



## Climate-Smart Agriculture

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United StatesDOI: [10.23956/ijarcsse/V7I2/01202](https://doi.org/10.23956/ijarcsse/V7I2/01202)

**Abstract**— *Climate-smart agriculture (CSA) is an emerging concept that adapts agricultural production to climate change. It is an integrative approach for developing agricultural strategies that will secure sustainable food security under climate change. It is one response to the challenges of climate change. It helps to make agriculture, forestry, and fisheries to be more productive and sustainable. This paper provides a brief introduction to climate-smart agriculture.*

**Keywords**— *Climate-smart agriculture, smart agriculture, climate change*

### I. INTRODUCTION

For most people living in the developing countries such as in Africa and South Asia, agriculture is the major employment source. But agriculture causes more than one fifth of the global emission of greenhouse gases. The impact of climate change occurs at the regional, national, and global scales [1]. Climate change affects crop product and hinders agricultural growth in those parts of the world. It affects rainfall. It also poses a threat to livestock production. It calls for collective action. National governments and corporate sectors can provide coordinated approaches to climate change, integrated risk management, agricultural and food security policies.

Smart-climate agriculture (CSA) avoids the lose-lose situation by integrating climate change in agriculture strategies. The term was coined by the UN Food and Agriculture Organization (FAO) in 2010. CSA promises to transform agricultural systems which will decrease global food insecurity and reduce poverty. CSA practices can raise farm productivity while mitigating climate change. By promoting new methods and technologies, CSA helps farmers to manage their resources, boost their profits, and reduce agriculture's contribution to climate change. Even small-scale farmers in developing nations can achieve success and increase farm production by adopting CSA technologies.

### II. CHARACTERISTICS OF CSA

Productivity (or food security), adaptation, and mitigation are the three interrelated pillars for achieving CSA. CSA plans to increase agricultural productivity without making a negative impact on the environment. It aims to build farmers' capacity to adapt and prospect in the face of odds. It helps to reduce greenhouse emissions. It facilitates climate change adaptation for farmers. Achieving these objectives requires intentional changes in current policies, funding mechanisms, and institutional arrangements.

In contrast to traditional agriculture, CSA integrates climate change and agricultural development. CSA may involve a wide range of technological innovations, water management, and agro-forestry [2]. Adopting it at farm scale may be influenced by institutional mechanisms, landscape governance, socio-economic factors, and climate conditions [3]. To achieve climate-change objectives, agricultural systems must become climate-smart landscapes. This involves integrating agricultural landscape management with adaptation and mitigation [4].

### III. CHALLENGES

The agricultural sector is facing great challenges in an attempt to feed the 9.6 billion people that the FAO predicts are going to be living on earth by the year 2050. Adoption of CSA faces some a number of challenges.

CSA practices may be climate smart in some areas but not in some others. In spite of the high potential for synergies between adaptation and mitigation activities, some barriers prevent the widespread adoption of climate-smart agriculture. One barrier is the lack of evidence that indicates that adoption of CSA have significant benefits. CSA is relatively new and lacks empirical evidence.

There is a growing divide between how developed and developing countries embrace CSA practices and technologies. This divide has limited the potential benefit of CSA to integrate adaptation, mitigation, and food security outcomes [5]. There is lack of knowledge or information to the farmers.

Socioeconomic factors such as culture, education, poverty, and investment costs may limit the widespread adoption of climate-smart agriculture. Although various tools and equipment with the latest technology can be used in the farm, most farmers cannot afford them. The cost of many labor-saving technologies is prohibitive.

### IV. CONCLUSIONS

Adaptation in agricultural section is necessary for eradicating poverty and hunger.

CSA encourages agricultural development through approaches that improve food security with low emissions and increase producer incomes. Adoption of CSA practices by farmers has been low globally despite its benefits. Shareholders must decide the appropriate policies and practices toward a viable agricultural production system. Governments must ensure CSA practices and technologies are integrated in their economic development strategies. Governments, funding agencies, donors, and private sectors can promote CSA by ensuring farmers have the required financial resources and technical capacity. Smart farming is the future of agriculture [6].

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