



Policies, laws and regulations in support of farmer-managed seed systems: still a long way to go

A review of 14 countries in Africa

Ronnie Vernooy, Joyce Adokorach, Dominic Kimani, Anna Marwa, Alfios Mayoyo, Daniel Nyadanu

The Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT) delivers research-based solutions that address the global crises of malnutrition, climate change, biodiversity loss, and environmental degradation.

The Alliance focuses on the nexus of agriculture, nutrition and environment. We work with local, national, and multinational partners across Africa, Asia, and Latin America and the Caribbean, and with the public and private sectors and civil society. With novel partnerships, the Alliance generates evidence and mainstreams innovations to transform food systems and landscapes so that they sustain the planet, drive prosperity, and nourish people in a climate crisis.

The Alliance is part of CGIAR, the world's largest agricultural research and innovation partnership for a food-secure future dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resources.

alliancebioversityciat.org

www.cgiar.org

Author affiliations

Joyce Adokorach, Plant Genetic Resources Centre (PGRC), National Agricultural Research Organisation (NARO), Uganda

Dominic Kimani, Seed Savers Network (SNN), Kenya

Anna Marwa, Participatory Ecological Land Use Management (PELUM), Tanzania

Alfios Mayoyo, consultant, Zimbabwe

Daniel Nyadanu, Cocoa Research Institute of Ghana (CRIG) and NUS Network, Ghana

Ronnie Vernooy, Alliance of Bioversity International and CIAT, the Netherlands

Acknowledgements

We acknowledge the financial support provided by the Integrated Seed Sector Development in Africa (ISSD Africa) 2019-2022 project. We also acknowledge the cooperation and participation of the many stakeholders over the course of this study, without which this work would not have been successfully conducted. We recognize the Alliance of Bioversity International and CIAT for coordinating the study. We thank the Community Technology Development Organisation-Zimbabwe for hosting the writing team during the ISSD Africa workshop held in May 2022. We thank John Wasswa Mulumba of the PGRC-NARO, Uganda, for his feedback on the draft report. We thank the editors of this report: Olga Spellman, Scientific Editor and Coordinator of the Alliance of Bioversity International and CIAT Science Writing Service, and Vincent Johnson and Harri Washington, consultants to the Alliance of Bioversity International and CIAT Science Writing Service. We thank Cinzia Russo for administrative support and Luca Pierotti for report design. Any views expressed or remaining errors are solely the responsibility of the authors.

Citation: Vernooy, R., Adokorach, J., Kimani, D., Marwa, A., Mayoyo, A., Nyadanu, D. 2023. Policies, laws and regulations in support of farmer-managed seed systems: still a long way to go. A review of 14 countries in Africa. ISSD Africa, Alliance of Bioversity International and CIAT, Rome, Italy. <https://hdl.handle.net/10568/128579>

Cover photo: Harvesting beans from the seed multiplication plot at the Gumbu community seed bank, South Africa.

Credit: Bioversity International/R.Vernooy

Cover design: Luca Pierotti

© Bioversity International, 2023
Via di San Domenico, 1
00153
Rome, ITALY

CONTENTS

INTRODUCTION TO THE REVIEW	V
<i>Background</i>	<i>v</i>
<i>Towards resilient farmer seed systems</i>	<i>v</i>
<i>Purpose of the review</i>	<i>vi</i>
<i>Methodology</i>	<i>vii</i>
<i>References</i>	<i>vii</i>
WEST AFRICA	1
<i>List of Acronyms and Abbreviations</i>	<i>1</i>
Benin	3
<i>Introduction</i>	<i>3</i>
<i>History of seed policy development</i>	<i>3</i>
<i>Regional harmonization of agricultural and seed policies</i>	<i>4</i>
<i>Legal regulations that support farmer-managed seed systems</i>	<i>5</i>
<i>Protecting farmer-managed seed systems: current policy gaps</i>	<i>6</i>
<i>Gender equality in Benin's agricultural policy</i>	<i>7</i>
<i>Conclusion</i>	<i>7</i>
<i>References</i>	<i>8</i>
Burkina faso	9
<i>Introduction</i>	<i>9</i>
<i>History of seed policy development in Burkina Faso</i>	<i>10</i>
<i>Regional harmonization of agricultural and seed policies</i>	<i>11</i>
<i>Legal regulations that support farmer-managed seed systems</i>	<i>12</i>
<i>Protecting farmer-managed seed systems: current policy gaps</i>	<i>13</i>
<i>Gender equality in Burkina Faso's agricultural policy</i>	<i>13</i>
<i>Conclusion</i>	<i>14</i>
<i>References</i>	<i>14</i>
Ghana	15
<i>Introduction</i>	<i>15</i>
<i>History of seed policy development in Ghana</i>	<i>16</i>
<i>Regional harmonization of agricultural and seed policies</i>	<i>17</i>
<i>Legal regulations that support farmer-managed seed systems</i>	<i>17</i>
<i>Seed (Certification and Standards) Act of 1972 (NRCD100)</i>	<i>17</i>
<i>Plants and Fertilizer Act of 2010 (No. 803)</i>	<i>18</i>
<i>National Seed Policy, 2013</i>	<i>19</i>
<i>The National Seed Plan, 2015</i>	<i>20</i>
<i>The Plant Variety Protection Bill, 2020</i>	<i>21</i>
<i>Local laws</i>	<i>22</i>
<i>Protecting farmer-managed seed systems: current policy gaps</i>	<i>22</i>

<i>Gender equality in Ghana's agricultural policy</i>	23
<i>Conclusion</i>	24
<i>References</i>	24
Mali	25
<i>Introduction</i>	25
<i>History of seed policy development</i>	25
<i>Regional harmonization of agricultural and seed policies</i>	26
<i>Legal regulations that support farmer-managed seed systems</i>	26
<i>Protecting farmer-managed seed systems: Current policy gaps</i>	27
<i>Gender equality in Mali's agricultural policy</i>	27
<i>Conclusion</i>	28
<i>References</i>	28
Nigeria	29
<i>Introduction</i>	29
<i>History of seed policy development</i>	30
<i>Regional harmonization of agricultural and seed policies</i>	31
<i>Legal regulations that support farmer-managed seed systems</i>	32
<i>Collaborative programs in Nigeria's seed sector</i>	33
<i>Protecting farmer-managed seed systems: Current policy gaps</i>	34
<i>Gender equality in Nigeria's agricultural policy</i>	34
<i>Conclusion</i>	35
<i>References</i>	36
EAST AFRICA	39
<i>List of Acronyms and Abbreviations</i>	39
Burundi	41
<i>Introduction</i>	41
<i>Seed legislation and regulation</i>	42
<i>The national seed policy framework</i>	42
<i>Quality and enforcement of seed regulations</i>	43
<i>Implementing regional regulations</i>	44
<i>Efforts to eradicate counterfeit seed</i>	44
<i>Institutional support</i>	45
<i>Service to smallholder farmers</i>	45
<i>Conclusion</i>	46
<i>References</i>	46
Kenya	47
<i>Introduction</i>	47
<i>Summary of seed-related laws and regulations and their impact on farmer seed systems</i>	48
<i>Regional seed laws and their impact on farmer seed systems</i>	52
<i>Conclusions</i>	52
<i>References and sources</i>	53
Tanzania	55
<i>Introduction</i>	55

<i>Brief history of national seed policy development</i>	55
<i>Regulating Farmer-Managed Seed Systems under international instruments</i>	56
<i>Regional harmonization of legal frameworks in the seed sector</i>	56
<i>Description of regulations that impact Farmer Seed Systems in Tanzania</i>	57
<i>National Agriculture Policy (2013)</i>	57
<i>Plant Breeders' Rights Act (2012)</i>	58
<i>Rationale of policy changes and driving forces behind changes</i>	58
<i>Current policy gaps in the protection of farmer-managed seed systems</i>	59
<i>Government's role in regulating farmer-managed seed systems</i>	59
<i>Tanzania agricultural policies in relation to gender equality</i>	60
<i>Will policies and regulations benefit farmer-managed seed systems in the future?</i>	60
<i>Conclusion</i>	61
<i>References</i>	62
Uganda	63
<i>Introduction</i>	63
<i>Policies, laws, and regulations reviewed</i>	63
<i>Constitution of the Republic of Uganda (1995)</i>	64
<i>Seed and Plant Act (2007)</i>	64
<i>National Seed Policy (2018)</i>	64
<i>Quality Declared Seed (QDS)</i>	65
<i>National Biotechnology and Biosafety Policy (2008) and the Biotechnology and Bio-safety Bill (2012)</i>	66
<i>Plant Variety Protection Act (2014)</i>	67
<i>The National Environment Management Policy (1994) and National Environment Act 1998</i>	67
<i>Draft Food and Nutrition Bill (2009)</i>	68
<i>Geographical Indications Act (2013)</i>	68
<i>National Agriculture Policy (2013)</i>	69
<i>Conclusion</i>	69
<i>References</i>	70
SOUTHERN AFRICA	73
<i>List of Acronyms and Abbreviations</i>	73
Background	75
Analysis of the inclusion of farmer-managed seed systems in national policies and support for their development	76
<i>Malawi</i>	76
<i>Namibia</i>	77
<i>South Africa</i>	78
<i>Zambia</i>	78
<i>Zimbabwe</i>	79
Country outline of the support rendered to farmer-managed seed systems, as stated in the national agricultural policies	80
<i>Zambia</i>	80
<i>Zimbabwe</i>	81

Country identification and explanation of some of the good practices that have been supported by the national agricultural policies for the advancement of farmer-managed seed systems	83
<i>Malawi</i>	83
<i>Namibia</i>	84
<i>South Africa</i>	85
<i>Zambia</i>	86
<i>Zimbabwe</i>	86
Interrogation of the involvement of each country in the regional seed policy harmonization protocol	89
<i>Malawi</i>	90
<i>Zambia</i>	90
<i>Zimbabwe</i>	90
Gender and women's empowerment	91
<i>Malawi</i>	91
<i>Namibia</i>	91
<i>South Africa</i>	92
<i>Zambia</i>	92
<i>Zimbabwe</i>	92
Conclusions and recommendations	93
<i>References and resources</i>	95
SYNTHESIS AND CONCLUSION: FARMER-MANAGED SEED SYSTEMS IN AFRICA LEFT ON THE FRINGES	99
<i>Overall assessment: lack of recognition of and support for farmer-managed seed systems</i>	99
<i>Detailed assessment</i>	101
<i>Country review: Snapshots</i>	103
<i>Positive examples from practice that could inform policy and legal revisions</i>	105
<i>References</i>	107

INTRODUCTION TO THE REVIEW

Ronnie Vernooy

Background

Estimates suggest that 60–80 percent of the seeds on which smallholder farmers in developing countries depend is saved on farm or obtained through informal distribution channels (rather than through formal channels that are regulated, monitored and sanctioned by government and produced and sold by the private seed sector). This seed is obtained through seed exchanges between farmers in the same or neighboring communities or other community sharing systems (e.g., labor for seed), through community seed bank seed donation and return practices, and at the local fresh food markets (where often both grains and seeds are sold). Farmers manage and control the flows of this seed, through on-farm activities such as sowing, planting, selecting (in the field, pre- or post-harvest), storing, and regenerating. Women farmers play key roles in farmer seed systems, although they are often overlooked by researchers and development personnel, policies, and programs.

This high level of seed autonomy among farmers does not mean there are no challenges. Almost everywhere, local seed systems are under stress (Subedi and Vernooy, 2019). Many farming households have become more individualized in terms of decision-making and deployment of knowledge, labor, capital, and seeds. Traditional seed exchange relationships have become weaker in many areas. Farming production practices are becoming more market oriented, which has both benefits and costs depending on the local context. Large-scale rural-to-urban migration is contributing to a decline in farming in many countries or transforming small-scale family farming into contract farming. It is also leading to the feminization of agriculture, increasing women's workload and responsibilities in many regions (Chhetri et al., 2020).

These trends are affecting local seed production, selection, storage, distribution, and exchange practices, for example, through substituting local varieties with hybrids that can be easily purchased at local markets or from agrodealers. In this way, formal and informal become intertwined (Kuhlmann and Dey, 2021). Climate change is placing additional pressure on farmers' seed and food production systems and on the multiple functions that they fulfill. Future impacts of climate change are expected to become more pronounced in many parts of the world, forcing farmers to change their practices and causing them to search for information about crops and varieties that are better adapted to new weather dynamics.

Towards resilient farmer seed systems

Resilient seed systems are generated/formed/thrive when supportive policy, legal, and socioeconomic conditions coexist, at local, district and national levels, and where a diversity of seed production and distribution practices, including farmer-managed practices (e.g., custodian farmers, seed saver groups, community seed banks, local seed businesses, farmer field schools, and community-supported agriculture) are in place and active. Such a system contributes to greater food availability throughout the year and supports the production of more nutritious and healthy crops, income generation, and a sustainable resource base.

Resilient seed systems (Subedi and Vernooy, 2019):

- Rely on the ability of seed system actors to absorb disturbances, regroup or reorganize, and adapt to stresses and changes caused by a perturbation in the environment
- Result from multiple seed and knowledge interactions and continuous learning among seed system actors and related institutions
- Is demand driven and responsive to different needs and interests, supporting all users and farming systems
- Recognizes, respects and supports the key roles played by women farmers as seed custodians, managers, networkers, and entrepreneurs.

Resilient seed systems reduce vulnerability by (Subedi and Vernooy, 2019):

- Ensuring access to seeds in terms of preference, affordability, and availability when needed
- Ensuring availability in terms of production and distribution
- Guaranteeing seed quality in terms of adaptability, safety, and longevity
- Guaranteeing seed choice and diversity
- Producing crops that underpin a nutritious and healthy diet, including neglected and underutilized species
- Recognizing and respecting seed as social and cultural capital.

The key question is: **Do such supportive policy, legal, and socioeconomic conditions coexist at various levels?**

Purpose of the review

To find an answer to this question, we carried out a review under the umbrella of Theme 3 on “Agrobiodiversity, seeds and climate change” of the Integrated Seed Sector Development (ISSD) Africa project (2019-2022) (<https://issdafrica.org/>). The review compiled and analyzed changes in policies, laws, and regulations (approved or in the process of being approved by national, district or local authorities in the last ten years), that are directly related to seed systems that contribute to the (further) development of resilient farmer seed systems – at local, district, or national levels – in 14 selected African countries in Central, East, West and Southern Africa: Benin, Burkina Faso, Burundi, Ghana, Kenya, Malawi, Mali, Namibia, Nigeria, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe.

The main question addressed by the review is **How do (seed)-related policies and laws impact on farmer seed systems, in particular related to these dimensions: access, availability, quality, price, diversity, safety, adaptability, seed longevity, nutrition and health, and social and spiritual values?**

Additional questions considered are:

- Is there any form of practical support for farmers’ seed systems, i.e., recognition, appreciation (valuation), political/technical/ organizational/financial support or incentives?
- If not, are there any recent examples of policy and law revisions underway that consider farmers’ seed systems central to national seed sector development?
- What are the most important farmers’ seed systems issues addressed in these revisions?

Methodology

The 14 country reviews were carried out as desk reviews by African agricultural experts from various countries. Daniel Nyadanu carried out the West Africa review (Burkina Faso, Benin, Ghana, Nigeria, Mali), Anna Marwa and Dominic Kimani the Kenya and Tanzania reviews, Joyce Adokorach the Burundi and Uganda reviews, and Alfios Mayoyo the Southern Africa review, which includes Malawi, Namibia, South Africa, Zambia, Zimbabwe. This Introduction and the Synthesis and conclusion sections have been conceptualized and written by Ronnie Vernooy of the Alliance of Bioversity International and CIAT, the study's coordinating organization. Country reports were presented and commented on at an international workshop held in Harare, Zimbabwe (May 2022), hosted by the Community Technology Development Organisation (CTDO) of Zimbabwe, under the umbrella of the ISSD Africa 2019-2022 project.

This publication is organized by region; the chapters follow the logic of the original reviews carried out by the authors. The reviews of the countries in West, Central, and East Africa are presented country by country, whereas the reviews of the Southern African countries are grouped and presented by chapter topic or sections.

This report is complemented by a policy brief, *On the margins: A review of policies and laws in support of farmer-managed seed systems in Africa*, which summarizes the main findings (Vernooy et al., 2022).

