[Article ID : 01/IV/01/0421]

CLIMATE SMART AGRICULTURE

Gorte Amruta[1]*, Dr. P.B. Wadikar[2], Zade Yuga Arun[3]

[1&3] M.sc (Agriculture) Genetics and Plant Breeding
[2] M.sc (Agriculture), PhD Genetics and Plant Breeding
College of Agriculture, Latur (VNMKV, Parbhani)
Email Id : amruta.gorte@gmail.com

Climate change is today's major concern as it mainly affects the agriculture sector resulting growing food insecurity across the world. Agriculture is the most vulnerable and sensitive sector affected by climate change because of its dependency on local climate parameters like rainfall, temperature, soil health, etc. Impact of climate change on agriculture will be one of the major deciding factors influencing the future food security of mankind on the earth. The increased frequency of extreme weather events such as floods, cyclones and droughts are the most challenging issues of current age. The developing countries due to their dependency on agriculture and allied sectors and limited infrastructure suffer the most. The extreme weather events cause tremendous loss in agriculture and allied sector (crop, livestock, fisheries, etc.) leaving farmers in distressed condition. At present around 570 millions farms are facing the threat of climate change across the world. The estimated impacts of both historical and future climate change on cereal crop yields in different regions indicate that the yield loss can be up to -35% for rice, -20% for wheat, -50% for sorghum, -13% for barley and -60% for maize depending on the location, future climate scenarios and projected year.

In Asia, agricultural crop yields are expected to decline by 5-30% by 2050s due to rising temperature in the Himalayas and this decline in agricultural yield will lead to food insecurity, which becomes a serious future problem for human beings. Higher temperature eventually reduces yields of desirable crops while encouraging weed and pest proliferation. Here, climate smart agriculture can be a better solution to address the issues of changing climate as well as to enhance global food security. To alleviate the challenges posed by climate change, agriculture has to become "climate smart".

The term CSA is coined by FAO in the background document prepared for the 2010 Hague Conference on Food Security, Agriculture and Climate Change. The CSA concept was developed with a strong focus on food security including adaptation to climate change. Climate Smart Agriculture 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 Food and Agricultural Organization (FAO) defines CSA as "agriculture that sustainably increases productivity, enhances resilience (adaptation), reduces GHGs (mitigation) where possible and enhances achievement of national food security and development goals".

Despite the recognized importance of Climate Smart Agriculture (CSA), the dissemination and uptake of climate smart technologies, tools and practices is still largely an ongoing and challenging process. The adaptation of climate related knowledge, technologies and practices to local
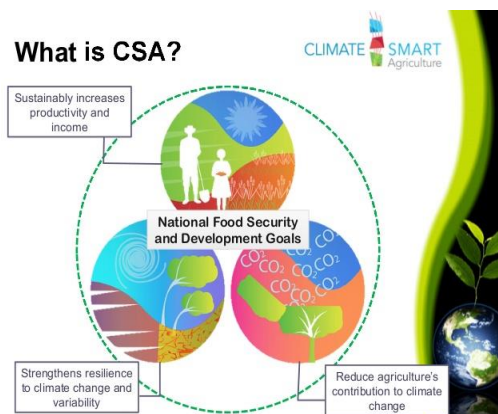
conditions, promoting joint learning by farmers, researchers, extension personnel and widely disseminating Climate Smart Agriculture (CSA) practices, is critical. CSA approach deals with these interlinked challenges in a holistic and effective manner.

The Three Pillars of CSA

Productivity

CSA aims to sustainably increase agricultural productivity and incomes from crops, livestock and fish, without having a negative impact on the environment. This, in turn, will raise food and nutritional security. A key concept related to raising productivity is sustainable intensification. As per report by FAO, to achieve food security and agricultural development goals by 2030, adapting to climate change and lowering emissions will be necessary.

Adaptation

CSA aims to reduce the exposure of farmers to short- term risks, while also strengthening their resilience by building their capacity to adapt and prosper in the face of shocks and longer-term stresses. Particular attention is given to protecting the ecosystem; services which ecosystems provide to farmers and others. These services are essential for maintaining productivity and our ability to adapt to climate changes.

Mitigation

Wherever and whenever possible, CSA should help to reduce and/or remove greenhouse gas (GHG) emissions. This implies that emissions from production of each calorie or kilo of food, fibre and fuel should be reduced; deforestation from agriculture should be avoided and manage soils and trees in ways that maximizes their potential to act as carbon sinks and absorb CO_2 from the atmosphere.

Key Elements of Climate Smart Agriculture

Climate smart agriculture is an approach that involves different elements embedded in local contexts. CSA relates to actions both on-farm and beyond the farm and incorporates technologies, policies, institutions and investment. The different elements which can be integrated in climate smart agricultural approaches include:

1. Management of crops, livestock, aquaculture and capture fisheries to manage resources better, produce more with less while increasing resilience.
2. Ecosystem and landscape management to conserve ecosystem services that are key to increase at the time resource efficiency and resilience
3. Services for farmers and land managers to enable them to implement the necessary changes.

How CSA is different?

Climate smart agriculture explicitly considers climate risks that are happening more frequently with greater intensity than in the past. We need to change our existing agricultural technologies and should adopt improved technologies and approaches to deal with the new climatic risks. CSA approaches need greater investment in managing climatic risks, understanding and planning for adaptive transitions that may be needed. For example, new farming systems or livelihoods, utilizing opportunities for reducing or removing greenhouse gas emissions where feasible.

Examples of CSA Interventions

Examples of specific CSA interventions include soil management, drought- tolerant maize, dairy development, farming catfish intensively and carbon finance to restore crop fields, waste-reducing rice thresher, rainfall forecasts and incentive system for low carbon agriculture.

Actions needed to implement climate smart agriculture

A range of actions can be undertaken by government and other agencies for successful implementation of climate-smart agriculture in agriculture systems. CSA approaches include four major types of actions.

1. Expanding the evidence base and assessment tools to identify agricultural growth strategies for food security that integrate necessary adaptation and potential mitigation.
2. Building policy frameworks and consensus to support implementation at scale.
3. Strengthening national and local institutions to enable farmer management to climate risks and adoption context-suitable agricultural practices, technologies and systems.
4. Enhancing financing options to support implementation, linking climate and agricultural finance.