Chapter 6
Achieving Climate Smart Agriculture With a Sustainable Use of Water:
A Conceptual Framework for Sustaining the Use of Water for Agriculture in the Era of Climate Change

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ABSTRACT

With time there has been an unpredictable climate change affecting the requirement of water for agriculture. Survival of agriculture has become a matter of concern with an efficient management of water. The aim of the chapter is to design a conceptual framework in sustaining water for agriculture in the era of climate change. The authors in the present chapter have used secondary data from previous research work and critically analysed the cases on water management for agriculture. The chapter discusses on practices like drip irrigation, new adaptations, mitigation technologies, vapour pressure, agro-ecological zone model and other water management strategies and the agricultural practices which though increases the yield but is leaving an adverse impact on climate. The chapter designs a conceptual framework to sustain water for agricultural use in the era of climate change and discusses it. This must be dealt through in order to attain sustainability.

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INTRODUCTION

Agriculture is the soul of every country. With time there has been an unpredictable climate change affecting the requirement of water for agriculture (Branca et al., 2011). Survival of agriculture has become a matter of concern with an efficient management of water (Vanclay, 2004). With the growing population there has been rapid cutting down of forests for socio-economic development. This has resulted into strong buildings and roads which has disturbed the climate. Looking into the past fifty years one can find that there is a drastic change in climate and has severely influenced water resources and agriculture (Sakhuja, 2008). The change in climate is responsible for an increase or decrease in availability of water which has an influence on the biodiversity hotspots, ecosystems and agriculture. Water availability has declined since 1947 from 5150 cubic metre to 2200 cubic metre in 2000. According to the estimations, the country will be water stressed by 2017 when water availability will be only 1600 cubic metres (Kenyon, 2004). The World Bank has reported about Ethiopian agriculture which is dependent on rainfall. As a result of climate change the country is facing severe problems of land degradation and soil erosion due to heavy runoff and deforestation. Morison (1996), in his study has stated that scientists working on climate change are of the opinion that gases leading to climate change will go on increasing which will have a direct effect on water resources and an indirect effect on agriculture. There is a strong link between agriculture, climate change and water which can be clearly seen today (Adger, 2005). One can find a link of the three factors which affects one another directly or indirectly. Looking into the past fifty years one can find that there has been a drastic change in climate and has severely influenced water resources and agriculture (Sakhuja, 2008). Human activities are responsible for the change in climate one or the other way (Singh, 2012). The change in climate is responsible for an increase or decrease in availability of water which has an influence on the biodiversity hotspots, ecosystems and agriculture. This has affected the crop yield leading to food shortage and malnutrition problems.

Several techniques have been evolved for an efficient and integrated water use in agriculture. The authors in the present chapter have used secondary data from previous research work and critically analysing case studies on supportive climate smart agricultural development with watershed management. It's high time now that one has to be prepared for the future and examine all the domains economic, social, institutional and biophysical in order to manage the risks and shocks.. Today the major issue of concern is the evil impacts of climate change on agriculture and the evil impacts of agricultural and water practices to climate change (FAO, 2016). This must be dealt through in order to attain sustainability. The reason for increasing global warming is not just pollution but also the agricultural practices which though increases the yield but is leaving an adverse impact on climate. In one or the other way the water availability has been a matter of concern for agriculture.

Minimum wastage of water can lead to a sustainable water utilisation for agriculture. With time there has been found a vast variation in climate. The reasons for this are rise in population, cutting down of trees, construction of tall buildings, industries, rise in pollution and unsustainable practices followed in the country. These causes have led to change the climate into too hot, humid and followed by unpredictable rainfall. The ultimate sufferers of this change are agriculture whose lands have shifted into buildings and industries and the remaining land is left to be swept away by heavy rainfall or becomes a victim of drought conditions. The objectives of the chapter is to discuss the impact of water availability in agriculture in the era of climate change, design a framework in sustaining water for agriculture in this era of climate change and to discuss on practices like drip irrigation, new adaptations, mitigation technologies, vapour pressure, agro ecological zone model and other water management practices.