References

- Chhetri, A., Regmi, P. P., Chanana, N., & Aggarwal, P. K. (2020). Potential of climate-smart agriculture in reducing women farmers' drudgery in high climatic risk areas. *Climatic Change*, 158(1), 29–42. <https://doi.org/10.1007/s10584-018-2350-8>
- Kuhlmann, K. and Dey, B. (2021). Using regulatory flexibility to address market informality in seed systems: a global study. *Agronomy* 11(2), 377. <https://doi.org/10.3390/agronomy11020377>
- Subedi, A., Vernooy, R. (2019). Healthy food systems require resilient seed systems. In Bioversity International, *Agrobiodiversity Index Report 2019: Risk and Resilience*. Bioversity International, Rome, Italy, 2019, pp. 127–134. <https://hdl.handle.net/10568/100820>
- Vernooy, R., Adokorach, J., Kimani, D. Marwa, A., Mayoyo, A., Nyadanu, D. (2023). *On the margins: A review of policies and laws in support of farmer-managed seed systems in Africa*. ISSD Africa, and the Alliance of Bioversity International and CIAT, Rome, Italy. <https://hdl.handle.net/10568/128580>

WEST AFRICA

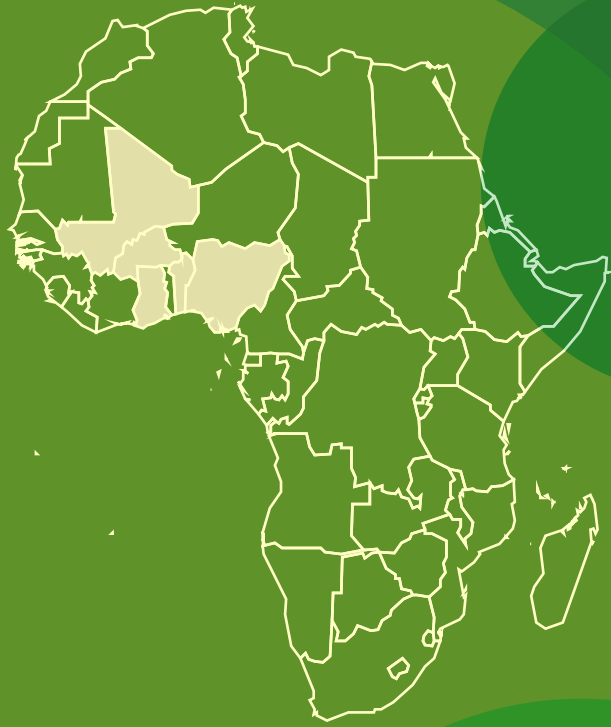


Photo 1. Farmers explore local crop (and seed) diversity on display at a community seed fair in Mangoase, Ghana. Credit: Bioversity International/R. Vernooy

WEST AFRICA

Daniel Nyadanu

List of Acronyms and Abbreviations

AOPP	Association of Professional Farmer Organisations (Mali)
ASBP	African Seed and Biotechnology Program
ASSEMA	Association de semencière du Mali (Seed Association of Mali)
AU	African Union
CAADP	Comprehensive African Agriculture Development Program
CNS	Comité National de Semences (National Seed Committee; Burkina Faso)
CNSF	Centre National des Semences Forestières (National Center of Forest Seeds; Burkina Faso)
CORAF	West and Central African Council for Agricultural Research
CSP	Collaborative Seed Programme (Nigeria)
ECOWAP	West African Regional Agricultural Policy
ECOWAS	Economic Community of West African States
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Development Cooperation)
GSC	Ghana Seed Company
GSID	Ghana Seed Inspection and Certification Division
INERA	Institut de l'Environnement et de Recherches Agricoles (Institute for the Environment and Agricultural Research; Burkina Faso)
ISSD	Integrated Seed Sector Development
METASIP	Medium-Term Agricultural Sector Investment Plan (Ghana)
MoFA	Ministry of Food and Agriculture (Ghana)
NASC	National Agricultural Seed Council (Nigeria)
NEPAD	New Partnership for Africa's Development
NERICA	New Rice for Africa
NGO	Non-governmental organization
NSC	National Seed Committee
NSS	National Seed Service

OAPI	Organisation Africaine de la Propriété Intellectuelle (African Intellectual Property Organization)
PAFISEM	Seed Sector Support Project (Mali)
PNIASAN	National Plan for Agricultural Investments and Food and Nutritional Security (Benin)
PNISA	Programme National d'Investissement dans le Secteur Agricole (National Programme for Investment in the Agricultural Sector; Mali)
PPRSD	Plant Protection and Regulatory Services Directorate (Ghana)
PSCE	Private seed certification entity (Nigeria)
PSDSA	Strategic Plan for the Development of the Agricultural Sector (Benin)
PSRSA	Plan Stratégique de Relance du Secteur Agricole (Strategic Plan for the Recovery of the Agricultural Sector; Benin)
PVP	Plant variety protection
QDS	Quality declared seeds
UO	Université de Ouagadougou (University of Ouagadougou; Burkina Faso)
UPB	Université Polytechnique de Bobo Dioulasso (Polytechnic University of Bobo Dioulasso; Burkina Faso)
UPOV	International Union for the Protection of New Varieties of Plants
USAID	United States Agency for International Development
WAEMU	West African Economic and Monetary Union

Benin

Introduction

In the Republic of Benin, agriculture is regarded as one of the most important sectors, contributing 35 percent to national Gross Domestic Product (GDP) (GAIN Report, 2014). About 70 percent of the working population is employed in agriculture, providing about 75 percent of total export earnings as well as 15 percent of state revenue. Some of the major constraints limiting the sustainable intensification of agricultural production in Benin are the availability of quality seeds (Achigan-Dako et al., 2014), lack of water for irrigation and poor consideration of gender when enacting development policies. In food crop production, seeds are important components of agricultural development (Etten et al., 2017) and contribute about 30 percent to crop productivity. However, other factors, such as seed quality (for example, health status, germination power, moisture content, specific purity, varietal purity, vigor) account for 40 percent of variation in crop yield (Kpedzroku and Didjeira, 2008).

Seed systems and markets are critical components of national and regional efforts to boost agricultural production, promote structural change and enhance livelihoods. For a wide group of seed system actors—including commercial enterprises, farmer-based organizations, regulators and researchers—recent seed policy reforms have provided new laws, initiatives and opportunities. Nonetheless, there are several complex issues that must be addressed. As the public and private sectors compete in emerging seed markets, their roles must be continually redefined. Much work remains to be done to better integrate informal and formal seed systems, ensuring that farmers benefit from improved cultivars developed through breeding programs, providing industry with new market opportunities and allowing the government to expand its regulatory reach to support farmers and rural entrepreneurs (Spielman, 2020).

Certified seeds in Benin are mainly produced by farmers' organizations and the private sector. Most foundation seeds used for certified seed production are sourced from the Institut National des Recherches Agricoles du Bénin (National Institute of Agricultural Research of Benin), which is located in Bembèrèkè municipality.

History of seed policy development

Under the guidance of the Centres d'Action Régionale pour le Développement Rural (Regional Action Centers for Rural Development), eight government-sponsored seed production farms were developed between 1978 and 1984. Following a 1989 study, the sector was restructured with the execution of a National Seed Plan for 1990–1995. This plan, which decreased the number of government-run seed farms to three, reaffirmed the need for approved seed production and sought to open the seed market to private actors. A second plan for 1995–2000 further restructured the seed industry. Seed-producing cooperatives are dominated by large federal and national umbrella organizations. The collapse of the Société Nationale pour la Promotion Agricole (National Society for Agricultural Promotion), a state-run entity that coordinated 90 percent of commercial seed business until 2008, laid the groundwork for the cooperatives.

Benin is a member of the Organisation Africaine de la Propriété Intellectuelle (OAPI; African Intellectual Property Organization), which is headquartered in Yaoundé, Cameroon. The other members are Burkina

Faso, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Senegal, and Togo. The OAPI has a mission to establish and promote an effective seed system to encourage the creation of new improved plant varieties. OAPI's Bangui Agreement deals with intellectual property matters relating to patents, utility models, trademarks, industrial designs, trade names, geographical indications, copyrights, unfair competition, integrated circuit layouts and plant variety rights. The treaty recognizes the enormous contribution of farmers to the development of global plant genetic resources. Therefore, it has called for the protection of farmers' traditional knowledge by increasing farmers' participation in national decision-making processes and ensuring that they share in the benefits accruing from use of these resources. The treaty also helps to maximize crop breeding and promotes development and maintenance of diverse farming systems.

Plant Variety Protection (PVP) regulations in Benin came into existence on January 1, 2006. The PVP is ensured by Annex X of the Bangui Agreement and allows breeders to obtain intellectual property protection documents known as plant variety certificates.

The International Union for the Protection of New Varieties of Plants (UPOV) Convention was adopted in Paris in 1961 and was revised in 1972, 1978 and 1991 (UPOV, 1991). In 2016, of seventy-four member states, South Africa and Kenya were the only African countries to adhere to the Convention by subscribing to the 1968 Act. It is specifically designed to reflect the peculiarities of breeding, cultivation and use of new plant varieties. Benin is the only African country to have ratified the UPOV Convention by subscribing to the revised Act of 1991, which was adopted on March 19, 1991, in Geneva but was rejected by several countries and farmers' organizations.

In February 2017, the government of Benin transmitted a draft decree to the National Assembly to authorize ratification of the 1991 Act of the International Convention on New Varieties of Plants. However, in February 2019, the National Assembly rejected the UPOV Convention Act because the law lacks transparency and accountability, prevents farmers from saving seeds from improved varieties and prevents seed exchange among farmers, which may lead to the disappearance of traditional farmers' varieties. There are 150 varieties of non-patented seeds in Benin. Several organizations (non-governmental organizations (NGOs), civil organizations, peasant farmers' groups) have campaigned against legalization of the UPOV Convention.

Benin approved the ratification of the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas on December 17, 2018, the provisions of which, in particular Article 19, are violated by the UPOV Convention. The declaration puts peasants at the heart of global food security, access to production elements and environmental protection challenges.

Regional harmonization of agricultural and seed policies

Benin is a member state of different regional agricultural policies in West Africa, including those of the West African Economic and Monetary Union (WAEMU) and the Economic Community of West African States (ECOWAS). WAEMU's policy operated for three years (2002–2004) and was then extended to 2009 to define an institutional framework and adopt regional regulations and three-year plans. The last three-year plan ended in 2016 but regional regulations on plants, animals and food safety were harmonized in 2007. In addition, a master plan was adopted to prioritize the agricultural sector.

All ECOWAS member states adopted the West African Regional Agricultural Policy (ECOWAP) in Accra (January 2005). ECOWAP was defined by the agricultural component of the New Partnership for Africa's Development (NEPAD) and the Comprehensive African Agriculture Development Program (CAADP) that was adopted in 2002 and lasted for ten years. A new direction was defined during an ECOWAP+10 seminar in Dakar in November 2015. A high-level scientific forum of ECOWAP/CAADP actors identified climate-smart agriculture as one of the most relevant responses of agricultural actors to climate change effects.

The West African Seed Committee is the main management body for the implementation and monitoring of harmonized regulations at the regional level in terms of quality control, certification and the marketing of seeds to promote seed sector development in member states.

Legal regulations that support farmer-managed seed systems

Seed laws and regulations define the seed sector's institutional framework and rule enforcement, thus impacting who produces, markets and sells seeds of which varieties and under what conditions. There are various types of legal and policy initiatives that directly affect the kind of seeds that small-scale farmers can use, including intellectual property laws that grant state-sanctioned monopolies to plant breeders at the expense of farmers' rights, and seed marketing laws that regulate trade in seeds, often making it illegal to exchange or market farmers' seeds.

The Republic of Benin operates intellectual property law as part of its membership of the OAPI Bangui Agreement of March 2, 1977. The law is for regional conventions of all member countries and also acts as national legislation on intellectual property. It conforms with the UPOV Convention, of which Benin is not a member state.

Until 1995 when the seed sector was liberalized, the state had been responsible for seed production and distribution in the formal seed system. The government of Benin was the major source of low-cost seed delivery, challenging the competitiveness and survival of other seed enterprises. Benin's current regional seed policy is reflected in Agreement C/REG.4/05/2008 that harmonizes the rules related to quality control, certification, and marketing of seeds in the West African sub-region (ECOWAS, 2008).

In 2006, the government of Benin initiated implementation of a Strategic Plan for the Recovery of the Agricultural Sector (Plan Stratégique de Relance du Secteur Agricole, PSRSA) which was adopted in 2011 by the Council of Ministers and expired in December 2015.

Benin's national seed policy was adopted in 2015 with an action plan for implementation based on the PSRSA. The national seed policy seeks to address the following objectives: (i) make quality seeds available to farmers at an appropriate time and affordable cost; (ii) create a favorable environment for seed trade by reducing trade impediments; (iii) create a favorable environment for private investment in the seed sector; (iv) promote public-private partnership and (v) reinforce institutional and legal seed sector frameworks. The national seed policy outlines various actors' roles in the formal seed system, namely research institutions, support service providers, farmers' organizations and the private sector as well as government and regional organizations.

The national seed policy was renewed for 2017–2025 under the Strategic Plan for the Development of the Agricultural Sector (PSDSA) 2025 and the National Plan for Agricultural Investments and Food and Nutritional Security (PNIASAN) 2017–2021. The PSDSA aims to: (i) enhance agricultural growth and food security through efficient production and (ii) ensure competitiveness and market access by developing

value chains. To achieve these objectives, from 2012 to 2015, the government of Benin was involved in collecting, processing, and distributing staple foods (rice, maize), and cotton, which is Benin's main export commodity. The government also provided annual input subsidies to cotton producers, while certified seeds were occasionally subsidized for maize and rice producers in 2008–2009. Market support measures included annually fixed floor prices at the farm gate for cotton and rice as well as recommended prices for rice and maize in selected retail stores. Finally, a 10 percent tariff is in place for rice imports. The PSDSA is strongly oriented to climate change adaptation and takes into account sustainable resource management and population resilience. Climate-resilient agriculture is promoted and value chains for cashew, maize and shea are being developed.

New Market Lab and the Catholic Relief Services drafted a seed policy initiative and programs review on January 5, 2021. The review encompasses different seed programs that have been initiated in several African countries. Some of these programs are summarized below:

- The Access to Seeds Index evaluates and compares seed companies according to their efforts to improve access to quality seeds of improved varieties for smallholder farmers (Access to Seeds, 2019). The index seeks primarily to identify leadership and good practices, providing an evidence base to determine where and how the seed industry can increase its efforts. In 2019, the index presented four rankings and in-depth studies that evaluated the performance of global seed companies as well as the regional industry in South and Southeast Asia and sub-Saharan Africa. The methodology is based on input from farmers, companies and policymakers, which is then reviewed by dozens of regional experts. The index measures four categories of indicators (commitment, performance, transparency and leadership) in each of the areas studied (governance and strategy, genetic resources, intellectual property, research and development, seed production, marketing and sales, and capacity building).
- The Africa Yam project involves a network of research organizations including the National Root Crops Research Institute and the Ebonyi State University in Nigeria, the Crops Research Institute and the Savanna Agricultural Research Institute in Ghana, the Centre National de Recherche Agronomique in Côte d'Ivoire, and the Université d'Abomey-Calavi in Benin (AfricaYam, 2021). The project's objective is to develop yam breeding programs that increase productivity while reducing production costs in the four target countries. The project seeks to develop and deploy end-user preferred varieties with higher yield, greater resistance to pests and diseases and improved quality.
- AMAFINE has a wide variety of projects focused on different crops. Currently, there is an ongoing project with the West and Central African Council for Agricultural Research (CORAF) aimed at improving access to funding for node actors along the maize value chain in Benin, Burkina Faso and Cote d'Ivoire. AMAFINE also developed a seed program in Senegal, from 2014 to 2016, which was focused on seeds of specific crops.

Protecting farmer-managed seed systems: current policy gaps

The PSDSA 2025 and the PNIASAN 2017–2021 hardly refer to the seed sector. Currently, the Republic of Benin does not have a Plant Breeders Act and farmers rely heavily on the National Agricultural Policy. Generally, the current seed policy and regional harmonization framework of the Ministère de l'Agriculture, de l'Élevage et de la Pêche (Ministry of Agriculture, Livestock and Fisheries) does not include the marketing of quality declared seeds (QDS). There is no provision for including QDS into the framework as in other African countries—Tanzania, Uganda and Zambia—where smallholder farmers

produce and market QDS. However, the production of certified seeds is carried out under the control of the Seed Quality Control and Certification Department of Benin (Service de la Promotion de Contrôle de Qualité et du Conditionnement des Produits Agricoles), but effective implementation would benefit from more resources and staff. The government needs to create a conducive atmosphere for seed companies to encourage private investors to enter the seed industry. Low capacity for resilience in vulnerable populations in terms of food and nutrition in the face of climate change, land degradation, and poor risk management are other challenges. In general, seeds are not resilient or tolerant to climate variability.

Gender equality in Benin's agricultural policy

The PSDSA 2025 and the PNIASAN 2017–2021 capture cross-cutting areas such as gender to ensure the sustainability of achievements. The PNIASAN 2017–2021 considers how to improve governance and information systems in the agricultural sector, and how to increase nutritional security. Component 4.4 under Axis 4 considers the promotion of gender in the agricultural sector.

The PSDSA 2025 and the PNIASAN 2017–2021 also identify various challenges that inhibit women's empowerment in the agricultural sector, some of which have been linked to low levels of education and training, limited access to productive resources and employment, and minimal participation in decision-making bodies.

The documents highlight the various roles that women must play in the agricultural and rural sectors which need to be supported by ensuring that (i) women have access to improved resources with relation to land, credit, agricultural inputs and employment and (ii) rural women's capacity for action is strengthened through education and vocational training programs. The role of women in the agricultural sector needs to be strengthened. Policies to support women in the seed sector have not been clearly defined. Future seed regulations should ensure gender equity in delivery of quality seed to farmers.

Conclusion

The seed sector of Benin is still in a development stage and requires improvement. Although there is a seed policy in place, it is biased toward the formal seed system. There is no attention paid to quality seed production by farmers for farmers (e.g., through QDS). Certified seeds are produced under the control of the Seed Quality Control and Certification Department of Benin. The seed system in Benin is not fully liberalized, and lacks a conducive atmosphere for seed companies to enter the seed industry.

References

- Access to Seeds (2019). Access to seeds Index 2019. Synthesis report. <https://www.accesstoseeds.org/>
- Achigan-Dako, E. G., Sogbohossou, O. E., and Maundu, P. (2014). Current knowledge on *Amaranthus* spp.: Research avenues for improved nutritional value and yield in leafy amaranths in sub-Saharan Africa. *Euphytica*, 197(3), 300-317. <https://doi.org/10.1007/s10681-014-1081-9>
- AfricaYam (2021). Enhancing yam breeding for increased productivity and improved quality in West Africa. (2021, April 8). Ibadan, IITA. <https://www.iita.org/iita-project/africayam-enhancing-yam-breeding-for-increased-productivity-and-improved-quality-in-west-africa/>
- ECOWAS (2008). Regulations C/Reg.4/05/2008 on harmonization of the rules governing quality control, certification and marketing of plant seeds and seedlings in the ECOWAS region. <https://gazettes.africa/archive/aa-ecowas/2008/aa-ecowas-official-journal-dated-2008-05-01-vol-53.pdf>
- Etten, J. V., López Noriega, I., Fadda, C., and Thomas, E. (2017). The contribution of seed systems to crop and tree diversity in sustainable food systems. In Bioversity International, *Agrobiodiversity Index Report 2019: Risk and Resilience*. Bioversity International: Rome, Italy, 2019, pp. 81-102. https://www.bioversityinternational.org/fileadmin/user_upload/online_library/Mainstreaming_Agrobiodiversity/4_Seed_Systems_for_Crop_Tree_Diversity.pdf
- Global Agriculture Information Network (GAIN) Report (2014). Benin: Agricultural Situation. https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Agricultural%20Situation_Lagos_Benin_3-20-2014.pdf
- International Union for the Protection of New Varieties of Plants (UPOV) (1991). International Convention for the Protection of New Varieties of Plants of December 2, 1961, as Revised at Geneva on November 10, 1972, on October 23, 1978, and on March 19, 1991. UPOV, Geneva, Switzerland. https://www.upov.int/edocs/pubdocs/en/upov_pub_221.pdf
- Kpedzroku, A. and Didjeira, A. (2008). Guide de production de semences certifiées maïs-sorgho-riz-niébé. Lomé, Togo: ITRA/ICAT/CTA. *Collection Brochures et Fiches Techniques*, 1. http://www.fao.org/fileadmin/user_upload/spid/docs/Mali/GUIDE_final_04_05_2012.pdf
- Spielman, D. (2020). Seed policies and regulatory reforms. Sustaining Africa's Agrifood System Transformation: The Role of Public Policies. ReSAKSS Annual Trends and Outlook Reports. https://www.resakss.org/sites/default/files/2020_ator_individual_chapters/Ch3%20ReSAKSS_AW_ATOM_2020.pdf

Burkina faso

Introduction

Burkina Faso is a landlocked country where agriculture contributes to about 30 percent of GDP and employs over 90 percent of the workforce (Silga, 2019). Most farmers are smallholders and many produce primarily for their own consumption. The sector is dominated by small-scale farms of less than five hectares and the main products are sorghum, millet and maize (highest volume), and cotton (highest value) (OECD, 2014). People's livelihoods therefore depend on agricultural land and seeds, making the traditional use and management of seeds vital to rural people's nutrition. Smallholder farmers use multiple avenues to purchase seed, which helps to prevent bottlenecks in seed supply that may be caused by changes in government policy, the end of a seed project, or natural or man-made disasters (Almekinders et al., 1994). Channels for the supply of farmer seed in Burkina Faso are generally grouped into formal and informal (also known as local, traditional or farmer) seed systems.

