Chapter 59
Social and Environmental Impacts on Agricultural Development

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ABSTRACT

Addressing environmental and social impacts on agricultural development and food security is a global priority since increased food production of 60-70% is estimated to be required by 2050 to feed the growing world population. In developing nations, the situation is more acute since fewer social, technological and financial resources are available to combat climate change, which is expected to have negative effects on agricultural production, and there are other constraints to achieving food security. This chapter explores the social and environmental issues affecting agricultural production facing farmers and other agricultural practitioners, policy makers, institutions and stakeholders in the developing world. It will also address how progress in research in emerging economies can be put to maximum benefit in the face of these existing social and environmental challenges. A cohesive strategy to address these challenges is presented.

INTRODUCTION

The world's population is expected to increase to 9 billion by 2050 (Hubert, Rosegrant, Van Boekel & Ortiz, 2010), and it is estimated that a 60-70% global increase in food production is needed to feed this growing population (Consultative Group for International Agricultural Research (CGIAR), 2015; FAO, 2007, 2014; Mba, Guimaraes, & Ghosh, 2012). Currently, approximately 2 billion persons are food insecure since they do not meet one or several of the Food and Agriculture Organisation's (FAO's) dimensions of food security (access to adequate food, availability and utilization of nutritious food and stable supply (Hubert et al., 2010; Wheeler & von Braun, 2013)). Furthermore, 805 million persons did

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not have access to sufficient food during 2012-2014 (Maggio, Van Criekinge, & Malingreau, 2015). Food availability must increase to meet demand by 100% in developing countries (CGIAR, 2015). This can be achieved through increasing production as well as reducing losses (food waste). Improving agriculture[1] to meet the Millennium Development Goals[2] of the United Nations, which include halving extreme poverty and hunger by 2015 and eliminating it by 2030 (under the sustainable development agenda), requires optimisation of agricultural practices and systems, and dealing effectively with technological, social, environmental as well as economic issues that influence the sustainability of agricultural production. The United Nations Framework Convention on Climate change (UNFCCC) (2007) described the developing nations as most vulnerable to climate change impacts that are expected to have negative effects on agricultural production and food security, as described by the International Food Policy Research Institute (IFPRI, 2009). This is attributed to the limited social, technological and financial resources available to address climate change in these countries.

Currently, sustainable food security and agricultural development are constrained globally by degradation and loss of agricultural land, the loss of biodiversity, depletion of water and other resources and pollution (Chaudhury, Vervoort, Kristjanson, Ericksen, & Ainslie, 2103; Sonnino, Moragues Faus, & Maggio, 2014). These factors are exacerbated by the negative impacts of climate change and may also contribute to climate change.

This chapter explores the social and environmental issues facing agricultural practitioners (producers and entrepreneurs alike) in the developing world, who are striving to contribute to food security in their communities and, by extension, the world. It will also address how the progress in research in emerging economies can be put to maximum benefit in the face of existing social and environmental challenges in developing nations, as described by Ejeta (2009).

Heat stress could affect developing countries by 2030 (Inter-Governmental Panel on Climate Change (IPCC), 2007, 2013). Expenditure of USD 200 and 250 billion a year may be required to address negative impacts of climate change in developing countries (Peterson, 2011). These impacts can significantly reduce sustainability of livelihoods and the well-being of citizens in developing nations (Noble et al., 2014).

A multi-sector approach is advocated to deal with the challenges and potential impact of social and environmental factors such as climate change on food security. The proposed model encompasses the role of farmers, entrepreneurs, social policy makers, governments, the private sector, scientists and organisations in a cohesive strategy. The role of education and extension in preparing for the impacts of climate change, as described by Bekele and Ganpat (2014) in the context of small island developing states (SIDS), is also discussed.

In order to illustrate the current situation, constraints and putative solutions to social and environmental impacts on agricultural development and food security in developing countries, several staple crops in Africa, Latin America and the Caribbean (LAC) and the commodity, cocoa, are highlighted in this chapter.