1 Introduction

*Richard A. Sikora, Eugene R. Terry,
Paul L.G. Vlek and Joyce Chitja*

Global population is expected to reach an estimated nine billion by the year 2050. Addressing the global food demand that this represents will require significant investments and policy reforms to transform important key agricultural production systems. Specifically, these investments should lead to higher returns from sustained productivity growth, from infrastructure development, from institutional reforms and from the environmental services generated by sustainable resource management (FAO, 2008, 2009; IFPRI, 2013).

Nearly all of this future increase in population will take place in those parts of the world comprising today's developing countries. This trend in growth is very evident in Southern Africa where population growth rates are among the highest in the world. In 1960, there were only 43 million people living in the region. It is projected, however, that by the year 2050, the population will increase to about 350 million people (Chapter 3 on population growth rates in this volume) with most of the growth in rural areas.

Rural growth will outpace opportunities for employment in primary agriculture. Therefore, in Southern Africa, there is an urgent need for the creation of a transition to non-agriculture employment (see Chapter 31 on small-scale enterprise in this volume).

More than 70% of the world's population is expected to be urban by 2050 due to rural-urban migration and this will significantly influence lifestyles, income levels and it will change food consumption patterns (FAO, 2009). Africans living in urban areas increased from 28% in 1980 to 40% today and are projected to grow to 50% by 2030.

Africa is the world's most food insecure continent, with relatively low levels of agricultural productivity, low rural incomes, high rates of malnutrition and a significantly worsening food trade balance (see Chapter 2 of this volume). However, Africa possesses 60% of the world's arable land and 70% of its water as well as human capital. These natural resources are important components needed for improved production. Conversely, African small-scale farmers, who are in the majority, lack access to modern technology to improve food production. These farmers are an important element in the transformation of food system in Southern Africa as outlined in chapters in this volume. Southern Africa could contribute significantly to the growing global demand

for food, as well as, to energy markets through a sustainable transformation of agriculture.

Agriculture accounts for about 40% of GDP, 15% of exports and 60–80% of Africa's employment. Therefore, the transformation to a more efficient and environmentally sound agriculture system will be fundamental in achieving agriculture economies that: 1) create growth, 2) deliver opportunities for a growing youthful population, 3) tackle malnutrition and food insecurity and 4) simultaneously protect and sustain the natural resource base.

These objectives will not be realized without significant investments and radical improvements in access to modern agricultural technology and a simultaneous improvement in agricultural policy that favours the small-scale land-owners. This shift will require substantial private and public investment as well as more efficient public investment (NEPAD, 2003).

The countries in Southern Africa mainly targeted in this book includes Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe, but countries bordering this area are also considered in the book chapters. Agriculture in Southern Africa is at present labour intensive and inefficient, especially with regard to the small size landholders. An important element of the agricultural transformation is therefore improvement of agricultural productivity by improving land tenure issues, access to knowledge, improve credit, access to mechanization and better market access, to name a few of the modern technologies of production used in other areas of the world as outlined in the chapters in this volume. Initiatives in this direction would provide multiple benefits, including increased food availability and improve food security, while freeing up labour to participate in future non-agriculture enterprises (SADC, 2018).

Evidence suggests that the future of Southern Africa is an urban one, and that urban food insecurity is therefore a large and growing challenge to the agricultural community of the population. The causes, determinants and solutions for food insecurity vary between rural areas where food is produced and the urban settings that are basically domestic food importers. It is important therefore that urban food insecurity be addressed as an integral component of the food security agenda of Southern Africa (Crush and Frayne, 2010).

The editors provided the authors writing the chapters with a set of hypotheses as they relate to agricultural transformation in the region as follows:

- 1 The effect of continuous population pressure and adverse effects of climate change resulting in agriculture being practiced today on land that is often unsuitable for sustainable food production and where the cost in ecosystem services exceeds the meagre returns in any form of agricultural production. Therefore, land-use policies, reforms and appropriate community interventions will be needed to address this issue.
- 2 The land that can be managed sustainably for agricultural production in Southern Africa is extremely diverse as is the cultural and institutional

environment in which farmers operate. Community-based land-use planning is needed to ensure the optimal use of land, be it for plantations, pastures, agricultural or horticultural crops.

- 3 The myriad of management and technological interventions to augment agricultural production systems in a profitable fashion need to be tailored to these conditions and adjusted as these conditions change.
- 4 In contrast with most other parts of the world, the productivity gap in most African agricultural regions is well in excess of 50% even in many areas that can be considered favourably endowed biophysically as well as institutionally.
- 5 In the quest to produce the food needed for the Southern Africa population of the future, efforts to intensify agriculture sustainably should target those areas where the biophysical as well as institutional conditions are conducive to socioeconomic success and advancement.
- 6 The interventions and technologies that are proposed for sustainable intensification should aim at reaching the economically feasible production potentials of the targeted region by eliminating genetic and other biophysical constraints, avoid major losses due to pest or diseases either pre- or postharvest and avoid any cost due to loss of ecosystem services.
- 7 Pre and postharvest losses in Southern Africa amount to 30% or more. Areas where food production systems are intensified and serve commercial markets such losses need to be eliminated through proper pest management, extension and infrastructural investments.
- 8 Enabling conditions for sustainable intensification will require secure land rights, public investments in infrastructure, market, storage and value chain development, credit and other services such as research and extension, education and safety nets to cope with crop failures as well as an active engagement with the private sector.
- 9 Given the rapidly ageing farmer and rural population of Southern Africa, there is an urgent need to provide strong motivation and incentives to retain more tech-savvy and entrepreneurial youths to both farming and business in the food and value chain economy in the rural communities who can be the agents of sustainable intensification.

The book provides policy recommendations derived from analysis of the most relevant elements of these hypothetical considerations and predicated on the following assumptions:

- 1 That most of the technologies required to transform agriculture and significantly increase crop production are already available and effective
- 2 That farmer access to these technologies is often impeded by a lack of appropriate agricultural policies and/or processes and market access
- 3 Bringing technology and policy together is required to successfully transform agricultural systems in the region.

Thus, the book is divided into five sections that present relevant content on:

- 1 The drivers of change towards agricultural transformation, such as population growth, climate change, globalization and urbanization; constraints to improving and increasing agricultural productivity, such as land and water resources, as well as biological constraints and economic barriers
- 2 A section on current technologies and a second on emerging technologies available to address biophysical and other production constraints, such as germplasm improvement, pest and disease management and improved crop and animal production tools
- 3 An additional section is devoted to policy issues, capacity building, land tenure, infrastructure and markets that will be needed to facilitate the agricultural transformation towards sustainable intensification
- 4 The last section defines the outlook and where we hope the book is helpful in the future for transforming agriculture in Southern Africa.

The book should be used as a handbook, or solutions cookbook, whereby decision makers attempting to improve agricultural production, select those chapters (technologies, policies, processes) that fit the problems facing the farmers and agricultural production systems in their own country. This is basically a book of high-quality ingredients and not of recipes – this aspect is being left to the decision makers.

We hope the book will help decision makers develop the policies that will improve agricultural production on the farms of Southern Africa and the adoption of processes that will improve food production and access to food and thus enhance human nutrition and well-being in the region.

References

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