Burkina Faso's formal seed sector comprises numerous institutions from the public and private sectors. Variety development falls within the remit of the Institut de l'Environnement et de Recherches Agricoles (INERA; Institute for the Environment and Agricultural Research). Seed quality control, inspection and certification is conducted by the Service National des Semences (National Seed Services), which is under the Ministère de l'Agriculture et des Aménagements Hydrauliques (Ministry of Agriculture and Hydraulic Management). The Comité National de Semences (CNS; National Seed Committee) oversees variety release and registration. Seed production and marketing is conducted by seed companies, seed co-operatives and individual seed producers. The Association Nationale des Entreprises Semencières au Burkina Faso is the national seed association, bringing seed companies together under one umbrella. It serves as a platform for the seed industry's private sector (Waithaka et al., 2019). The formal seed system involves a chain of activities leading to the production, inspection, and certification of seed of released varieties. The process usually starts with plant breeding, includes multi-location trials to establish wide adaptability of distinct and uniform germplasm, and concludes with formal declaration of varietal release. Seed regulations aim to maintain varietal identity and purity and to guarantee physical, physiological and sanitary quality. Seed is typically marketed through officially recognized seed outlets, either commercially or by way of national agricultural research systems (Louwaars, 1994).

The informal seed sector broadly refers to the traditional practices through which farmers produce and maintain local varieties. Under this system, farmers either retain seed from previous harvests or source seed from neighbors, family members or food markets. Due to limited investment in seed production and processing, about 85 percent of smallholder farmers in Burkina Faso still rely on the informal seed sector for most crops (Sanou et al., 2017). The informal seed system embraces most of the ways in which farmers themselves produce, disseminate and procure seed, directly from their own harvest, through gifts and barter among friends, neighbors and relatives and through local grain markets or traders. Farmers' seed is generally selected from harvests or grain stocks, rather than produced separately. Local technical knowledge and standards guide informal seed system performance (Bougma et al., 2018).

In an era of agricultural modernization and intensification, promoting the production and use of quality seeds of improved varieties has taken center stage in agricultural policies, strategies and programs in Burkina Faso. A conscious effort by the government has led to productivity increases of up to 40 percent. However, for staple crops such as maize and sorghum, 80 percent of farmers use their own seeds (Lipper et al., 2005). The formal seed sector is used as a source of seed largely for more recently introduced crops.

History of seed policy development in Burkina Faso

In 1970, Burkina Faso experienced severe drought, which precipitated the need for agricultural improvements, especially in the seed sector. This led to the 2002 seed specialization program and the passing of the Seed Law in 2006. Law No. 010-2006/AN (Portant Règlementation des Semences Végétales au Burkina Faso) was passed with the help of donor agencies and NGOs. The law aimed to create conditions to promote the quality, production, marketing and use of seeds in order to contribute to achieving the national objectives of agricultural intensification and modernization and increasing agricultural and forestry production and food security. This liberalized the seed system in Burkina Faso. In 2008, Burkina Faso experienced a serious famine, which prompted an increase in investment in the seed sector by the Burkinabe government, causing a rise in certified seed use in Burkina Faso.

After enacting the Seed Law in 2006, three decrees and twelve specific sets of regulations covering many aspects of the seed system were passed with the aim of increasing the availability and use of certified seed. These include Decree No. 2008-680/PRES/PM/MAHRH/MECV/MESSRS of October 27, 2008, concerning attributions, composition and functioning of the National Seed Committee (NSC); Decree No. 2008-705/PRES/PM/MAHRH/MECV/ of November 17, 2008 on the organization and operation of the Seed Sector Support Fund; Ministerial Order No. 2011-017/MAHRH/MEDD/MEF of March 15, 2011 determining the titles and functions of agricultural and forestry agents charged with quality control for plant seed certification; and Ministerial Order No. 2010-22/MAHRH/MEDD/MICPIPA/MRSI/CAB of March 15, 2011 outlining the categories of seed sector actors in Burkina Faso. These decrees brought the NSC and the Seed Sector Support Fund into full operation.

Variety release in Burkina Faso falls under the mandate of the CNS under Law No. 010-2006/AN of March 17, 2006 (Portant Régime de Sécurité en Matière de Biotechnologie au Burkina Faso). The CNS was officially formed in 2012 and released the first National Variety Catalogue for Burkina Faso in 2014, which constituted the official release of all varieties developed up to that year. Before 2014, varieties were developed and released without going through a formal process of variety release and registration.

The enactment of the Seed Law also set up Burkina Faso's public institute for agricultural research, INERA, which was tasked with increasing general uptake of quality seeds nationwide. In 2016, INERA designed a framework agreement on future public-private partnerships for producing initial seed classes. To create an effective formal seed sector, the Burkinabe government set up three structures to support national seed production, marketing and distribution: l'Association des Grossistes et Détaillants d'Intrants Agricoles (Association of Input Wholesalers and Retailers of Burkina Faso), l'Association Nationale des Entreprises Semencières du Burkina Faso (National Association of Seeds Enterprises of Burkina Faso), and l'Union Nationale des Producteurs Semenciers du Burkina (National Union of Seed Producers of Burkina Faso). Institutions involved in agricultural research include:

- Centre National des Semences Forestières (CNSF, National Center of Forest Seeds): CNSF is a public institution advised by the Ministère de l'Environnement et du Cadre de Vie (Ministry of Natural Environment and Living Environment). It was created in 1983 following a Sahelian drought period, with the main objective of ensuring a supply of good quality forest seed for reforestation. It has been engaged in conventional plant breeding since 1984 and in biotechnology since 1996.
- Université de Ouagadougou (UO, University of Ouagadougou): UO is a public university established in 1974. Its principal responsibility is to educate and train students in agricultural sciences. It has been involved in plant breeding, beginning with the sorghum breeding program. Currently, research activities undertaken with students include breeding cowpea, okra, rice and taro.

- Université Polytechnique de Bobo Dioulasso (UPB, Polytechnic University of Bobo Dioulasso): UPB is a public university established in 1996. Like UO, UPB plays an important role in the national agricultural research system by supplying trained research professionals.

Regional harmonization of agricultural and seed policies

In 2008, Burkina Faso joined ECOWAS to sign the regional Seed Regulations (C/Reg.4/05/2008) (ECOWAS, 2008) that harmonize member states' seed policies to allow easy access to and marketing of varietal seeds across the ECOWAS block. It covers seed variety release, seed certification and quality assurance, quarantine and phytosanitary measures for seeds, but does not oblige its members to harmonize national legislation with regional decisions (ECOWAS, 2008). Since 2017, Burkina Faso has taken steps to harmonize its Seed Law with that of ECOWAS.

Burkina Faso is also a member of OAPI. In Burkina Faso, plant breeders' rights are protected by the Plant Varieties Protection Act. In 1999, OAPI joined the UPOV Convention (UPOV, 1991). By signing the UPOV Convention for the Bangui Agreement revision on intellectual property, OAPI members adopted another form of plant invention protection. The revised Bangui Agreement formalizes the rights of OAPI member states to protect certain new plant varieties. The introduction of this new provision meets the requirement of the World Trade Organization Agreement on aspects related to Intellectual Property which obliges all signatories to accede to the UPOV Convention. The purpose of the convention is to recognize and ensure that new plant variety breeders have exclusive rights to exploit their variety, covered by a plant variety certificate issued by OAPI. Under certain conditions, the plant variety certificate holder may prohibit any person from exploiting that variety. The convention thus prohibits the production or reproduction, packaging for the purpose of reproduction or multiplication, offer for sale, sale or any form of marketing, export and import of the protected variety without the breeder's prior consent.

Burkina Faso has acceded to the International Treaty on Plant Genetic Resources for Food and Agriculture, which is also known as the Seed Treaty or Plant Treaty; and the Sanitary and Phytosanitary Measures and Technical Barriers to Trade Agreement, which regulates the exchange of plants and plant parts.

In July 2005, the Ordinary Session of the Assembly of the African Union (AU) in Sirte, Libya, suggested that the AU Commission lead a continental effort to develop an African Seed and Biotechnology Program (ASBP). The ASBP serves as a blueprint for the development of Africa's seed sector, considered vital to address food security problems. In 2007, after much deliberation and many consultations, the AU approved the program in Addis Ababa, Ethiopia. The aim of the ASBP is to provide a comprehensive and strategic approach to overcome current barriers and obstacles to seed industry development in Africa. The program is yet to be implemented in most African countries due to financial constraints. In 2018, Burkina Faso signed an MoU with Africa Seeds, of which Burkina Faso was a founding member in 1998. The MoU promotes sustainable seed sector development in Burkina Faso, within the framework of the ASBP.

Legal regulations that support farmer-managed seed systems

According to the Access to Seeds Index (2019), Burkina Faso is a leading country within West Africa as it has a seed policy and regulations in place as well as a functional seed committee, certification agency, updated national catalogue and active private sector seed association. The seed system in Burkina Faso is mainly legislated by the Seed Law, Law No. 010-2006/AN (Portant Règlementation des Semences Végétales au Burkina Faso), which was enacted in 2006, and three decrees and two ministerial orders to ensure operationalization of the law.

Although the Seed Law recognizes both traditional and improved seeds, it promotes almost exclusively commercial seed distribution, primarily by establishing intellectual property rights on varieties and strongly regulating production and trade. Traditional varieties are only marginally affected. However, the law does not address farmers' rights to keep, use and exchange seeds within their own networks; it restricts farmers' rights to certified varieties, which are protected by intellectual property rights.

The Seed Law recognizes INERA as the sole body with the right to produce and select stock seeds and pre-basic and basic seeds. INERA facilitates regular training of seed producers and supervisors and supports the organization of seed producers into groups, associations, cooperatives, unions, federations or other structures as appropriate. Articles 9 and 10 of the Seed Law indicate how new varieties are approved and registered and obsolete varieties withdrawn, giving the Ministries of Agriculture and Forestry the sole right to produce certified seeds.

Plant breeders' rights are enshrined in the Seed Law. Articles 11 and 12 indicate breeders' benefits and the extent to which new varieties can be controlled, stating that no new variety can be protected by a patent. The Articles state how traditional genetic resources are protected: no traditional variety, including farmers' seed, may leave the national territory for research purposes without prior authorization from the ministers responsible for research in forestry and agriculture. Article 15 states that benefits derived from the use of traditional genetic resources, including seeds, shall accrue to the local people who have been users and custodians of these resources for several centuries.

Article 3 of the Seed Law also indicates channels for the production, registration, marketing, import and export, quality control and specifications of seeds in Burkina Faso. To promote the seed sector, the NSC was established by Decree No. 2008-680/PRES/PM/MAHRH/MECV/MESSRS on October 27, 2008. The NSC is an advisory body based on the principle of broad stakeholder participation in the seed sector. It is responsible for the certifying and registering agricultural varieties.

In accordance with Article 33 of the Seed Law, the Seed Sector Support Fund was established by Decree No. 2008-705/PRES/PM/MAHRH/MECV/ on November 17, 2008. The fund's mission is to finance seed registration, seed quality control and seed sector promotion. This includes access to credit and training extension, seed distribution and national seed policy implementation. The Minister of Agriculture and Minister of Finance supervise the fund. The management board comprises representatives from the Ministry of Agriculture and Hydraulic Management, the Directorate of Forests and Waterbodies, the Ministry of Scientific Research and Innovation, Ministry of Finance, seed producer organizations, seed user organizations, and organizations of plant seed traders and distributors. The fund is financed by proceeds from one-off fees for entry in the seed producer registry, income from quality control fees, state subsidies, interest on fund investments, transaction proceeds, contributions from development partners and financial resources from donations or legacies to the fund.

Decree No. 2008-706/PRES/PM/MAHRH/MEF/MECV/MJ of November 17, 2008, was enacted to determine transactions applicable to offences committed in violation of Law No. 010-2006/AN of March 31, 2006 on plant seed regulations. The decree mandated the swearing in of judicial police officers, agents of the Ministry of Agriculture and the Directorate of Forests and Waterbodies, and officials of the Economic Inspectorate of the Ministry of Trade and empowered them to enter seed distribution compounds and buildings, as well as depots, warehouses, shops and storage areas. The officials are permitted to access any document relating to the operation of a seed producer or distributor's farm; inspect seed facilities, installations, structures, vehicles, equipment and products; take samples and measurements necessary for seed quality control; and may seize and confiscate non-conforming seeds or any object related to fraudulent seed activities, without prejudice to criminal sanctions. Some of the crimes defined in the decree include usurping seed producer status, distributing uncertified or unapproved seed, using misleading labeling, distributing treated seed for human or animal consumption, importing seeds without authorization, and exporting without a declaration. Offenders can be charged between CFA 200 000 and CFA 20 000 000 if found guilty. The decree is not sympathetic to the farmer-based seed system as it criminalizes the sale of seeds generated by the system.

Protecting farmer-managed seed systems: current policy gaps

Farmers' traditional means of using, propagating, breeding and exchanging their seeds are under serious threat in Burkina Faso. Large seed companies are aggressively campaigning for the use of industrial and genetically modified seeds and forcing their way into the market. The companies receive support from government programs and laws that support their approach, as well as from a variety of other actors and donors in the national agricultural sector. The Seed Law does not address farmers' rights to keep, use and exchange seeds within their own networks. It restricts farmers' rights to certified varieties, which are protected by intellectual property rights. The traditional seed system or farmer seed system has been deemed inferior. There are many publicly and privately financed programs that advertise the commercial system in rural areas. The government subsidizes the production of certified varieties, presenting them as the solution to a variety of problems that farmers face, including shorter wet seasons and regional and temporal changes in rainfall patterns. Burkina Faso has a decree that criminalizes the sale and distribution of uncertified or unapproved seeds. Meanwhile, the procedure for the certification and approval of seeds is cumbersome and lengthy. Therefore, a policy framework that allows the use, sale, and distribution of farmers' seeds is needed.

Gender equality in Burkina Faso's agricultural policy

In Burkina Faso, approximately 95 percent of women work in subsistence agriculture or the informal sector, using low levels of technology. However, Burkina Faso is far from achieving gender equity. The Seed Law and associated decrees do not include support for women. No provision was made to provide greater support to women in agriculture from the Seed Sector Support Fund; both men and women were to be supported equally. The National Plan of Action (1991–1995) for Burkina Faso was drawn up to strengthen women's role in development, and to promote women's productivity, alleviate their work burden and eliminate oppressive structures and practices. Burkina Faso scores poorly on the Women's Empowerment in Agriculture Index according to an assessment by the Hunger Project (2017) indicating inadequate policy implementation.

Conclusion

Within West Africa, Burkina Faso has a relatively well-functioning seed sector. It has a seed policy and regulations in place, as well as a functional seed committee, certification agency, updated national catalogue and active private sector association. However, the sector does not address farmers' rights to keep, use, and exchange seeds within their own networks. Legal provisions should be made to recognize and effectively protect traditional seed systems in Burkina Faso, which will give farmers the right to keep, use, and trade their seed varieties. Maintaining traditional seed systems is the only way to effectively preserve Africa's enormous diversity of species and varieties and the knowledge of its farming communities (Lossau et al., 2000).

References

- Almekinders, C.J.M., Louwaars, N.P. and de Bruijn, G.H. (1994). Local Seed Systems and their Importance for an Improved Seed Supply in Developing Countries. *Euphytica* 78: 207-216.
- Bougma, L.A., Sawadogo, N., Ouedraogo, M.H., Ouedraogo, M., Balma D. and Sawadogo, M. (2018). Overview of the Burkina Faso seed system: Case of the formal seed system. *International Journal of Agricultural Policy and Research* 6(10), 169-175. <https://doi.org/10.15739/IJAPR.18.019>
- ECOWAS (2008). Regulations C/Reg.4/05/2008 on harmonization of the rules governing quality control, certification and marketing of plant seeds and seedlings in the ECOWAS region. <https://gazettes.africa/archive/aa-ecowas/2008/aa-ecowas-official-journal-dated-2008-05-01-vol-53.pdf>
- Hunger Project. (2017) Hunger Project 2016 Annual Report. The Hunger Project, New York, USA. <https://thp.org/reports/annual-report-2016/>
- Lipper, L., Cavatassi, R. and Winters, P. (2005). Seed Systems, Household Welfare and Crop Genetic Diversity: An Economic Methodology Applied in Ethiopia. UN FAO Agricultural and Development Economics Division. ESA Technical Paper, November 2005. <http://www.fao.org/es/esa>
- Lossau, A., Von, Weiskop, F. B. and Kasten, W. (2000). Support for the Informal Seed Sector in Development Cooperation - Conceptual Issues. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
- Louwaars, N. (1994). Seed supply systems in the tropics: International course on seed production and seed technology. Wageningen, The Netherlands: International Agriculture Centre.
- OECD (2014). Policy Framework for Investment in Agriculture, OECD Publishing. <http://dx.doi.org/10.1787/9789264212725-en>
- Sanou, B., Savadogo, K. and Sakurai, T. (2017). Determinants of Adoption and Continuous
- Use of Improved Maize Seeds in Burkina Faso, Japanese Journal of Agricultural Economics, 19(0), 21-26. <https://ideas.repec.org/a/ags/jpjire/314859.html>
- Silga, L. (2019). Traditional seeds are under threat. International Human-Rights Organization FIAN in Burkina Faso. <https://www.dandc.eu/en/article/industrial-and-genetically-modified-seeds-are-rise-burkina-faso>
- Waithaka, M., Dao, A., Traore, E.V., Mugoya, M. and Tihanyi, K. (2019). Burkina Faso Brief 2018 - The African Seed Access Index. Market Matters Inc., Ithaca, USA.

Ghana

Introduction

As in most African countries, agriculture is important for Ghana's economic growth and development. It contributes about 30 percent of national GDP and over 30 percent of export earnings and is a major source of raw materials in the manufacturing sector (GSP, 2013). Although the agricultural sector is smaller than the service and industry sectors, it is the second largest employer in Ghana (World Bank, 2012). Seeds are the basic unit of plant propagation and, as such, play a large role in agricultural production. Quality seeds are considered to be the most important technology for successful agriculture and constitute a major pathway to achieving national food security goals. In a country such as Ghana, where agriculture is the main pillar of the national economy, there is great need to ensure the availability and widespread use of quality seeds that are adapted to the environment where they will be grown (Almekinders and Louwaars, 2008).

