

# CLIMATE SMART AGRICULTURE AN APPROACH TO SUSTAINABILITY

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The climate change has a potential impact on every spheres of life. It act as a critical challenge for global food security. Farming communities are need to be build their resilience and abilities to adapt to climate change in a way to feed the expanding population without exploiting natural resources. Climate smart agriculture is an approach that prepares farmers to respond to the uncertainties associated with the climate change and its impact on agriculture.

## WHAT IS CLIMATE SMART AGRICULTURE?

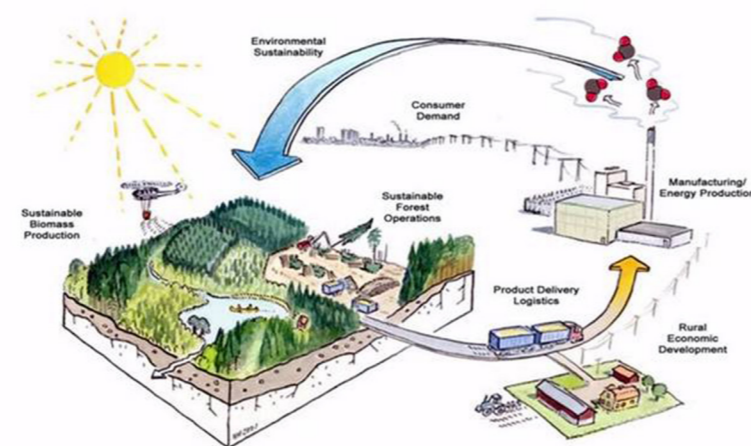
The concept of CSA was developed by Food and Agricultural Organization for managing agriculture for food security under the changing climate. FAO defines CSA as the 'Agriculture that sustainably increases productivity, enhances resilience, reduces or removes greenhouse gases where possible and enhances achievements of national food security and development goals'. This approach offer countless methods to help stake holders to recognize agricultural strategies appropriate for their local communities. It is based on three objectives

### 1. Sustainably increasing agricultural productivity and income

According to the world bank (2019) 44 per cent of the world population is living in rural area and the main source of income for them is agriculture. The changing climate have imparted serious consequences on the lives of farmers due to decline in productivity, uncertain weather conditions and crop failure due to abiotic stress. Sustainable increase of agricultural productivity and income by adopting climate smart agricultural practices is the only way to bring rural farmers to the forefront of society.

### 2. Adapting and building resilience to climate change

Global average temperature is increasing at an alarming rate. It leads to changes in precipitation



pattern, melting of glaciers and rising sea levels. Changes in precipitation pattern influence the cultivation of season specific crops. Sowing time has to shift in order to adapt to the changing precipitation pattern. Increase in sea level may lead to the intrusion of saline water to the rivers, water bodies and agricultural field, this may impart saline stress to the crops. There is an urgent need to develop climate ready crops which can adapt to the changing climate and able to strive under various abiotic stress conditions.

### 3. Reducing greenhouse gas emission

Nine percentage of the total greenhouse gas is produced by agriculture which can be reduced by adopting CSA practices. For example methane emission from rice farming can be reduced by

alternate wetting and drying which reduced the anaerobic condition and better management of organic wastes.

### Strategies to achieve the objective of CSA

A set of strategies are there to achieve the objectives of CSA. Use of integrated renewable energy sources, resource conservation technologies, developing new cultivars and weather tuned farming practices are some of the potential tactics to achieve these objectives. Foremost important strategy is to adopt "weather tuned agricultural practices". Frequency of extreme weather events are increasing and crops are highly susceptible to this weather aberrations. Timely forecast of weather and following weather based agro advisories may solve this problem to an extent. Popularizing the use of renewable energy sources is important in forming an energy smart farming practices. A few such technologies are wind mills, solar panels, biogas extraction units, bio -oil mining and purification and bio energy operated water pumps. Optimum utilization of all forms of agricultural inputs and natural resources can be attained by various resource conservation technologies such as zero tillage, crop rotation and residue recycling. These techniques also reduces greenhouse gas emission by means of carbon sequestration. Climate change have a detrimental effect on crop production by imposing drought and temperature stress due to global warming. The crop yield in south and central Asia is expected to decrease by 5-30%. The introduction of genetically modified or improved crop varieties which have the tolerance to these abiotic stress will serve as a solution for this.

### Climate smart villages – way forward to CSA

Stakes holders and various institutions are responsible for disseminating the knowledge of various technologies among grass root level such as farmer's field schools and farm radio. Climate Smart Villages (CSV) are the concept which take a bridge between the scientific knowledge and local actions so that the novel strategies of climate smart agriculture can be effectively implemented among the farmers. With the cooperation of farmers the scientists test and implement the CSA practices. According to the CGIAR report, 2014, the idea of climate smart villages are to incorporate climate smart agriculture into village development plans. CSV have implemented in Indian states like Haryana and Bihar. Let us take

an example of Haryana. Haryana is a semiarid region where irrigation intensity is more than 175 per cent. Based on the survey conducted among 8 randomly selected villages in Haryana, various climate smart agricultural practices have been selected. Village committees have been constituted comprising of farmers, researchers and local planners. The CSA strategies which are relevant for the communities are implemented. Practices like laser land levelling, stress tolerant crop varieties, zero tillage, crop diversification and legume integration, information and communication technologies to access weather forecast, site specific nutrient management, direct seeded rice, nutrient expert decision support tool for maize and wheat, alternate wetting and drying of rice, residue mulching and plant health monitoring using green seeker are some of the CSA strategies adopted in the village. Weather alert and weather based agro advisories are disseminated by the meteorology department to the farmers which help them to take timely decisions. The farmers could save upto 30% of water by adopting direct sowing and alternate wetting and drying of crops (CGIAR, 2014). Due to the success of this CSVs government of Haryana has decided to launch additional 500 CSVs in the state.

## CONCLUSION

Food security is the all-time concern of people across the globe. Agriculture is in the midst of threat due to climate change and decline in area under crop cultivation. CSA is a novel concept which aims to achieve food security through sustainability and resource conservation also, adapt to changing climate. It offers the integration of various existing technologies in a sustainable way to achieve optimum production and better livelihood for farmers in near future.