

## Chapter 12

# Climate Change Impact on Agriculture and Food Security

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### ABSTRACT

*Research on the impact of climate change on agriculture and food security is important, especially in the agricultural economies, not only to know the severity of impact but also the policies to be adapted to halt climate change and the technology to be used to mitigate the impact of climate change. The study was conducted in Kapiri Mposhi district of Central Province in Zambia to find out the impact of climate change on agriculture and food security. The objectives of study include to know the intensity of climate change and its impact on area under cultivation, late sowing of seed and damage of seed due to lack of water, fertilizer absorption reduction, food shortage, livestock, and productivity. The chapter also focuses on the sources of credit to the farmers.*

### INTRODUCTION

Today, climate change is at the top of the agenda of policy makers in all countries of the world. The demand for cereals will increase by 70% by 2050 and will double in many low-income countries due to increase in population and higher per capita consumption with growing incomes (FAO, 2006). Agriculture is highly sensitive to climate change. Climate change is a threat to the humanity itself. But the actions to mitigate climate change impact on agriculture and food security are less and uneven in countries of the world.

Climate change means changes in the patterns of overall climate of the earth, i.e., changes in the earth's average temperature and precipitation patterns. There are two reasons for climate change – natural and human. The natural reasons are changes in earth's orbit, in the amount of energy coming from the sun and volcanic eruptions. The human causes for climate change are due to the combustion of fossil fuels like coal, oil and natural gas whose burning releases green house gases, such as carbon dioxide in

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to the air. The Intergovernmental Panel on Climate Changes (IPCC) Fifth Assessment Report (2007) concluded that “the human influence on the climate system is clear and is evident from the increasing green house gas concentrations in the atmosphere, positive radiative forcing, observed warming and understanding of the climate system”. 97 per cent or more of climate scientists agree that this is due to human activity- notably, emissions of carbon dioxide (Cook, 2013).

Climate change affects agriculture by destroying harvests and reducing agricultural productivity. Research on impact of climate change on agriculture and food security is important, especially in the agricultural economies not only to know the severity of impact but also the policies to be adapted to halt climate change and the technology to be used to mitigate the impact of climate change. Individuals living in rural areas in poor countries are also disproportionately affected by climate change because they are more dependent on natural resources and the environment for their livelihood (World Bank, 2011). Climate change and global warming reduces economic growth and slows economic activity. Global warming affects agriculture in two ways. Firstly, it destroys agricultural harvests and secondly, it affects on agricultural productivity permanently (Dell, et.al, 2012).

World Bank (1986) defined food security as “access by all people at all times to sufficient food for an active and healthy life”. Naiken (2003) defined undernourishment as that part of the distribution lying below a minimum energy requirement level. Mauro, et.al. (2006) identified five indicators for measuring food security. The first indicator was “undernourishment”, which was also adapted by FAO. The second indicator was “food intake”, which measures the amount of food actually consumed at the individual or household level. The third indicator was “nutritional status”, which considers dietary deficiencies. The fourth indicator was “access to food”, which considers wealth status measured by total consumption or income. Income as access-to-food was the main food security indicator. Lastly, “vulnerability” indicator, which expresses ex-ante vulnerability and ex-post outcomes.

Table 1 shows the global share of greenhouse gas emissions by country.

*Table 1. Global share of greenhouse gas emissions by country*

Country	Share of Global	CO <sub>2</sub> Population (tco <sub>2</sub> per Capita)	CO <sub>2</sub> /GDP PPP (kg co <sub>2</sub> per Current International \$)	GDP per Capita (Current ppp)
China	28%	6.65	0.55	12,196
United States	16%	16.18	0.31	52,980
India	6%	1.49	0.28	5,418
Russian Federation	5%	10.75	0.43	25,033
Japan	4%	9.70	0.27	36,223
Germany	2%	9.42	0.21	43,887
Korea	2%	11.39	0.34	33,089
Canada	2%	15.25	0.35	43,033
Islamic Republic of Iran	2%	6.79	0.42	16,067
Saudi Arabia	1%	16.39	0.31	52,993
Total share (10 top countries)	67%			

Source: (IMF, 2015).

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