A national seed sector assessment by the ISSD Africa program in 2012 identified five major types of seed system operating in Ghana. These are farmer-saved seed systems, community-based seed production systems, mixed public-private (local seed businesses), and purely public or private commercial systems (NSP, 2015). These various seed systems contribute to fulfilling the diverse seed demand of Ghanaian farmers. In practice, Ghana has three basic seed systems: formal, informal and combinations of the two (hybrid/quasi seed systems). Farmer-saved seeds and community-based seeds are informal systems existing outside of seed certification (Etwire et al., 2016).

Traditionally in Ghana, seeds were either exchanged among farmers or sourced from local markets (Cromwell et al., 1992). The primary seed source for most farmers is saved on-farm from the previous harvest (about 60–70 percent); the remainder comes from off-farm and other local sources (Franzen et al., 1996). Most farmers, upon getting access to openly pollinated varieties through on-farm trials of new varieties, keep recycling from their own stock. A farmer will only purchase improved seeds after experiencing loss in seed vigor. Over time, formal seed delivery systems emerged; however, traditional or informal seed delivery systems still exist in most parts of the country. In the informal seed system, farmers obtain seeds from traditional sources based on seed exchange or gifts, or purchases from other farmers and local markets (Pandey et al., 2011). The informal seed system is not regulated or supervised by any private or public institution, but is controlled by farmers (Etwire et al., 2013). The farmer-based seed system makes up about 80 percent of the total seed system for most staple crops in Ghana (Louwaars and de Boef, 2012). In the informal system, seed varieties are selected, multiplied and distributed at the local level based on traditional knowledge (Etwire et al., 2013). Farmers combine different crops and maintain genetic diversity usually consisting of traditional landraces.

In contrast to the informal seed system, the formal system is characterized by the development and distribution of improved seed varieties through a series of interdependent activities. The varieties are certified by the Plant Protection and Regulatory Services Directorate, a department under the Ministry of Food and Agriculture (MoFA) responsible for regulating seeds in Ghana. Formal seed only contributes to 11–14 percent of national seed requirements (MoFA, 2015). Ghana's formal seed sector is made up of numerous institutions, including government Crop Research Institute, Ghana Seed Inspection and Certification Division (GSID), GLDB, SARI and district extension), the private sector (mostly local seed companies and agro-input dealers), and development agencies.

To bridge the gap between informal and formal seed sources, a hybrid system that relies on selected farmers or groups with some degree of specialization in seed production was facilitated by various NGOs, projects, donor agencies and related entities. The hybrid/quasi-formal seed system is an emerging community seed production and distribution system in Ghana that blends the formal and informal seed systems. It is promoted by development projects to complement the formal seed system and thereby make improved seeds accessible to local communities (Etwire et al., 2013). These projects access certified foundation seeds from the formal system and pass them on to farmer groups based locally for multiplication and distribution. Usually, these farmer groups receive chemical inputs and capacity building support from the projects and the associated costs are repaid after selling the harvest. The system aims to improve farmers' access to certified seeds (Etwire et al., 2016). The farmer-based seed system and the hybrid seed system have the potential to sustain Ghana's food system as they provide a majority of the seeds required by farmers.

History of seed policy development in Ghana

Ghana's seed industry started in 1958 and was operated through various public sector entities until 1989 when the government adopted privatization. This paved the way for a new Ghana Seed Program in which the private sector took over the seed industry's commercial components, while the public sector continued with its responsibility of supervision and service. The seed industry was regulated by the Seeds (Certification and Standards) Regulations Decree of 1972, which covered the production, certification, and distribution of seeds in Ghana. The state-owned Ghana Seed Company (GSC) was established in 1979 to produce all classes of seed except breeder seed. Dissolution of the GSC in 1989 was the catalyst for private sector involvement in the commercial components of the formal seed sector, with the public sector retaining service-related aspects (Addo-Quaye and Djokoto, 2013; GSP, 2013).

In 1991, a task force was formed in MoFA to review the Seeds (Certification and Standards) Regulations Decree of 1972 and make recommendations on rules and regulations pertaining to the seed industry's operations in view of its new, privatized structure. This led to the passage of the Plants and Fertilizer Act, 2010 (Act 803), which makes provisions for plant protection, seeds and fertilizer control. Seed industry studies in 2008 by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) identified the need for a national seed policy. In June 2013, Ghana adopted its National Seed Policy to address inequities in the seed sector. Effective implementation of the National Seed Policy requires a National Seed Plan that translates the policy statements into practical activities to develop the public and private seed sector and industry, in the short, medium, and long term.

In 2015, the National Seed Plan was put in place to create an environment conducive to orderly growth as well as comprehensive and balanced development of the seed industry. Potential actors were encouraged to play their respective roles in Ghana's seed sector. In 2011, the country passed the Biosafety Act 831, which allows the application of biotechnology to food crop production. In 2016, Ghana ratified the ECOWAS Regulations, which harmonize the rules governing quality control, certification and marketing of plant seeds and seedlings in the ECOWAS zone. The Plant Variety Protection Bill, also known as the Plant Breeders Bill, was passed into law in November 2020 (Mabaya et al., 2017).

Regional harmonization of agricultural and seed policies

In May 2008, ministers of ECOWAS countries, of which Ghana is in good standing, approved Regulation C/REG.4/05/2008 on Harmonization of the Rules Governing Quality Control, Certification and Marketing of Plant Seeds and Seedlings in the ECOWAS Region (ECOWAS, 2008). This process began in 1987, when ECOWAS proposed the implementation of ECOWAS Community Foundation Seed Farms in selected member countries, which did not occur due to budgetary constraints. The harmonization protocols were of great help to Ghana in preparing its Seed Law and Regulations and have enhanced seed trade across national borders in the sub-region. The Regulations on Seed Harmonization complement the rules governing quality control, certification and marketing of plant seeds and agricultural plants in member states. The harmonization is intended to ensure good seed quality and determine the origin of seeds of plant species and varieties listed in the West African Catalogue of Plant Species and Varieties, as defined in Article 9 of the Regulation. ECOWAS adopted enabling regulations on the roles, organization and functions of the West Africa Seed Committee in June 2012 (Keyser, 2015), which was created under the ECOWAS Regulations to enforce legislation related to seed quality control, certification and marketing. Ghana has harmonized its seed policies with the seed regulations of ECOWAS (C/Reg.4/05/2008). In West Africa, CORAF has also been a significant partner in regional harmonization efforts and has been tasked with implementing the ECOWAS Regulations.

Legal regulations that support farmer-managed seed systems

The key policies, laws and regulations that govern Ghana's seed industry are the Seed (Certification and Standards) Act of 1972, the Ghana Plants and Fertilizer Act of 2010, the 2012 Plant Protection Regulations, the 2013 Ghana National Seed Policy, the 2015 National Seed Plan, and the 2020 Plant Variety Protection Bill (also known as the Plant Breeders Bill), which was modelled after the UPOV Convention.

Seed (Certification and Standards) Act of 1972 (NRCD100)

Until 1989, the seed industry was regulated by the Seeds (Certification and Standards) Regulations Act of 1972 (NRCD100), which controlled the production, certification, and distribution of seeds in Ghana. The act established the National Seed Committee (NSC) to coordinate and develop the national seed industry and the National Seed Service (NSS) to provide secretarial services to the NSC to aid seed sector growth. The act made provisions for the public control of sale, import and export of seeds of plant varieties (Republic of Ghana, NRDC 100 Seed (Certification and Standards) Act, 1992), replacing the Prevention and Control of Pests and Diseases of Plants Act 1965 (Act 307). Trading seeds without ministerial approval or that did not meet the prescribed standard or were not packaged or labelled in the prescribed manner was criminalized. The Act empowered the Minister for Agriculture to designate qualified persons as seed inspectors to enforce the act, and detailed the penalties that offenders would

face. The resulting strict regulation of international seed imports led to the development of the farmer-based seed system in Ghana. The act was repealed by the Plants and Fertilizer Act, 2010 (No. 803).

Plants and Fertilizer Act of 2010 (No. 803)

The government's new seed program was developed in 1989. The GSC's dissolution led to an increase in the number of certified private seed producers to about 150 in the first year, with an additional 150 certified seed growers producing improved seeds each subsequent year (World Bank, 2012). The passage of the Plants and Fertilizer Act, 2010 (Act 803), which was assented to by the president on September 6, 2010, resulted from the recommendations of the Minister of Agriculture's task force on private sector seed industry rules and regulations (Republic of Ghana, Plants and Fertilizers Act of 2010 (No. 803)). It serves as the Agriculture Law for Ghana. The Plants and Fertilizer Act makes provisions with respect to plant health and protection from pests and diseases, the import and export of plant material, seed production and marketing, seed quality control, and the control of fertilizer manufacture, use and trade. Part Two of the Plants and Fertilizer Act deals with the seed industry, regulating production, inspection, import, export and commercial transactions related to seeds in Ghana as well as the activities of seed growers, cleaners, importers and exporters (Etwire et al., 2013).

The Plants and Fertilizer Act changed the name of the National Seed Committee to the National Seed Council and established two other committees, the National Variety Release and Registration Committee and the Technical and Variety Release Committee. The National Seed Council is responsible for formulating policies for seed development, production, inspection, sampling, analysis, conditioning and marketing; monitoring seed supply to ensure national seed security; developing procedures for the registration of cultivars and prescribing standards for seeds and procedures for seed certification. The National Variety Release and Registration Committee is mandated to create and maintain the national variety list and to give recommendations regarding variety release, removal of varieties from the register and inclusion of crop species. The Technical and Variety Release Committee advises the National Seed Council regarding registration and certification procedures and fees, publishes an annual list of crop varieties grown in Ghana and conducts technical reviews as needed. The committees are composed of representatives of private sector stakeholders in the seed sector and farmers' representatives. Both committees are responsible for recommending crop varieties for approval to the National Seed Council and creating and updating the National Variety Register (Republic of Ghana, 2010).

The Plant Protection and Regulatory Services Directorate was created under MoFA to organize, regulate, implement and coordinate plant protection services needed to support sustainable growth and agricultural development in Ghana (MoFA, 2015). The directorate is divided into four divisions: GSID; Crops, Pests and Diseases Management; Pesticides and Fertilizer Regulatory; and Plant Quarantine. The GSID plays a central role and has responsibility for seed certification, registration of seed growers, dealers, producers and traders, and conducting field inspections. GSID also provides advisory services to seed growers and dealers. It operates the National Seed Testing Laboratory, which performs seed sampling and laboratory quality tests.

Section 31 of the Seed Act prohibited the import, export, production, cleaning or sale of seed in commercial quantities without registration. The act did not preclude any person from registering to produce any class of seed (parental material, pre-basic seed or breeder seed, basic seed or foundation and certified seed). Seed were to be packed and labelled in accordance with the act's provisions. Section 43 of the act stipulated that a new variety may be introduced into the country only after receiving approval from MoFA. A new variety shall be entered into the National Variety Register after appropriate distinctness, uniformity and stability (DUS) and value for cultivation and use (VCU) tests have been

conducted. The act did not consider farmer-produced seed, which is not certified and usually not well-labelled and packaged. It was difficult for the informal seed sector to comply with national DUS and VCU rules.

National Seed Policy, 2013

The government of Ghana has developed policies and projects to stimulate inclusive agribusinesses at the smallholder level, improve productivity and catalyze agricultural industrialization, which will improve national growth. One of the key policies focused on agricultural sector growth and productivity is the Food and Agriculture Sector Policy Framework, the goals of which are aligned with the Growth and Poverty Reduction Strategy and NEPAD's CAADP. Although the Food and Agriculture Sector Policy Framework provided a broad strategic framework that enhanced crop production profitability through access to improved technologies, the formulation and adoption of the National Seed Policy in June 2013 was the first step in the process of addressing the seed industry's major weaknesses and inequities in Ghana.

The National Seed Policy's main objective was to support the development and establishment of a well-coordinated, comprehensive and sustainable private sector-driven seed industry through systematic and strategic approaches, which would create a continuous supply of new improved varieties for farmers' use. It also sought to support successful seed production, certification, marketing and seed security systems, which would underpin food security and support overall development of the agricultural sector (Republic of Ghana, 2013).

The Minister of Food and Agriculture is responsible for overseeing the National Seed Policy's implementation through the Directorate of Crop Services. The policy was disseminated to the general public, notably seed industry stakeholders. Public education and awareness creation took place and specific interventions were implemented. Although the policy did not itself have force of law, it forms the basis of ensuing national legislation, such as the Seed and Plant Protection Laws, plant breeders' rights legislation, and farmers' rights legislation. The policy prioritizes the following crops:

- Cereals: maize, millet, rice, and sorghum
- Legumes: cowpea, groundnut, and soybean
- Roots and tubers: cassava, cocoyam, sweet potato, and yam
- Tree and industrial crops: cashew, coconut, cotton, mango, oil palm, orange, rubber, shea
- Fruits and vegetables: banana, garden egg, okra, onion, papaya, pepper, pineapple, plantain, and tomato

The National Seed Council has the additional responsibility of advising MoFA and the rest of the government on all matters relating to the National Seed Policy and ensuring that legislations and protocols as well as seed industry planning and implementation are followed. A Seed Industry Development Office was added to the NSS to provide direct support, guidance and assistance to any private sector agency or persons interested or participating in any seed industry activities and to gather seed industry intelligence and data required by the seed industry, particularly the private sector.

The National Seed Policy is divided into three parts: Part A establishes the background and justification for the policy, Part B contains the actual seed policy statements and Part C provides guidelines for preparing an implementation plan, the National Seed Plan. The policy statements in Part B introduce an administrative setup for the seed policy and establish the objectives of the seed industry's various components and propose required interventions.

The National Seed Policy aims to enhance support to research institutions for the derivation of new varieties most suited to Ghanaian agroecologies and to ensure that processes of variety testing, release and registration as well as issues of ownership and other rights are adequately addressed as per international norms and standards. The policy aims to create a platform for safe and effective use of biotechnology and genetically modified crops in the national seed industry as a means of rapidly attaining national food security goals. It will ensure that public services are devoted to early class seed production to form a strong foundation for the seed industry and to support the private sector to take responsibility for certified seed class production by assisting with outputs from public sector-mandated agencies.

The policy will boost support to the informal seed sector to integrate it with the formal sector. Some of the informal sector's practices will be systematically upgraded with a view to part of the informal sector eventually evolving into or enhancing the growth of the formal seed sector. The policy seeks to enhance maintenance of high-quality seeds of crop varieties in production, handling and commerce. It aims to ensure that materials emanating from research and eventually proposed for introduction into the seed market as new varieties are sufficiently screened as per stated procedures. The policy also aims to ensure that adequate capacity and resources have been provided to mandated institutions to efficiently and effectively release varieties.

All pertinent stakeholders should be consulted on seed export and import with a view to encouraging the national seed industry to produce seeds in excess of immediate national requirements and to exploit niche markets for international seed export. This will increase foreign exchange earnings and enhance incomes and livelihoods of producers and stakeholders along the seed value chain. Other policy objectives are to minimize over-reliance on imports by encouraging the local seed industry to develop its output potential; to strengthen national seed regulatory bodies to undertake their responsibilities in line with facilitative international seed trade norms and acting within the West African seed trade harmonization protocol; and to encourage the national seed industry to develop new varieties that can compete favorably with imports. The policy also seeks to create an enabling environment for the rapid development of an active and efficient private seed sector. This will include effective collaboration between public and private seed enterprises and agencies, facilitative investment incentive packages and infrastructural development. National seed policy formulation and implementation provides support for the farmer-based seed system to develop to its full capacity.

The National Seed Plan, 2015

The first stage in implementing the National Seed Policy is the conversion of policy statements into a comprehensive National Seed Plan, consisting of methodologies and programs. The National Seed Plan, created in 2015, represents the government's strategy to guide effective and comprehensive implementation of the National Seed Policy (Republic of Ghana, 2015). It is aimed at transforming Ghana's seed industry to attain food security and enhance agricultural productivity. The plan seeks to strengthen the private sector to drive commercialization whilst addressing key institutional and oversight challenges.

Development of the National Seed Plan received financial and technical support from Africa Seeds, the Alliance for a Green Revolution, AU-ASBP, GIZ, the International Fertilizer Development Centre, Seed Producers Association of Ghana, United States Agency for International Development (USAID), and the World Bank. The plan will operationalize the National Seed Policy, resulting in seed sector improvements and an increase in the availability of affordable and quality seeds of superior varieties to farmers.

The National Seed Plan is inspired by two pillars, which are clearly stated in the National Seed Policy:

- Pillar 1: The government of Ghana is committed to delegating responsibility for leadership in the commercial components of the seed industry to the private sector, and facilitating the sector to assume that role expeditiously.
- Pillar 2: Recognizing that several support services, which do not hold immediate prospects for commercialization are nevertheless imperative for the seed industry's overall effective conduct, the government pledges to assume supportive responsibility for such service areas as plant genetic resources management, research and variety development, early generation seed multiplication, seed quality assurance, agricultural extension, seed security and seed production and the supply of important traditional and food security crops, which the private seed industry ignores.

The National Seed Plan aims to progressively increase the national seed supply rate within five years of implementation. It includes the following budgeted interventions to ensure comprehensive, balanced and orderly seed industry development:

- Direct private sector interventions to strengthen the private sector's role in the seed industry, to develop private sector seed marketing and to assist with infrastructure improvements;
- Supportive services for seed industry growth to develop a strong seed value chain for a vibrant seed industry, ensure adequate human resources and strengthen the seed industry's plant genetic resource base;
- Addressing gaps in strategic components of the seed sector to cater for traditional crop seed requirements, implementing the national seed security project and strengthening the informal seed sector; and
- Seed sector governance and coordination to strengthen the National Seed Council Secretariat.

The NSS did not develop as expected, failing to facilitate private sector development in the seed industry. Therefore, the National Seed Plan established a new agency known as the National Seed Industry Association, a non-profit private sector seed development agency, which is an association of seed industry entities, producers and processors. The Association's formation fulfilled a key policy objective of the government to assist in building a credible and viable private seed sector that will constitute the main conduit for national seed delivery of key crops. The NSS also put in place the National Seed Security Project. This will assist in the development of a seed security system by which seed production and supply systems can be quickly restored to maintain the productive capacity of rural populations affected by disasters, so that they are able to recover their livelihoods as soon as possible. Finally, it will enhance the continuous availability of and access to quality seeds under all conditions.

The Plant Variety Protection Bill, 2020

The Plant Variety Protection Bill was passed into law in 2020 to establish a legal framework for the protection of the rights of breeders of new plant varieties. The bill ensures that Ghana complies with the 1991 UPOV Convention to which Ghana is a signatory and conforms with the World Trade Organization's Agreement on Trade and Related Aspects of Intellectual Property Rights. The bill is designed to incentivize development of new varieties to contribute to sustainable national progress in agriculture as well as horticulture, plant medicine, floriculture and forestry.

