# A Role of Artificial Intelligence in Climate-Smart Agriculture Approaches to Sustainable Agricultural Development - As a Review

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Climate-smart agriculture, including the use of traditional and modern technologies, is critical to achieving a sustainable agricultural system through three main pillars: increasing agricultural productivity through the optimal utilization of natural resources and reducing greenhouse gas emissions. The phenomenon of global warming and adaptation to future climate change and mitigation. The application of climate-smart agriculture will bring many benefits to the agricultural system by promoting improved horticultural and field productivity and access to safe and high-nutritious agricultural products and will reduce agricultural inputs such as pesticides and chemical fertilizers, which are a burden on the environment through pollution and emissions reduction, harmful pollutants and gases. The application of climate-smart agriculture depends on certain transactions that will eliminate or minimize greenhouse gas emissions. The carbon footprint means recognizing the amount of emissions of any product during the production process of this product at different stages. Agricultural products, especially horticultural crops of vegetables and fruits.

The use of artificial intelligence technology is one of the pillars of the smart agriculture platform climate globally and artificial intelligence proves itself day by day as a necessary solution to improve agricultural productivity. Since artificial intelligence is the mainstay of robots of all kinds, there is an increasing reliance on robots in the agricultural sector for better crop productivity. The gradual shift of farmers towards robots, smart sensors, drones and increasing trends of precision agriculture has stimulated market movement like some countries America and China.

The increasing demand for agricultural products due to the increasing population and the adoption of advanced technology and information management system as well as Internet of Things "IoT" for crop productivity and global initiatives to adopt modern agricultural technologies such as climate-smart agriculture are the main reasons for increasing the need to use artificial intelligence in agriculture.

An artificial intelligence program for image recognition was developed that can detect diseases based on images of cassava leaves. The researchers identified three diseases and two types of pest damage with high accuracy using this technique. Also interesting in this program is that it is small enough to download and run on the mobile smartphone "and can apply that technology" with appropriate changes "with many other crops field and horticultural crops.

Many technologies are being developed to improve crops, and in the next few years sensors, drones and robots will be deployed in a large number of agricultural fields to analyze the surrounding environment and help make appropriate decisions.

Nowadays, there are many small agricultural planes that make accurate maps of the land to analyze the soil and plan patterns of seed cultivation. The techniques available in the plane of measuring distances, ultrasound so that these aircraft adjust their altitude so that they can survey the ground and pump the right amount of fertilizers or pesticides. These aircraft also rely on multispectral or thermal sensors

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that allow the identification of any dry parts of the field to irrigate. Later, once the crop is grown, the drones allow the calculation of the vegetation index and the technology is developed and used periodically, especially in China.

Artificial intelligence and the Internet of Things go hand in hand, and their role should not be based on data collection but should be analyzed. The Internet of Things is also required and cannot be separated from artificial intelligence to benefit from them in agriculture, which is what the world seeks in all applications for all fields of agriculture.

The Expert System is one of the applications of artificial intelligence in many fields such as medicine and agriculture. It is a computer program that simulates the specialized expert "expert group" which is consulted to solve a specific problem. Experiences needed by the user "farmer or agricultural producer" in a specialty to solve a specific problem, the expert system asks the user the same questions asked by the expert and from the user's answers the system reaches the appropriate solution. The practical application of the expert system in the agricultural sector has proved that it can contribute to solving many agricultural problems in record time which positively reflects on the increase of production.

The use of artificial intelligence technology in the field of precision agriculture where the use of this technique is very useful and precision agriculture is a set of agricultural transactions concentrated in a specific area within the farm at a specific time and this is contrary to traditional methods where different agricultural transactions such as irrigation, fertilization, pesticides of pests and herbicides on the entire field without taking into account any differences or variations that may appear within the same field. Advances in remote sensing technology and the low cost of some types of sensors have provided the opportunity for widespread use of these technologies in agriculture. Using these sensors, it is possible to identify any part of the field that needs any kind of transactions, thus limiting the use of chemicals inside the field to the parts that it really needs, which of course reduces the chemicals used and the cost of the transactions as well as the importance of this in the preservation of the environment.

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