a computer program that simulates a specialized expert "group of experts" that is consulted to solve a specific problem, as this program "subject to change, addition, development and modernization" contains a summary of that The experiences that the user "farmer or agricultural producer" needs in a specialty to solve a specific problem. The expert system asks the user the same questions that the specialist inquires about, and from the user's answers, the system arrives at the appropriate solution. The practical applications of the expert system in the agricultural sector have proven that it can contribute to solving many agricultural problems in record time, which will positively affect the quantity and quality of production.

Working to spread and localize the applications and technologies of smart agriculture and the Internet of things in Egypt will inevitably result in maximizing agricultural production and improving its quality and quantity, through:
- Improving the efficiency of using agricultural inputs, such as fertilizers, pesticides, irrigation water, and others
- Improving the efficiency of using agricultural machinery in the various stages of production
- Improving the productivity of field and horticultural crops
- Better control over costs and ensure profitability of agricultural projects
- Preserving natural resources, especially irrigation water

- Helping to make decisions quickly using software on cell phones
- Using short missions in extension and awareness activities to communicate with farmers
- Direct link to market data through informational software to make the right decision for product marketing
- Among the agricultural systems that support sustainability is the Friends of the Earth Environmental Agricultural System, which depends on achieving sustainable comprehensive agricultural development on the following
- Ecosystem protection and conservation. Agricultural activity should not deprive the resource environment

It should be an integral part of it:
- Reducing the use of pesticides and chemical fertilizers to ensure product safety and enhance biological control
- Improving energy efficiency through the use of renewable energy sources. There is a need to reduce production costs and energy production by recycling products or exploiting natural resources
- Proper waste management and reuse to facilitate recycling and re-introduction of waste into the production cycle
- Reducing field interventions and rational use of water to ensure its use and efficiency over time
- Social responsibility to ensure minimum rights for all operators
- A well-structured environmental management procedure
- A system to protect the ecosystem and create designated areas for the preservation of wild fauna and flora
- Reducing the use of synthetic chemicals according to the principles of organic or integrated farming
- Plan and implement appropriate crop and green manure rotation cycles
- Biological control, rational use of water resources and rainwater harvesting
- Minimizing mechanical interference with the ground and its pressure
- Energy use from renewable sources
- Controlling greenhouse gas emissions and establishing systems to reduce them