The bill aims to improve the quality and quantity of food and raw materials for industry at a time when the global food situation is precarious and uncertain. According to the memorandum that accompanied

the law in parliament, “the Plant Variety Protection Bill seeks protection for new plant varieties, which will boost investment in plant breeding, which requires long term funding sources that entrepreneurs often cannot access in the absence of protections”. The bill promotes the development of new varieties adapted to Ghana’s local environment and specific needs that will increase agricultural productivity in the face of scarcity of arable land and other resources. Providing farmers with better seeds will increase yields from the same amount of land, thereby improving productivity and enhancing economic development. Food security can be improved by breeding and distributing seeds of high-yielding varieties that are adaptable to Ghana’s environment and have good taste and nutritional qualities.

The Plant Variety Protection Bill was first introduced in Ghana’s parliament in 2013 as the Plant Breeders Bill, but was later withdrawn following opposition by some civil society groups. Further consultations took place. In 2015, scientists from the Council for Scientific and Industrial Research, West Africa Centre for Crop Improvement and various universities petitioned parliament to pass the bill. Their petition indicated the bill’s importance for combating poverty as farmers desperately need access to improved varieties of staple crops. The petition claimed it was essential for agricultural modernization and to spark a national green revolution. In 2020, the bill was reintroduced in parliament; it was passed into law in November 2020 and was given presidential assent in December 2020. However, the bill is hostile to smallholder farmers and farmer-based seed exchanges and sales systems as it does not allow farmers to sell and exchange seeds from so-called “improved varieties.” It also strengthens the power of global seed companies, commercial breeders and seed producers, as indicated in Section 23 of the bill. The bill undermines biodiversity and food sovereignty as it prevents farmers from developing and distributing seeds that suit their particular environments through the traditional method of continued selection.

Local laws

In Ghana, there are traditional folk laws that are not regularized into national policies or institutions but protect seed systems and agricultural environments. For example in Keta, local laws forbid farmers from building houses in areas reserved for farming. This practice has ensured diversified seed resources and protected farming systems across many generations, thus ensuring improved livelihoods.

Protecting farmer-managed seed systems: current policy gaps

Ghana’s seed policy recognizes the informal seed sector and the community-based seed system. However, all efforts to improve the seed sector focus on the formal seed sector. Project 9 in the National Seed Plan aims to support the informal seed sector to become more useful as a source of quality seeds to the majority of farmers who depend on it, to systematically strengthen linkages with the formal sector and contribute to national seed industry growth. This intervention led to the hybrid seed system, where farmers are supported with foundation seeds and other inputs to multiply and distribute to other farmers in their communities. However, the passing of the Plant Variety Protection Bill constrained farmer-based systems as it banned local farmers from multiplying and distributing improved seeds. The Plants and Fertilizer Act also criminalized the sale of seeds without appropriate labels and packaging, thereby rendering the farmer-based seed exchange and sale system illegal.

Civil society organizations who opposed the Plant Variety Protection Bill unsuccessfully proposed a Farmers’ Bill instead, which would have promoted and protected farmers’ rights, especially in terms of

seed protection. The Farmers' Bill would have been supported by Ghana's status as a signatory to the International Treaty on Plant Genetic Resources for Food and Agriculture, which has enshrined farmers' rights to save, exchange and sell their seed with neighbors and at local markets, participate in national decision-making processes, share the benefits from commercial use of their traditional varieties and protect their traditional knowledge. The passing of the Plant Variety Protection Bill has engendered intense debate in the national seed industry. The National Seed Policy therefore suggests the use of advocacy and education to reduce conflict and avoid possible constraints to seed industry development.

Gender equality in Ghana's agricultural policy

Women play important roles in rural development and agriculture and are involved in all stages of agricultural value chains. Women constitute about 52 percent of the Ghanaian population and 79 percent of women are actively involved in agriculture (Madison, 2020). Women's low status in rural areas, coupled with gender stereotypes and poor gender equality, continues to persist in Ghana.

Despite efforts by the government of Ghana to reduce gender inequalities, there remains a gap between legislation and implementation. The National Agricultural Investment Plan, which is the Medium-Term Agricultural Sector Investment Plan (METASIP) for Ghana, considers three key cross-cutting issues—gender, climate change and nutrition. These agricultural development issues are considered in all agricultural sector programs, projects and activities. To implement METASIP, MoFA established the Women in Agriculture Directorate in 2016 to address poverty and food security and increase incomes and women's empowerment, targeting female farmers in particular. The Women in Agriculture Directorate developed the Gender and Agriculture Development Strategy, which was designed to guide the implementation of the Food and Agriculture Sector Policy Framework and METASIP in ways that promote gender equity, reflecting the contributions of both men and women to agricultural development in Ghana.

Implementation of the 2030 Sustainable Development Agenda in Ghana created more opportunities to address gender inequalities in the agricultural and rural sectors. Ghana's Ministry of Gender, Children and Social Protection has a mandate to spearhead gender equality and women's empowerment, reduce vulnerability and promote social inclusivity through effective mainstreaming of gender in all national development processes, programs, policies and laws. However, activities are constrained by lack of budgetary support from the government, which forces reliance on donor funds to implement programs.

MoFA has developed a resettlement policy framework that protects the interests of women in resettlement cases. Among the challenges faced in implementing this policy is the fact that women are often users of land but not owners, which affects their decision-making power. However, this issue is being addressed in the second phase of the Land Administration Project, which seeks to increase women's ownership of land, as well as their user rights.

Notwithstanding efforts to mainstream gender in agriculture, gender-related bottlenecks remain in the rural sector, where agriculture is the main source of livelihood, employing a majority of women. Although women contribute a lot in the informal sector, men dominate decision-making channels and power in the agricultural sector. Women lack visibility in decision-making processes, because of factors such as domestic responsibilities, socio-cultural inhibitions and poor literacy.

Conclusion

Ghana's seed industry is still developing, and many policies are in place to streamline this development. However, greater effort and investments are required to develop the farmer-based seed system and legalize farmers' activities through recognition of farmers' rights, which are enshrined in the International Treaty on Plant Genetic Resources for Food and Agriculture, of which Ghana is a signatory.

References

- Addo-Quaye, A. and Djokoto, J. (2013). Report on Vegetable Seed Systems and Policy Integrated Agricultural Research Systems for the Humid Tropics: A CGIAR Research Program. December 2013.
- Almekinders, J. M. and Louwaars, N. P. (2008). The importance of the farmers' seed system in a functional national seed sector. *Journal of New Seeds*, 4(2): 15–33. http://dx.doi.org/10.1300/J153v04n01_02
- Cromwell, E., Friis-Hansen, E., Tucker, M. (1992). The Seed Sector in Developing Countries: A Framework for Performing Analysis. Overseas Development Institute, London, England. Working Paper 65. www.odl.org/sites/odi.org.uk/files/odi-assets/publications-opinionfiles/6969.pdf
- ECOWAS (2008). Regulations C/Reg.4/05/2008 on harmonization of the rules governing quality control, certification and marketing of plant seeds and seedlings in the ECOWAS region. <https://gazettes.africa/archive/aa-ecowas/2008/aa-ecowas-official-journal-dated-2008-05-01-vol-53.pdf>
- Etwire, E., Ariyawardana, A. and Mortlock, M.Y. (2016). Seed delivery systems and farm characteristics influencing the improved seed uptake by smallholders in Northern Ghana. *Sustainable Agriculture Research*, 5 (2). <https://ideas.repec.org/a/ags/ccsesa/234991.html>
- Etwire, P. M., Atokple, I. D. K., Buah, S. S., Abdulai, A. L., Karikari, A. S., and Asungre, P. (2013). Analysis of the seed system in Ghana. *International Journal of Advance Agricultural Research*, 1(1), 7–13. <http://www.bluepenjournals.org/ijaar/pdf/2013/March/Etwire%20et%20al.pdf>
- Franzen, H., Ay, P., Begemann, F., Wadsack, J. and Rudat, H. (1996). Variety improvement in the informal sector: Aspects of a new strategy. In: Eyzaguirre, P. and Iwanaga, M. (eds.) *Participatory Plant Breeding. Proceedings of a Workshop on Participatory Plant Breeding 26–29 July 1995, Wageningen, The Netherlands*. IPGRI, Rome, Italy, pp. 19–30.
- Keyser, J. (2013). Regional Trade of Food Staples and Crop Inputs in West Africa. World Bank Group. March 2013.
- Louwaars, N. P. L., and De Boef, W. S. (2012). Integrated seed sector development in Africa: A conceptual framework for creating coherence between practices, programs and policies. *Journal of Crop Improvement*, 26(1): 39–59. <https://doi.org/10.1080/15427528.2011.611277>
- Mabaya, E., Adzivor, S.Y., Wobil, J. and Mugoya, M. (2017). Ghana Brief 2017 - The African Seed Access Index. TASAI: The African Seed Index. https://nastag.org/docx/resources/tasai_brief_2017rev2019_ghana_final_lr.pdf
- Madison, K. (2020). Ghanaian Women and Agriculture. The Organization for World Peace <https://theowp.org/reports/ghanian-women-and-agriculture/>
- Pandey, A., Bisht, I. S., Bhat, K. V., and Mehta, P. S. (2011). Role of informal seed system in promoting landrace diversity and their on-farm conservation: A case study of rice in Indian Himalayas. *Journal of Genetic Resource Crop Evolution*, 58, 1213–1224. <http://dx.doi.org/10.1007/s10722-010-9654-5>
- Republic of Ghana (1972). Seeds (Certification and Standards) Act, 1972. <http://faolex.fao.org/docs/pdf/gha933481.pdf>
- Republic of Ghana (2013). Ghana Seed Policy. <https://www.fao.org/faolex/results/details/fr/c/LEX-FAOC169581/>
- Republic of Ghana (2010). Plants and Fertilizers Act, 2010 (Act 803). <http://faolex.fao.org/docs/pdf/gha168842.pdf>
- Republic of Ghana (2015). National Seed Plan. April 2015. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC170416/>
- World Bank (2012). Agribusiness Indicators: Ghana. Economic and Sector Work. Report number: 68163-GH

Mali

Introduction

Mali is a low-income country with a population growth rate of about 3.6 percent (Centre de développement de l'OCDE, 2016). Its economy is controlled largely by the rural sector where agriculture contributes significantly to national economic stability. The agricultural sector has been a major force in job creation and income generation as well as food security improvement. The agricultural sector contributed approximately 35–39 percent of national GDP during 2006–2010 (INSTAT, 2012).

In Mali, seeds are accessed through formal, intermediate and informal seed systems. The traditional methods of producing, maintaining and exchanging local varieties of seeds among farmers are referred to as the informal seed system. The formal seed system deals with strict and systematic methods of selection, production and the sale of improved seeds as well as certified varieties. It includes the formal public-private system and the formal closed public system. The intermediate seed system describes the community-based seed system. About 80 percent of seeds are produced by small-scale producers from both the informal and formal systems. The informal seed system is classified as a peasant seed system (FAO, 2015). Mali's seed sector faces the following challenges: (i) low levels of certification of seed production for most crops, (ii) low levels of awareness of the importance of using quality seeds, (iii) poor organization, coordination and interaction among different components of the Malian seed value chain and (iv) inadequate enforcement of seed policy and its regulatory framework.

Mali experienced severe drought in 2011, which affected national food security. The political situation destabilized in 2012 and a peace agreement was signed in 2015. Mali achieved the Millennium Development Goal of decreasing its proportion of hungry people by 2015 (FAO, 2017). The government of Mali aims to foster socioeconomic development and improve food security (Coulibaly, 2017). Key policy documents are the Growth and Poverty Reduction Strategic Framework 2012–2017, the Agricultural Orientation Law (2006), the National Food Security Strategy and the Strategic Framework for Economic Recovery and Sustainable Development in Mali 2016–2018.

History of seed policy development

The seed sector in Mali has been in transition for almost two decades. Since gaining independence, the government has developed and implemented different seed systems, moving the seed sector from public sector to private sector domination. In 1960, the Institute of Rural Economy introduced the production of pre-basic and basic seeds and certification, according to Ordinance No. 59 /PG-RM of November 29, 1960. In May 1977, the Selected Seed Production Operation was created to produce, collect, store and distribute selected seeds. In 1991, the National Seed Service (NSS) replaced the Selected Seed Production Operation, taking over coordination of state seed activities following Ordinance No. 91-052/P-CTSP of August 21, 1991.

In 1996, seed production in Mali was transferred from state sector operation (Directorate General for Regulation and Control) to private companies and producer groups with significant support from Rural

Development Operations, according to Law No. 96-055. In 2003, the Seed Sector Support Project (PAFISEM) supported transfer of the seed system from the government to private companies. Different solutions have combined to restructure the national seed system. For example, intervention by private companies, development of participatory research and the empowerment of small-scale producers through the informal seed system have resulted in different distribution channels and techniques.

In 2003, the Seed Association of Mali was established under the aegis of the African Seed Trade Association with seven horticultural seed importers. The Africa Rice Initiative was established for the promotion of NERICA (NERICA: New Rice for Africa) rice varieties. The Agricultural Orientation Law No. 06-045 was passed on September 5, 2006 (République du Mali, 2006) and highlighted the importance of the production, sale, and distribution of certified seeds, which encouraged private investment in seed production. PAFISEM ended in 2009 and new categories of seed cooperative emerged as decentralized cooperatives under the guidance of the NSS and cooperative associations under the aegis of the Association of Professional Farmer Organisations (AOPP) of Mali. Informal seed production in Mali was recognized under national law in Articles 3 and 4 of Law No. 10-032 of July 12, 2010 (République du Mali, 2010, the Law concerning Seeds of Vegetative Origin), which protects the origin of traditional seed varieties (Articles 17, 18 and 19).

The Agricultural Development Policy (Politique de Développement Agricole, 2011–2020), was adopted in 2011. In 2015, the policy was validated based on the CAADP ten-year investment plan and the National Programme for Investment in the Agricultural Sector (PNISA, Programme National d'Investissement dans le Secteur Agricole). PNISA identifies strategic investments in five value chains: inland fisheries, livestock products (both meat and dairy), maize, millet and sorghum, and rice. The President of the Republic of Mali has pledged to support development of seed-related policy since the promulgation of the Agricultural Law.

Regional harmonization of agricultural and seed policies

Mali is a member of different organizations that work together to formulate national and international policies. It is a party to the Convention on Biological Diversity, the Cartagena Protocol on Biosafety and the Nagoya Protocol. Mali is a member of ECOWAS, which has developed a certification guide under a West African Seed Program (WASP)/USAID project for use by approved inspectors and controllers responsible for: (i) conducting field inspections, (ii) controlling batches and (iii) certifying seeds to ensure categorical quality. The Harmonized Seed Regulations of ECOWAS were adopted on May 18, 2008, in Abuja by the Council of Ministers of the ECOWAS community.

Legal regulations that support farmer-managed seed systems

Under the auspices of the President of the Republic of Mali, Decree No. 2019-0756/P-RM establishing the national catalogue of plant species and varieties was enacted on September 30, 2019. The law focuses on a list of seed plant species and varieties that can be produced and marketed in Mali. The final draft of Mali's National Seed Policy was presented in March 2020 by the Ministry of Agriculture. The current agricultural policy advocates participatory management of the agricultural sector, with partnerships

among the state, local communities, farmers' organizations, service providers and the private sector leading to the diversification of agricultural production. The state has withdrawn from production, trade and stewardship activities and transferred its functions to the private sector and farmers' organizations. The seed sub-sector will be moved from centralized management (with a dominant role of the state at all levels including variety development, seed multiplication and extension services) to a participatory partnership consisting of inclusive management of the sub-sector. The National Seed Policy has been developed to help in structuring the different programs to be undertaken by the government such as the PNISA, the Agricultural Development Policy and the upcoming creation of the National Support Fund for Agriculture. These instruments will later be reinforced by implementation of the National Policy on Food and Nutritional Security.

A new seed policy plan aims at sustainable development of the national seed policy sub-sectors by: (i) preparing and adopting legal and regulatory texts to strengthen seed sub-sector governance, (ii) establishment of the National Committee for Seeds and Seedlings, which replaced the National Committee for Seeds of Plant Origin, (iii) development of a national catalog of species and varieties; (iv) professionalization and capacity building of actors in seed production, packaging and distribution, (v) creation of a national network of seed professionals grouped within AOPP and the Seed Association of Mali (ASSEMA), (vi) structuring the peasant seed system and (vii) creation of a multi-stakeholder consultation framework for the protection and recognition of peasant seed systems.

Protecting farmer-managed seed systems: Current policy gaps

Mali's current seed policy focuses more on the formal than the informal seed system. However, Article 51 of the Agricultural Orientation Law (2006) provides for food sovereignty as part of national agricultural development policy. Thus, the State recognizes past, present and future contributions of the peasants of Mali to the conservation, improvement, and provision of the agricultural and food plant genetic resources necessary to achieve food sovereignty. Farmer seed systems will be recognized and supported to enable farmers to maintain, improve and sustainably use plant genetic resources, knowledge and innovations.

Gender equality in Mali's agricultural policy

In 2011, the government passed its National Gender Policy to address issues faced by women when accessing the seed system. The policy states that all women must have access to seed resources for agricultural commodity production nationwide but implementation has been slow and is poorly monitored. The International Crops Research Institute for the Semi-Arid Tropics in Mali has set up several participatory plant breeding projects using the farmer field school approach for women to help in groundnut production. Women's associations have organized to produce seed of vegetable crops, principally onions and shallots. The NSS has expressed an interest in helping these associations finance their seed production activities. The government needs to put in place policies to support the activities of these women seed-producing groups.

Conclusion

Mali's seed sector, which is regulated by the country's National Seed Policy, has good potential to develop since the policy advocates the involvement of all stakeholders in the seed sector with the private sector and farmer organizations leading the production, trade and stewardship activities of seed production. Although the seed policy focuses more on formal than informal seed systems, the farmer seed systems are recognized and supported to enable farmers to maintain, improve and sustainably use plant genetic resources, related knowledge and innovations.

References

- Centre de développement de l'OCDE (2016). Perspectives Économiques en Afrique 2016: Villes Durables et Transformation Structurelle. Banque Africaine de Développement (BAfD), Programme des Nations Unies pour le Développement (PNUD), Éditions de l'OCDE, Paris. https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Perspectives_economiques_en_Afrique_2016_Ebook.pdf
- Coulibaly, M. (2017). Historic new law secures land for Malian farmers. International Institute for Sustainable Development, Winnipeg, Canada. <https://www.iisd.org/articles/insight/historic-new-law-secures-land-malian-farmers>
- Food and Agriculture Organization of the United Nations (FAO) (2015). Guide pour la Formulation d'une Politique Semencière Nationale. <https://www.fao.org/publications/card/fr/c/3dd29ab8-e245-4534-a929-f77b13da6d04/>
- Food and Agriculture Organization of the United Nations (FAO) (2017). Country Fact Sheet on Food and Agriculture Policy Trends-Mali. <https://www.fao.org/publications/card/en/c/6ad88fc2-1803-4cba-a055-43495c2099ce/>
- National Institute of Statistics Mali (INSTAT) (2012). Bulletin et Note de Conjoncture. <https://www.instat-mali.org/fr/publications/bulletin-et-note-de-conjoncture>
- République du Mali (2006). Loi No. 06-045/du 5 septembre 2006 portant L'oi d'Orientation Agricole. <http://www.hubrural.org/Mali-Loi-no06-045-portant-Loi-d.html>
- République du Mali (2010). Décret No. 10-428/P-RM du 9 août 2010 fixant les modalités d'application de la loi relative aux sémences d'origine végétale. <https://mali.eregulations.org/media/DNA%20Decret%20n%2010-428.pdf>

Nigeria

Introduction

The two main seed systems in Nigeria are the formal system, established by the State, and an informal or traditional system. The formal system is characterized by the production and purchase of commercial certified seed while the informal sector is based on seed production and exchange among farmers at the local level. Seeds from these two systems can further be grouped into four types: (i) farmer-saved seed, (ii) public-private seed development, with breeding by National Agriculture Research Institutes and private seed company involvement in certified seed production, (iii) public-led seed development and (iv) private-led seed development, which is dominated by local seed companies. Farmer-saved seed represents a large proportion of the seed available to farmers in Nigeria. It is estimated that only a small percentage of the area under crops is supported by the formal seed system, while the greater percentage is planted with seeds sourced by farmers through informal means such as local farmer-saved seed, open markets and farmer exchange. The formal seed system is able to supply 2 percent, 10 percent, 20 percent and 50 percent of the staple food crops of yam, rice, soybean and maize respectively, while the remaining share is sourced through the informal seed system (Context Network and Sahel Capital, 2016).

Seed policy formulation is key because seeds give the most dramatic and cost-effective return on investment of all yield-enhancing inputs in crop production. Improved seeds have provided 50 percent of Nigeria's agricultural productivity gains. The other 50 percent has come from improvements to management, including timeliness, best use of fertilizer, crop protection measures and equipment (NASCBF, 2019). Nigeria's Agriculture Promotion Policy (2016–2020) highlights the importance of providing a conducive legislative and agricultural knowledge framework for enhancing access to adequate inputs such as seed, as well as institutional mechanisms for seed sector coordination. It also encourages a shift in leadership in the seed industry's commercial aspects to the private sector and highlights the need for a strong government role in the provision of support services important for effective sub-sector development. Currently, Nigeria's aging population of farmers does not have access to a sufficiently wide variety of high-yielding seeds and other related support for successful crop production (Mofinews, 2019).

Despite efforts to raise awareness of the superiority of improved seeds over local seeds, the availability of improved seed varieties to rural farmers remains very poor. Farmers have difficulty obtaining necessary inputs of sufficient quality in a timely manner and pay very high prices (IFDC/IITA/WARDA/FGN, 2000). Current estimates indicate that only 5 to 10 percent of the seeds required to meet total grain production are provided. Farmers in many communities in Nigeria are yet to have access to improved seeds. As a result of these challenges, most seeds planted by farmers come from local sources, including farmers' own crops, neighbors, relatives and local markets. Many improved seed varieties have been in use for between one and two decades, but smallholder farmers have not benefitted much from them (IITA, 2000).

Although Nigeria is well-organized with appropriate structures for effective seed policy implementation, quantities of certified seeds are inadequate, production of breeder and foundation seed is modest, and seed distribution and information dissemination networks are poor. Improved varieties are released slowly, and this enhances the dominance of low-yielding local varieties. Poor implementation of seed quality regulatory mechanisms has allowed adulterated seeds onto the market. Effective seed policy

implementation has reportedly been constrained largely by inadequate human and financial resources, as well as institutional bottlenecks. Requirements for certified seeds far outweigh supply; however, effective demand is less than 10 percent of the total requirement for most crops. Hence, seed policies and programs need to be improved (Kormawa et al., 1992).

History of seed policy development

The seed sub-sector of Nigeria's agricultural economy has undergone different stages of development since the 1960s. The seed industry was part of the mandate of the Nigeria Federal Ministry of Agriculture and Natural Resources (now the Federal Ministry of Agriculture and Rural Development). It was later taken up by the National Seed Service (NSS) in 1975 under the Department of Agriculture. The NSS's mandate was to manage the seed industry, including implementation of seed programs and projects to develop the industry. The NSS provides foundation seeds to agricultural development programs and private seed companies (NSP, 2015). Both the agricultural development programs and the private seed companies produce certified seeds from their own farms or through contract farmers and out-growers. In 2019, following the enactment of Nigeria's National Seeds Council Act (Federal Republic of Nigeria, 2019), the National Agricultural Seed Council (NASC) was established to take over the NSS's functions (NASC, 2019) (the new act repealed the 2004 National Agricultural Seeds Act). Implementation structures within Nigeria's seed sector promote effective performance as they ensure linkages between research institutes and public institutions such as the former NSS and NASC, and provide farmers with alternative sources of certified seeds. Various units of the NASC are described below.

The Crop Variety Registration and Release Committee is responsible for making recommendations to NASC on matters relating to the registration and release of crop varieties and the declaration of a crop variety as a notified kind (Takeshima and Maji 2016). The Seeds Standard Committee is responsible for making recommendations to NASC on matters relating to seed standards and procedures. The Seed Industry and Skills Development Committee is responsible for making recommendations to NASC on seed industry and skill development. The Department of Training, Information and Seed Extension is responsible for training and information dissemination.

Under Decree No. 33 of the National Crop Varieties and Livestock Breeds (Registration, etc.) Act of 1987, the National Crop Varieties and Livestock Breeds Registration and Release Committee was established and a registrar's office was created (Republic of Nigeria, 1987). Implementation of the National Agricultural Seed Decree is coordinated by NASC as the principal institution under the Federal Ministry of Agriculture and Rural Development. NASC is responsible for supporting varietal development, registering and releasing new crop varieties, rapid multiplication of released varieties, promotion of improved quality of seeds sold to farmers for higher yields and better income, and encouraging private sector participation in seed operations through appropriate policies, promotional activities and incentives (Kormawa et al., 1992).

Under the National Seed Policy 2014, NASC is the principal institution responsible for administering and implementing the Federal Government of Nigeria's National Seed Policy (Federal Ministry of Agriculture and Rural Development, Government of Nigeria, 2014). It is responsible for regulating the market to promote competitiveness and quality control to protect farmers and the environment. As a principal coordinator, it plays the lead support role, maintaining public infrastructural and service support required to maintain efficient seed supply, enhances farmer demand for improved seeds, and creates a favorable environment for investment in the seed sub-sector. It is also tasked with facilitating the production and distribution of sufficient quantities of high-quality seed of improved varieties of all relevant crops to farmers in order to ensure production of required food, feed and fiber in Nigeria

(NASCBF, 2019). Nigeria needs seeds that can adapt to stresses and the changing climate and contribute to greater food security and higher income generation.

Regional harmonization of agricultural and seed policies

The government of Nigeria is increasing its focus on creating a legal and regulatory environment that encourages a thriving market for high-quality seed. Efforts to build a legal and regulatory system to govern the seed sector are part of seed policy harmonization interventions, which were initiated in 2018 to address challenges confronting the sector and to significantly impact the availability and accessibility of improved seed within the country (Kuhlmann et al., 2018). Seed harmonization consultations in Nigeria led to the following key recommendations to strengthen Nigeria's seed system and address remaining implementation gaps:

- Incorporate clear references to regional protocols in national legislation as good regulatory practice to facilitate harmonization with ECOWAS's regional seed framework;
- Streamline and increase transparency around regulatory processes along the entire seed value chain. Consultations highlighted possible improvements to variety registration and certification including introduction of clear and consistent procedures and fees;
- Put in place a plant variety protection system to motivate the private sector to more actively engage in developing new and relevant seed varieties for the market. This process is underway but will require additional effort from both government and the private sector;
- Implement national laws and regulations to align with the ECOWAS Seed System, working in close collaboration with stakeholders along the entire seed value chain to ensure the systems are understood and work well in practice;
- Adopt African and global good practices to improve quality and build capacity within the seed sector, including accreditation of private seed inspectors (which Nigeria is moving towards), enhancing the capacity of public laboratories, and considering alternatives to formal seed certification;
- Strengthen enforcement against counterfeit seed, through increased collaboration with private sector stakeholders and adoption of best practices to combat fake seed production;
- Increase regional regulatory collaboration and mutual recognition to enhance cooperation among regulators and improve mutual recognition of each other's procedures and results; and
- Improve knowledge of national and regional seed rules to enhance the ability of diverse stakeholders to benefit from the formal seed system.

The consultations indicated that implementation of the described frameworks remains an ongoing challenge that requires sustained focus and government interventions that evolve over time (Kuhlmann et al., 2018).

Legal regulations that support farmer-managed seed systems

In 2019, some reforms were made to Nigeria's seed policies through the National Agricultural Seeds Council (NASC) Act 2019. The NASC Act 2019 assigns NASC the following key functions:

- Analyze and formulate programs, policies and actions regarding seed development and the seed industry, including research on issues relating to seed testing, registration, release, production, marketing, distribution, certification, quality control, supply and use of seeds in Nigeria, and import and export of seeds;
- Design improved management systems and procedures relating to administration of seed activities;
- Implement official quality control and certification of seeds, and facilitate enrolment of approved private bodies in seed certification programs;
- Advise the Federal Government on the organization, management and financing of seed programs;
- Advise the national research system on the changing pattern of seed demand and farmers' needs;
- Plan, monitor and evaluate the national seed system's achievements and recommend improvements;
- Encourage the establishment of seed companies to research, produce, process and market seed;
- Issue licenses and permits under the Seed Act;
- Approve policies and strategies to protect small seed producers and local varieties and promote quality seed production;
- Regulate the national seed industry;
- Represent Nigeria and work closely with the West African Committee on Seeds to develop the seed sector.

Other key amendments in the NASC Act 2019 are expected to bring positive changes to national seed policy development. These include a reduction in the length of time spent on processing seed policy documents. For instance, under the new act, the process of registering and licensing a new seed company will be digitized to reduce processing time from 45 to 15 days. Processing annual license renewals will reduce from 14 to 5 days. This will lessen the bureaucratic challenges that have disrupted stakeholder operations in the Nigerian seed industry, especially for non-traditional seed producers. A projected increase in market inspection activities by 80 percent per region by 2024 and NASC's responsibility as the sole certifier of foundation and breeder seed will reduce the volume of adulterated seeds used by farmers. Setting up demonstration farms in rural communities is an innovation that will increase farmers' access to first-hand information on improved crop seed, which will help to achieve a 40 percent increase in improved seed use (NASC, 2019). The introduction of diversified income-generating services, through which NASC must raise up to 15 percent of its budgetary allocation, will make NASC more financially independent.

The introduction of private seed certification entities (PSCEs) into the national seed value chain will improve the seed industry. NASC will ensure that PSCEs include individuals (women- and youth-inclusive) and companies. The power given to NASC to license PSCEs for third-party seed certification from 2020–2021 may have enhanced adherence to strict seed certification protocols at local levels by promoting the use of improved seeds among farmers (NASC, 2019). The PSCEs are expected to fulfil the following roles:

- Retrieve and update lists of seed companies in focus regions: PSCEs will retrieve names and contact information from NASC of seed companies in their operating region and monitor the emergence of new seed companies in their region. This will ensure that all seeds produced across focus regions are certified.
- Inspect fields: All PSCEs will be required to have working tablet devices for data collection and reporting during field inspections using seed tracker technology.
- Generate revenue through certification fees: PSCE revenue will be generated from certification fees collected from seed companies. PSCEs' internal performance will be measured by the number of companies certified. Given current operational costs incurred by NASC to certify seed companies and the revenue generated from seed companies, NASC will develop a sustainable business model for PSCEs to ensure their profitability.
- Report to NASC: PSCEs will report on all activities electronically using the seed tracker system enabled through tablet devices. The seed tracker platform will be designed to allow oversight by NASC seed certification and quality control teams

The decentralized monitoring system devised by NASC and implemented through PSCEs will enable NASC to reach a greater proportion of individuals in the seed value chain. However, breeder and foundation seed certification remains the responsibility of NASC's certification officers (Oba, 2020). With proper coordination, PSCE empowerment will contribute significantly to reducing uncertified private seed producers' activities, thereby safeguarding farmers against the purchase or use of unapproved and likely unreliable seeds.

Collaborative programs in Nigeria's seed sector

The Collaborative Seed Programme (CSP) between Nigeria and the Netherlands started in 2021 and is financed by the Ministry of Foreign Affairs of the Netherlands. It is designed to address the challenges involved in supplying quality seeds to boost Nigeria's seed industry. The program ensures that only high-performing and well-adapted varieties enter the seed sector and become available for multiplication and marketing to farmers for food production. The collaboration also focuses on possible strategies to address delays in varietal release – this currently takes 42 to 55 months – ensuring timely release of new varieties in a cost-effective manner with fewer adverse effects on seed company operations. CSP's interventions will help to increase private sector involvement in seed development, which currently accounts for about 9 percent of total seed release in Nigeria. The CSP focuses on documenting and making available quality seeds for the improvement of four staple crops (cassava, maize, rice and tomato), as well as ensuring effective and efficient crop registration and variety release that will transform the national seed industry (CSP, 2022).

The CSP undertook a comprehensive review of the national seed sector, using a multi-stakeholder approach to develop a National Seed Road Map. The road map provides strategy and policies to guide all seed sector stakeholders in working towards increasing farmers' access to and use of quality seed of improved varieties. It will also contribute to government development of major seed policies and advise other stakeholders and development partners how to foster the requisite development of the seed sector in a well-structured and coordinated manner. The road map has been endorsed by all major seed sector stakeholders in Nigeria. It was originally developed for all crops at the national level but has since focused on Kaduna, Kano and Plateau states (Thijssen, 2019). The CSP also focuses on processes involved in seed sector transformation through stakeholder engagement to understand the current

context and help shape a vision for the seed sector. Issues affecting stakeholders in the seed sector will be prioritized.

The Seed Alert is a results-oriented activity designed to identify current challenges and outline urgent actions needed in the seed sector, based on surveys and focus group discussions with various stakeholders. Due to government measures to reduce the spread of COVID-19, researchers were unable to visit and evaluate variety performance trials and the National Crop Varieties and Livestock Breeds Registration and Release Committee was unable to hold its meeting. This meant that new varieties could not be approved or released in the short term. Research institutes could not start producing early generation seed of some varieties; consequently, seed companies and seed producers cannot include these in their portfolios nor promote promising new varieties. As a result, during the COVID-19 pandemic farmers were not able to access more productive varieties with desirable traits such as early maturity and resistance to pests and diseases. COVID-19 impacted negatively on all activities relating to timely varietal release such as appropriate stakeholder involvement. Other activities tailored to help transform the seed sector and ensure the availability and use of quality seeds by farmers at all levels were also affected (Seed Alert, 2020).

Protecting farmer-managed seed systems: Current policy gaps

Unlike many countries in West Africa, the private sector has played a vital role in the transition and growth of Nigeria's seed industry (Access to Seeds, 2019). Supply from local seed producers remains a major source of seed in Nigeria. The National Seed Policy contains a provision allowing farmers the right to use, exchange and share or sell their farm-saved seeds among themselves without restrictions. This is a great step in ensuring the preservation of good genetic material that has been conventionally selected by farmers at local levels over several decades. Such seeds have been found to be area-specific and better adapted to the climatic conditions under which they were selected. They are a very good source of planting material that can guarantee food security under adverse climatic conditions. Also, local seed producers help to supply seeds for crops that are not in mainstream seed production programs (Federal Ministry of Agriculture and Rural Development, 2014). Farmers' rights are under the National Seed Policy (2014) and have given local farmer groups the impetus to improve community-based seed production. Increasingly, this seed system is becoming the focus of technical and financial partners looking to enhance the availability of quality seeds to farmers across West and Central Africa, including in Nigeria. This semi-formal system of seed production makes farmer- and market-preferred seed varieties available to farming communities (Vabi et al., 2018).

Gender equality in Nigeria's agricultural policy

In Nigeria, smallholder women farmers play a crucial role in all aspects of agriculture including keeping seed banks. Smallholder farmers produce 98 percent of the food consumed in Nigeria, and 50 percent of this is produced by women farmers. However, due to cultural and religious beliefs, women are denied access to many agricultural inputs such as seeds, which would help their agricultural businesses become more successful (Jimoh, 2020). Nigeria's agricultural policy seeks to promote the adoption of gender-sensitive and responsive approaches in the agricultural sector by ensuring that men and women have equal access to, and control of, productive resources. When well implemented, such policies

will guarantee gender inclusivity at all levels of agricultural production, ensuring that women are not prevented from accessing quality seed. When women have access to farm inputs and markets and can make decisions on agricultural production, the likelihood of increasing productivity is very high (CGIAR, 2019). Hence, implementation of gender equality policies in agriculture is expected to contribute to achieving gender equity in access to agricultural inputs, including quality seeds.

Conclusion

Nigeria's seed sector is well-organized with appropriate structures and policies for effective sector development. These structures and policies can provide a level playing field for all stakeholders, encourage private sector investment in the seed sector and ensure institutional support to develop new improved varieties and achieve seed sector growth. However, it is noteworthy that Nigeria's seed industry did not dramatically improve following the National Seed Policy and the enabling Agricultural Seed Decree No. 72 of 1992. The various bodies involved in implementing Nigeria's National Seed Policy have not performed creditably. Effective seed policy implementation by relevant bodies has been constrained by inadequate human and financial resources, as well as institutional problems. Although Nigeria's private seed industry is viable, its comparatively low profitability is a major limitation (Nigerian Economic Summit Group-Federal Ministry of Agriculture and Rural Development, 2019). Currently NASC, the main institution spearheading seed policies and activities on behalf of the Federal Government of Nigeria, receives limited and inefficient funding. Therefore, it is unable to completely implement the seed projects and activities proposed for each fiscal year. This greatly affects its supervisory role in conducting field inspections to curtail sales of adulterated seeds and ensure that only quality seeds are available to farmers for planting. It is expected that by 2024, NASC will be positioned as the key convener of the seed industry, leading to dramatic improvements in the adoption of quality seeds by Nigerian farmers and resultant increased crop yields (NASC, 2019).

References

- Access to Seeds (2019). Access to seeds index (2019): Nigeria. <https://www.accesstoseeds.org/index/western-central-africa/country-profile/nigeria/>
- CGIAR (2019). A new gender policy on agriculture in Nigeria. <https://www.cgiar.org/annual-report/performance-report-2019/gender-policy-on-agriculture-in-nigeria/>
- Collaborative Seed Programme (CSP) (2022). Baseline assessment of the crop variety release and registration system in Nigeria, phase I. <https://csp-nigeria.org/2022/03/03/baseline-assessment-phase-i/>
- Context Network and Sahel Capital (2016). Nigeria early generation seed study country report. <https://sahelconsult.com/wp-content/uploads/2019/07/Nigeria-EGS-Study-Final-Report-August-2016.pdf>
- Federal Ministry of Agriculture and Rural Development, Government of Nigeria (2014). National seed policy. [https://www.seedportal.org.ng/admin/media/documents/Seed%20Policy%20\(2014\).pdf](https://www.seedportal.org.ng/admin/media/documents/Seed%20Policy%20(2014).pdf)
- Federal Republic of Nigeria (1987). National Crop Varieties and Livestock Breeds (Registration, etc.) Act, 1987, No. 33. <http://lawsofnigeria.placng.org/view2.php?sn=291>
- Federal Republic of Nigeria (2019). National Agricultural Seeds Council Act, 2019. <https://seedcouncil.gov.ng/uploads/2020/07/Official-Gazette-No.-142B-NASC-Act-2019.pdf>
- IITA (2000). 2000 Annual report. www.iita.org/iitadocument/annual-report-2000/%3Ca%20href=
- Jimoh, A. G. (2020). The impact of women farmers in Nigeria agriculture. Blueprint, Nigeria. <https://www.blueprint.ng/the-impact-of-women-farmers-in-nigerian-agric/>
- Kormawa, P., Okorji, E., and Okechukwu, R. (1992). Assessment of Seed Sub Sector Policy in Nigeria. International Institute of Tropical Agriculture, Ibadan, Nigeria. http://www.hubrural.org/IMG/pdf/nigeria_seed_sector_policy_analysis.pdf
- Kuhlmann, K., Zhou, Y., Naggayi, N.A. and Lui, H. (2018). Seed Policy Harmonization in ECOWAS: The Case of Nigeria. Syngenta Foundation for Sustainable Agriculture. https://www.syngentaoundation.org/sites/g/files/kgtney976/files/document/sites/g/files/zhg576/f/seed_policy_harmonization_in_ecowas_the_case_of_nigeria_2019.pdf
- Mofinews (2019). Agricultural Promotion Policy (2016–2020) and Rural Development in Nigeria (APPRDN). <https://mof.cr.gov.ng/agriculture-promotion-policy-2-2016-2020-and-rural-development-in-nigeria/>
- National Agricultural Seed Council (NASC) (2019). National agricultural seed council (NASC) strategic plan 2020–2024. <https://seedcouncil.gov.ng/wp-content/uploads/2020/02/Five-Year-Strategic-Plan-2020-2024.pdf>
- Nigerian Economic Summit Group–Federal Ministry of Agriculture and Rural Development.
- National Agricultural Seed Council Bill Factbook (2019). <https://agra.org/wp-content/uploads/2019/12/National-Agricultural-Seeds-Council-Bill-Factbook.pdf>
- Oba, J. (2020). NASC and digitalisation of Nigeria's seed sector. <https://www.blueprint.ng/nasc-and-digitalisation-of-nigerias-seed-sector/>
- Seed Alert (2020). COVID-19 CRISIS – Mobility restrictions and lockdown disrupt the processes involved in the evaluation and release of new varieties. Wageningen Centre for Development Innovation, National Agricultural Seeds Council, and Sahel Consulting, June 2020 (date 25 June 2020). <https://cspnigeria.files.wordpress.com/2021/01/covid-19-seed-alert-nigeria-02-june.pdf#>
- Takeshima, H. and Maji, A. (2016). Varietal development and the effectiveness of seed sector policies: The case of rice in Nigeria. IFPRI, Washington DC, USA. <https://www.ifpri.org/publication/variatal-development-and-effectiveness-seed-sector-policies-case-rice-nigeria>
- Tijssen, M. (2019). Nigeria Seed Sector Review. Wageningen University and Research, Wageningen, The Netherlands. https://issdafrica.files.wordpress.com/2020/02/seed-sector-review-nigeria-assessment-report_final.pdf
- Vabi, M.B., Ojo, P., Zidafamor, E., Ajeigbe, H.A., and Ubanduma, H. (2018). Community Based Seed Production System (CBSP) in Nigeria: An Opening for Complementing National Supply of Quality Seeds. ICRIAT, Hyderabad. Policy Brief 34. <http://oar.icrisat.org/10902/>

EAST AFRICA

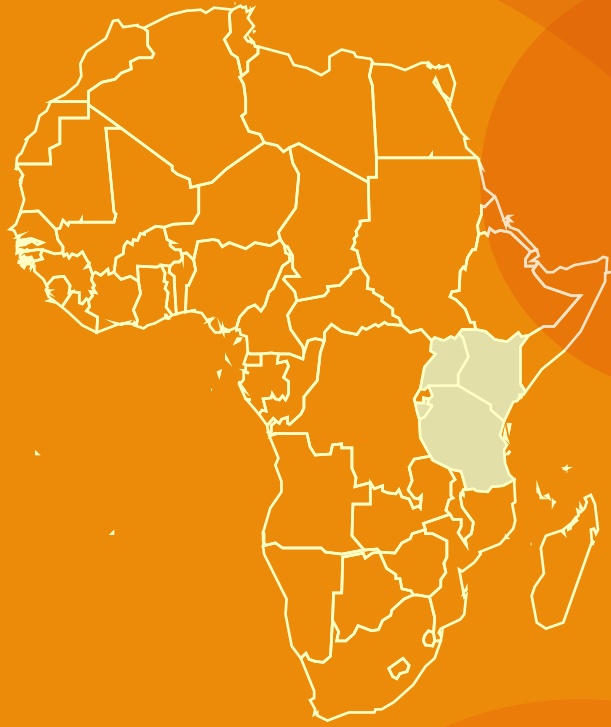


Photo 2. Community seed banks give easy access to farmer- and (farmer) improved varieties.
The community seed bank of Hoima, Uganda. Credit: Bioversity International/R. Vernooy

EAST AFRICA

List of Acronyms and Abbreviations

AFFA	Agriculture, Fisheries, and Food Authority (Kenya)
ASA	Agricultural Seed Agency (Tanzania)
ASDP II	Agricultural Sector Development Programme Phase II (Tanzania)
ATC	Agricultural Training Centre
CECM	County Executive Committee Member
CNS	Commission Nationale Semencière (National Seed Sector Commission) (Burundi)
COMESA	Common Market for Eastern and Southern Africa
COPROSEBU	Collectif des Compagnies et Coopératives de Production des Semences du Burundi (Burundi Collective of Seed Production Businesses and Cooperatives)
DUS	Distinctiveness, Uniformity, and Stability
EAC	East African Community
FAO	Food and Agriculture Organization of the United Nations
GI	Geographical Indication
GOK	Government of Kenya
ISABU	L'Institut des Sciences Agronomiques du Burundi (Institute of Agronomic Sciences)
ISSD	Integrated Seed Sector Development
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
LSB	Local Seed Business
MAAIF	Ministry of Agriculture, Animal Industrial and Fisheries
NAFCO	National Agriculture and Food Corporation (Tanzania)
NARCO	National Ranching Company Limited (Tanzania)
NDPIII	Third National Development Plan (Uganda)
NSC	National Seed Council (Burundi)
NSCS	National Seed Certification Services
ONCCS	Office National de Contrôle et de Certification des Semences (National Office of Seed Control and Certification) (Burundi)
PVP	Plant Variety Protection
QDS	Quality Declared Seed

SADC	Southern African Development Community
SPVA	Seeds and Plant Varieties Act
SRA	Strategy for Revitalization of Agriculture
TANSEED	Tanzania Seed Company
TASAI	The African Seed Access Index
TOSCA	Tanzania Official Seed Certification Agency
TOSCI	Tanzania Official Seed Certification Institute
UPOV	International Union for the Protection of New Plant Varieties
USAID	U.S. Agency for International Development

Burundi

Joyce Adokorach

Introduction

In Burundi, the agricultural sector plays a vital role in the national economy, contributing 90 percent of Gross National Product. It is a major source of employment and engages more than 90 percent of the rural labor force. The main rationale of agricultural policy in Burundi as expressed in the National Agricultural Strategic Plan 2018–2027 is to increase agricultural productivity to alleviate hunger and poverty, and develop the sector's resilience to climate change.

Traditional seed supply systems prevail, delivering more than 90 percent of total seed supply. The informal seed supply arrangements in use in traditional agricultural sectors are based on seed saving, purchase from local markets, and sharing with neighbors and other communities. These same sources are used when seeds are consumed during famine or lost due to pests, diseases, and natural disasters. Although private companies are encouraged to invest in the agricultural sector in order to increase capacity in variety research and development, and to produce a sufficient quantity of high-quality seeds, there is limited private sector participation in seed sector development.

L'Institut des Sciences Agronomiques du Burundi (ISABU; the Institute of Agronomic Sciences) is the principal national agricultural research institute under the Ministry of Agriculture and Livestock of Burundi. Its mission is to promote the scientific development of agriculture and livestock. ISABU's role is to provide and deliver agricultural technologies and innovations, knowledge, and information through diverse research programs and components. It has participated in national seed policymaking, is strategically positioned, and has the necessary expertise to guide both public and private initiatives to change seed sector standards and the regulatory framework. ISABU has experience in implementing national, regional, and international projects that involve extension, policy, innovation, dissemination, and marketing initiatives (<https://isabu.bi/>).

The National Seed Council (NSC) was created after enactment of the Seed Act in 1999. NSC retains a semblance of its responsibilities and continues limited operations. Rather than develop strategies and plan for seed industry development, its main responsibility appears to be distributing seed produced by ISABU. The formal seed system is disorganized; there are no specialized seed centers producing basic and commercial seeds and ISABU cannot meet national seed demands. The seed production control program, started in 2007 by ISABU, uses transitional seed standards provided by the East African Community (EAC) for quality control in the field and International Seed Trade Association rules for laboratory testing. NSC has been tasked with playing a more important role in national seed sector development and involving more actors to support the seed sector. Its development of a National Seed Plan is being supported by a Belgian Technical Cooperation project in Burundi.

Seed legislation and regulation

Development of the seed sector was initiated in 1985, but since then expansion of the industry has been limited. The draft national seed program was elaborated in 1987 but has never been fully operational. The first decree on seed production and trade was disseminated in 1993 and draft seed legislation was prepared and disseminated in the form of Decree No. 01/032, which was signed in the same year. The decree No. 01/32 emphasizes four main components: development of a national catalog of crops and varieties; provisions on production, importation, and commercialization of certified seeds; development of a seed control and certification system; and identification of each partner's roles in the seed chain.

In 1999, the Ministry of Agriculture and Livestock signed a series of ordinances to apply measures of the decree above (No. 01/32): Ordinance Nos. 710/500 and 710/501 were enacted on August 25, 1999, regarding the establishment of the National Seed Service, and the composition and function of the National Seed Council, respectively.

However, it has been difficult to implement these measures due to government instability and civil war. The National Seed Service, also called the Department of Promotion of Seeds and Plants, which is responsible for implementation of the Seed Act, has not succeeded in reorganizing the seed sector (Baramburiye, 2010). In this chaotic seed production and distribution context, international and non-governmental organizations active in the country started to play key roles by distributing emergency seed to vulnerable people and directly to farmers' associations. Some of this seed was used for seed production, mostly for direct consumption.

The national seed policy framework

Law No. 01/08 of April 23, 2012, governs seed sector organization (Republic of Burundi, 2012). It establishes the key institutions and outlines the processes for various seed services through decrees and ordinances (Mabaya et al., 2021), including the following:

- Decree No. 100/251 of 24 September 2012 on the creation, organization, and functioning of the Commission Nationale Semencière (CNS; the National Seed Sector Commission). The CNS is under the authority of the Minister of Agriculture and Livestock and is the highest-ranking advisory body for the general supervision, regulation, and coordination of seed company activities in Burundi.
- Ordinance No. 770/183 of February 19, 2015, sets up the accreditation system for seed certification (MINEAGRIE, 2015). It formalizes the delegation of officers conducting field inspections, seed sampling, including the labeling and sealing of packages, and seed testing.
- Ordinance No. 710/450 of April 4, 2016, on the seed certification system (MINEAGRIE, 2016a) regulates the certification of crop varieties.
- Ordinance No. 710/449 of April 4, 2016, on the inclusion of species and varieties in Burundi's National Variety Catalog (MINEAGRIE, 2016b) determines the conditions for registration of species and plant varieties in the National Catalog.
- Ordinance No. 710/339 of March 9, 2016, establishes criteria for approval of certified seed producers (MINEAGRIE, 2016c).

- The National Seed Plan (MINEAGRIE/CTB, 2009) was set out to strengthen seed sector coordination, production of improved seed by the public and private sectors, and involvement of the private sector in seed marketing. It is currently being updated.

The seed sector was reorganized following the peace agreement between the government and rebel groups in 2008. At present, there is apparent security in the country and people can move safely in rural areas for business and fieldwork. With technical and financial support from Belgian Technical Cooperation, seed legislation has been developed and is under promulgation in parliament. The seed regulations and seed standards have been revised; the national Seed Production Services and Certification Services are now two separate legal entities and are being institutionalized. The seed chain is composed of some public seed centers, but mostly private seed growers and small-scale seed farmer organizations. It is becoming better organized, but faces challenges such as a lack of proper seed storage facilities.

The National Seed Policy will soon be published. Regulations have been revised, taking into account the standards of EAC members, and are currently being disseminated. This should lead to the application of procedures for regional variety testing and registration. Many NGOs and development agencies, including an International Fund for Agricultural Development (IFAD)-sponsored initiative, PRODEFI, are engaged in projects to improve national agricultural production. NGOs have been working with farmers' associations to strengthen seed systems. In programs for seed production, storage, and marketing of beans, NGOs have been involved in seed multiplication and distribution, and postharvest improvement, and are gradually reducing farmers' dependency on seed aid interventions (Odihambo, 2020).

More recently, the Dutch government supported the Integrated Seed Sector Development (ISSD) Burundi project (2014–2018) to develop a national private sector-led seed industry. This was followed by the Private Seed Sector Development project (2018–2022), which aims to double the production and incomes of 108,000 farmer households in Burundi. ISSD Burundi achieved an increase in the number of private seed producers from 250 to over 800 (<https://www.kit.nl/project/private-seed-sector-development-burundi/>).

According to Ngendabanka et al. (2015), community seed banks in the Kirundo province are recognized as registered associations and are supported through the provincial investment plan for the agriculture sector. We could not obtain more recent information about community seed banks in the country.

Quality and enforcement of seed regulations

In Burundi, seed regulations give structure to the formal seed sector. An assessment by The African Seed Access Index (Mabaya et al., 2021) considered various seed regulations including support for seed sector growth, stakeholders' roles in design and implementation, stakeholders' awareness of laws and regulations, the presence of an enforcement agency, regulation costs, and the effectiveness of punitive measures. The study revealed stakeholders to be generally satisfied with the quality of current seed laws, ordinances, and decrees, rating them as "good" (70 percent satisfaction). However, producers were less satisfied with enforcement of ordinances and decrees, rating this as "fair" (55 percent satisfaction). The Office National de Contrôle et de Certification des Semences (ONCCS; the National Office of Seed Control and Certification), which is mandated to enforce seed laws, is constrained by limited funding and a lack of qualified personnel to fulfil required functions, including seed inspection.

Implementing regional regulations

Burundi is a member of both the EAC and the Common Market for Eastern and Southern Africa (COMESA). Both regional blocs are harmonizing seed regulations, but the COMESA process is more developed. The COMESA Seed Trade Harmonized Regulations were approved in 2014 (COMESA, 2014). Burundi's Ordinance No. 710/450 of April 4, 2016 on the national seed certification system was harmonized in line with COMESA's Seed Trade Regulations. One of the main benefits of implementing COMESA's Seed Trade Regulations is that it allows members access to improved varieties from across the COMESA region. According to the regulations, if a variety has been released in at least two COMESA member states, then it can be traded within the entire COMESA region without undergoing further tests. The EAC is currently finalizing an EAC Seed Bill and corresponding EAC Seed Regulations. The bill was referred to the EAC Sectoral Council of Legal and Judicial Affairs by the 38th EAC Council of Ministers in May 2019 for review. Thereafter, it will be forwarded to the East African Legislative Assembly—the EAC parliament—to be debated and passed into law.

Efforts to eradicate counterfeit seed

According to the TASAI report (Mabaya et al., 2021), counterfeit seed (also known as fake seed) threatens the seed sector in two important ways. First, it reduces farmers' confidence in certified seed due to cases in which farmers unknowingly plant inferior quality grain that has been incorrectly labeled as certified seed. Second, it threatens the success of efforts to increase the adoption of improved varieties because farmers are not sure what seed is genuine. TASAI tracks the number of cases of counterfeit seed reported by seed companies and the government and asks seed producers to report their level of satisfaction with government efforts to eliminate counterfeit seed. According to seed producers, the main sources of counterfeit seed are agrodealers who repackage seed in used bags, and some seed producers who deliberately mix seed with grain. On average, seed producers were not satisfied with the government's efforts to stamp out counterfeit seed, rating the efforts as "fair" (50 percent satisfaction).

The ONCCS is mandated to conduct seed inspections and to monitor the quality of seed available on the market, but the agency lacks sufficient funds to conduct these activities and does not have a system for tracking counterfeit seed reports. It does not have its own seed laboratory, but instead uses a laboratory owned by Ministère de l'Environnement, de l'Agriculture et de l'Élevage (MINEAGRIE; the Ministry of Environment, Agriculture and Animal Husbandry). This inhibits the ONCCS's ability to test seed. However, the seed regulations outline measures to address this challenge. Ordinance No. 710/339 of 4 April 2016 requires that all seed producers obtain a license before engaging in seed production. This is intended to guard against unqualified actors producing seed and to ensure that the government has a record of all registered seed producers, who can then easily be tracked. Articles 43 to 46 of the Seed Law No. 1/08 of 23 April 2012 stipulate the penalties for operating outside of the law and regulations. These penalties include fines of USD 50 for producing seed without ONCCS registration, and between USD 100 and 250 for importing seed without authorization, among other penalties. These penalties are too low to act as effective deterrents.

Institutional support

According to TASAI (Mabaya et al., 2021), well-functioning national seed trade associations play a key role in representing the industry's interests and engaging with the government. National seed associations' membership includes seed companies, seed cooperatives, seed associations, individual seed producers, and at times agrodealers. The Collectif des Compagnies et Coopératives de Production des Semences du Burundi (COPROSEBU; the Collective of Seed Production Businesses and Cooperatives of Burundi) is the national association of seed producers in Burundi. COPROSEBU was established in 2009 by 30 founding members and is registered with the Ministry of Interior as a not-for-profit organization. COPROSEBU is recognized by the MINEAGRIE and has registered a notable increase in membership, from 70 members in 2017 to 236 in 2020, all of whom are seed producers. This increase was largely attributed to COPROSEBU's increased activity at the provincial level, which improved the association's visibility among seed producers. However, only 27 of 42 seed producers interviewed in 2018 as part of the TASAI survey were association members. Of the 15 non-members, 7 were not aware of the association. All members must be registered with the ONCCS and are required to pay a monthly membership fee of BIF 10,000 (USD 5). COPROSEBU formulated and passed its constitution and internal rules of conduct in 2015. These instruments are operational and provide guidelines for the association's governance.

In 2020, COPROSEBU reached several important milestones. First, offices to coordinate activities were set up in each of Burundi's 17 provinces. Second, COPROSEBU finalized a strategic plan for the period 2021–2027 to guide its activities. Third, it established a local private seed company, Setraco. This company focuses on hybrid maize varieties; it produced 66 Mt of seed in 2019–2020 and released four new hybrid varieties. However, members have raised a number of challenges including undemocratic elections, inadequate managerial ability, and an inability to raise funds, all of which were rated between 51 and 55 percent in terms of satisfaction. The overall performance of COPROSEBU ranks relatively low compared to other seed trade associations in Africa. The TASAI report (Mabaya et al., 2021) recommends that COPROSEBU addresses the concerns raised by its members to ensure better institutional support.

Service to smallholder farmers

Seed inspection services ensure that certified commercial seed meets regulatory quality standards. To provide adequate inspection services requires a sufficient number of well-resourced inspectors. The TASAI study (Mabaya et al., 2021) tracked the number of inspectors and other information pertinent to their effectiveness, such as resource availability and the use of (new) digital tools. Public seed inspectors in Burundi are employed by the ONCCS and increased in number from seven in 2018 to nine in 2020. In addition, the ONCCS trained and accredited 22 private seed inspectors in 2018, with the intention that these inspectors would complement the work of public inspectors. In 2019, the accredited private inspectors conducted seed inspection in 27 percent of the total seed area; this increased to 34 percent in 2020. In comparison, the area inspected by official public inspectors decreased from 73 percent in 2019 to 66 percent in 2020. ONCCS does not own a laboratory to conduct seed tests and analysis; it currently uses a small seed laboratory owned by the Department of Plants and Seeds under MINEAGRIE. To be effective in conducting seed tests and analysis on a full-time basis, the ONCCS needs its own laboratory.

Conclusion

Burundi's seed sector laws largely address the formal sector, with farmers having limited choice regarding the type of seed that they receive. Recent projects, such as ISSD Burundi, have provided technical support to strengthen the private seed sector through a process of capacity building and based on conformity with formal seed sector regulations, with some success. The farmer-managed seed system—where seed is produced, maintained, and distributed through informal networks with over 90 percent of market share—is not adequately addressed and supported.

References

- Baramburiye, J. (2010). Baseline seed study for Burundi. Harmonization of seed policies, laws and regulations. AFSTA. <https://www.afsta.org/wp-content/uploads/2022/10/BURINDI-SEED-SECTOR-BASELINE-STUDY.pdf>
- Ministère de l'Environnement, de l'Agriculture et de l'Élevage (MINEAGRIE) (2015). Ordonnance No 770/183 du 09/02/2015. Portant Système d'Accréditation en Matière de Certification des Semences au Burundi.
- Ministère de l'Environnement, de l'Agriculture et de l'Élevage (MINEAGRIE) (2016a). Ordonnance No 710/450 du 04/04/ 2016. Portant Système de Certification des Semences au Burundi
- Ministère de l'Environnement, de l'Agriculture et de l'Élevage (MINEAGRIE) (2016b). Ordonnance No 710/449 du 04/04/ 2016. Relative à L'Inscription au Catalogue Nationale des Espèces et des Variétés Cultivées au Burundi
- Ministère de l'Environnement, de l'Agriculture et de l'Élevage (MINEAGRIE) (2016c). Ordonnance No 710/339 du 04/04/ 2016. Fixant les Critères d'Agrément d'un Producteur des Semences Certifiées
- Ministère de l'Environnement, de l'Agriculture et de l'Élevage/Coopération Technique Belge (MINEAGRIE/CTB) (2009). Plan National Semencier du Burundi. Document Finale. Ministère de l'Environnement, de l'Agriculture et de l'Élevage/Coopération Technique Belge
- Ngendabanka, C., Niyonkuru, G., D'Hooghe, L., Marx, T. (2015) Burundi: Community seed banks and 827 the Welthungerhilfe programme in Kirundo. In Vernooy, R., Shrestha, P., Sthapit, B. (eds). Community seed banks: Origins, evolution and prospects. Earthscan, Oxon. 176 -181.
- Odihambo, W. (2020) Understanding the beans seed system of Burundi: Evolution, Current status and future prospect. ISSD Africa. Not published.
- Private Seed Sector Development (PSSD). (2020) Private Seed Sector Development. Rapport Annuel 2020. International fertilizer Development Centre, Muscle Shoals, USA
- République du Burundi (2012a). Decret N° 100-251 du 24 Septembre 2012. Portant création, missions, composition et fonctionnement de la Commission Nationale Semencière
- République du Burundi (2012b). Loi N° 1/08 du 23 Avril 2012 Portant Organisation du Secteur Semencier. https://bi.chm-cbd.net/sites/bi/files/2019-10/loi%20n%C2%B01_8_du%2023_avril_2012-organi-sect-semenc.pdf

Kenya

Anna Marwa and Dominic Kimani

Introduction

Seed is a key input in agricultural production. Good quality seed contributes significantly to farm productivity and food security. Kenya has formal and informal seed systems. However, it is estimated that the bulk (78%) of the seeds used by Kenyan farmers comes from informal seed sources. One exception to this scenario is hybrid maize seed, of which 85 percent is sourced from formal seed sources (Ayieko and Tschirley, 2006).

Since Kenya's independence from Britain in December 1963, the seed sector in Kenya has undergone numerous legislation and policy changes. These include: the 1965 Sessional Paper No. 10 on African Socialism and its Implications to Planning in Kenya (GOK, 1965), the 1972 Seeds and Plant Varieties Act (1972 SPVA), Sessional Paper No. 4 of 1981 on National Food Policy (GOK, 1981), Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth (GOK, 1986), the Strategy for Revitalization of Agriculture (SRA) "with a view to transforming agriculture into a more competitive and commercial sector" (GOK, 2004), and the 2010 Agricultural Sector Development Strategy (GOK, 2010), among others. Despite the informal seed system being the dominant player in Kenya's seed sector, most of these policies, laws, and regulations since independence place greater emphasis on the formal seed system.

In the last three years, very few new policies, laws, or regulations affecting the seed sector have been developed in Kenya. However, past and current national-level policies, laws, regulations, and Treaties discussed in this review include:

- UPOV 1991
- Environmental Management and Co-ordination Regulations (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing), 2006
- The Constitution 2010
- The National Seed Policy, 2010
- The Seeds and Plant Varieties (Amendment) Act, 2011
- Kenya Plant Health Inspectorate Service Act, 2011
- The Crops Act, 2013
- The Agriculture, Fisheries and Food Authority (AFFA) Act, 2013
- COMESA-ACTESA Seed Trade Harmonization Regulations, 2014
- The Seeds and Plant Varieties (Amendment) Act, 2015
- Traditional Knowledge and Cultural Expressions Act, 2016
- The Seed and Plant Varieties (Variety Evaluation and Release) Regulations, 2016
- International Treaty on Plant Genetic Resources for Food

- East African Community (EAC) Seed and Plant Varieties Bill, 2018
- The Crops (Irish potato) regulations, 2019
- Seed and plant varieties (Plant Breeder's Rights) Draft Regulations, 2021
- Seed and plant varieties (Forest Tree seeds) Draft Regulations, 2021

Summary of seed-related laws and regulations and their impact on farmer seed systems

The Environmental Management and Co-ordination – which includes the Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing, Regulations – excludes seed exchange from its control. Part 3(c) in particular states that these regulations shall not apply to “the exchange of genetic resources, their derivative products, or the intangible components associated with them, carried out by members of any local Kenyan community amongst themselves and for their own consumption.” Therefore, Part 3(c) recognizes seed exchange as a cultural practice and as a livelihood means for local communities. This should form the basis of the informal seed system, but in practice it does not. These Regulations are in contradiction with other national legislation, which proclaims that it is even a crime to exchange seed, as we explain below. Overall, there is an unfavorable legal environment impeding farmers’ freedom to exchange, share, or even sell farm-saved seeds.

Section 9 of the Seed and Plant Varieties (Amendment) Act, 2011 states that farmers commit an offence for sharing, exchanging and selling unindexed (unregistered), uncertified seeds without a seed merchant license. Seed exchange can result in a fine of up to one million shillings, or a term of imprisonment not exceeding two years, or both. This means that the informal seed system and its associated practice of seed exchange and sharing is criminalized in Kenya despite its immense contribution to supplying diverse seeds. Kenyan law only allows farmers to save their own seeds for their own use and, where they save varieties with Plant Breeders’ Rights, they are expected to pay royalties when they sell the produce derived from those seeds.

This is stipulated under the Crops Act, 2013 section 6(1)(a), which states that the Agriculture, Fisheries and Food Authority (established under the Agriculture, Fisheries and Food Authority Act, 2013) on behalf of the national government, shall be responsible for licensing and charging of levies and breeder royalties on all scheduled crops on condition that the total sum of the levies charged by the Authority shall not exceed ten percent of the gate value of the produce.

Thus, farmers’ rights to save, sell, exchange, or share seeds are limited, despite Kenya being a signatory to the Food and Agriculture Organization of the United Nations (FAO) International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and notwithstanding the recognition by the Kenyan constitution that local communities own, maintain, and use indigenous seeds and associated traditional knowledge. This is clearly indicated in article 11(3)(b) under culture and protection of indigenous seeds and associated traditional knowledge intellectual property rights, as stipulated under article 69(1)(c) and €.

The above provisions in the constitution led to the amendment of the Seed and Plant Varieties Act in 2015 that created the Plant Genetic Resources Research Centre. Section 27(2) of the Act outlines the Centre’s functions. Among these, and of importance to the informal seed system, is the function that mandates to “protect the ownership of indigenous seeds and plant varieties, their genetic and diverse characteristics, associated indigenous knowledge and its use by the communities of Kenya.”

Furthermore, the Traditional Knowledge and Cultural Expressions Act, 2016 was also enacted as a requirement of the 2010 constitution. The Act did not include genetic resources and only dealt with traditional knowledge. This lack of attention to the connection between genetic resources (in a material sense) and the associated knowledge weakened the informal seed system. Seed sharing and exchange, which is a cultural practice, was subjected to other legislations that basically meant they were to be under the Seed and Plant Varieties Act. Thus, farmers did not receive any recognition and support for their seed management practices.

Various regulations were also made under the Seed and Plant Varieties Act in 2016, but of interest is the Seed and Plant Varieties (Variety Evaluation and Release) Regulations, 2016 that provided some room for exemption on National Performance Trials and the strict DUS (distinctiveness, uniformity, and stability) rules for variety performance evaluation and registration of farmers' varieties. Exemptions can be given if a farmers' variety has high importance for national food security or other national interests.

The Kenya Plant Health Inspectorate Service Act, 2011 created the Kenyan institution that registers and protects varieties in line with UPOV 1991, to which Kenya is a signatory. It only requires the person to have discovered or bred the variety as stipulated in the Seed and Plant Varieties Act. This greatly increases the risk of biopiracy further weakening the informal seed sector that predominantly uses the farmers' varieties without any member of the community applying for exclusive rights.

Kenya is also a member of the Common Market for East and Southern Africa (COMESA) and EAC, which are geared towards liberalizing seed trade, among other things. Under COMESA there are the Seed Trade Harmonization Regulations, 2014 (COMESA-ACTESA, 2014) that provide procedures to ease seed registration and business in member countries. The regulations do consider or include the informal seed system enhance the formal seed system.

Lastly, the Seed Policy, 2010 identifies both the informal and formal seed systems in Kenya. It recognizes that the former contributes the highest percentage of seeds produced, exchanged and sold compared to the formal seed system. However, the interventions highlighted for the seed sector are skewed towards favoring the formal seed system, with focus on new variety development and research. Some areas in the informal seed system, including quality assurance and research, remain unsupported.

Recent seed regulations (2019–2022)

The Crops (Irish Potato) Regulations, 2019

These regulations were made under section 40 of the Crops Act, 2013. The main objective of the regulations was to guide the promotion, development, and regulation of production and trade in Irish potatoes. The objective should be achieved through:

- Registering growers, grower associations, agrodealers, and Irish potato collection centers
- Registering processors, warehouses, importers, and exporters of Irish potatoes
- Quality assurance and marketing of Irish potatoes
- Establishing and enforcing standards in grading, sampling, and inspection, tests and analysis, specifications, units of measurement, code of practice and packaging, preservation, conservation, and transportation of crops to ensure health and proper trading
- Packaging and sale of Irish potatoes
- Promoting best practices in the Irish potato sub-sector

As explained earlier, this will be one of the major crops that farmers will be forced to pay royalties on and the County governments – due to the value chain approaches suggested under the Crops Act, 2013 – will support the formal seed system by supplying seeds and collecting levies. In the principal Act, which anchors these regulations, there is no mention of supporting farmers to improve the quality of their seeds despite them supplying a higher percentage of seeds compared to certified potato seeds.

Seeds and Plant Varieties (Plant Breeders' Rights) draft regulations, 2021

"The purpose of these Regulations is to give effect to the provisions of the Act to promote the development of new plant varieties through granting of plants breeders' rights of and owners of varieties; to protect against unfair exploitation of varieties." The Act referred to in these regulations is the Seed and Plant Varieties Act, 2021, which supports the formal seed system. Thus, the Regulations are designed to safeguard plant breeders' interests by strengthening plant breeders' rights with no focus on farmers' varieties and farmers' rights, the latter not fitting within these regulations.

The only window that is provided under part VI of the Act on the exception of plant breeders' rights provides for the use of protected varieties for private use and for non-commercial purposes. This means that farmers are free to save the seeds for their own use with the intention of producing food for their families without using them for income generation. However, section 30(2), sets further limitations to this, where it states that "The Director shall gazette a list of agricultural crops and vegetables whose varieties have been improved, protected and with historical practice of saving seeds and maximum land sizes, where small scale farmers will not need permission of the breeder to use farm saved seeds as determined by the Plant Breeders' Rights Committee."

The Seeds and Plant Varieties (Forest Tree Seeds) draft regulations, 2021

"These Regulations shall apply to all forest and agroforestry tree seeds produced for commercial, conservation and restoration purposes." These regulations are also made under Seed and Plant Varieties Act. Seeds for most forest and agroforestry trees are supplied by the informal seed system.

With these regulations, how the seeds were collected, multiplied, shared, exchanged, and sold, is changed. The activities are now controlled to a greater extent by the State; even so, farmers' activities concerning these seeds/seedlings are now criminalized. All actors are required to register as legal entities (seed collectors, seed stockists [bulking seeds], seed merchants) and failure to comply will result in a fine. These regulations therefore continue to shrink the space of the informal seed systems and set high-level requirements for seed exchange and sale, which can hardly be met by farmers, including the requirement to register as legal entities.

County/local government legislations and their impact on farmer seed systems

According to the Kenyan constitution, agriculture is a devolved function. The national government develops policies in agriculture that are adapted over time by county governments. The county governments are also at liberty to legislate agriculture to address specific needs for their population.

However, in most cases the Crops and AFFA Acts of 2013 (GOK, 2013) guide the counties in formulating their laws, which are in support of the formal seed system and require farmers to pay royalties and levies on scheduled crops. This comprises crops identified as of economic value. Therefore, the legislations that are highlighted in this section will not have a positive impact on the informal seed systems, even if they include seed-related activities.

Migori County Agricultural Training Centre (ATC) Act, 2020

This is an Act of the County Assembly of Migori to provide for the growth and development of Agriculture in Migori, to improve productivity and production, upgrade quality and competitiveness, facilitate efficient management through establishment of a revolving fund to finance approved programs and projects in the institution to maximize on the provision of service, as well as to generate County revenue to enhance its growth. There is no consideration of gender and equity in this policy.

The major actors in this Act are: the County Executive Committee Member (CECM) in charge of Agriculture; Migori County; County Assembly of Migori; and the farmers. Actual/expected benefits for the farmers include:

- Developing a Miyare farmers' training center to be used by farmers for increased knowledge skills and positive attitude towards agriculture
- Establishing a fund to support demonstration farms for the farmers
- Providing a legal framework to facilitate farmers and stakeholders training in Migori County
- Providing facilities for adaptive on-farm county trials on relevant agricultural technologies
- Serving as a bulking center for plant materials, livestock, and fish fingerlings for farmers
- Providing incubation for viable agri-business for stakeholders

The Nyamira County Crop Agriculture Act, 2019

This is an Act of the County Assembly of Nyamira to establish the efficient legal and institutional framework for the development and regulation of crop agriculture and for connected and incidental purposes. The law does not address gender and equity.

The driving actor is the County Assembly of Nyamira, CECM Agriculture. Actual/expected benefits for farmers:

- Provide a comprehensive, harmonized, efficient, and effective legal and regulatory framework for development and regulation of crop agriculture in Nyamira County.
- Develop and establish an efficient institutional framework for the development and regulation of crop agriculture.
- Develop efficient, effective, harmonized, and market-friendly policies and regulations for crop agriculture.
- Provide for the review of regulations, permits, licenses, and other administrative or bureaucratic requirements governing crop agriculture with a view to ensuring achievement of the overriding objective of this Act.
- Promote the production, development, and marketing of scheduled crops.
- Establish experimental stations and seed farms and bulking sites for the development of varieties suitable to the agroclimatic conditions of the area and markets that will provide greatest value added to scheduled crops.
- Provide incentives to growers through credit assistance, affordable farm inputs, technical and infrastructural support, and post-harvest facilities and technologies.

Regional seed laws and their impact on farmer seed systems

Under discussion is the EAC Seed and Plant Varieties draft Bill. Its particulars are also aimed at promoting seed trade thus enhancing the formal seed system. It is geared towards standardizing seed registration, certification and commercialization to create a bigger market in seven partner states, namely, Burundi, Democratic Republic of Congo, Kenya, Rwanda, Southern Sudan, Tanzania, and Uganda.

Similar to the Kenyan seed and Plant Varieties Act, the focus of this draft EAC Bill is on the breeder who is defined to have bred, or discovered and developed a variety. This locks out farmers' varieties, which comprises most of the informal seed system. This means there is a possibility of biopiracy. A person can steal farmers' varieties when there is mention of discovery as a prerequisite for variety registration.

Lastly, once the Bill is passed, the vital practice of sharing, exchange, and sale of seeds in the informal seed system will be illegal in the seven partner states. Plant breeders' rights are also prioritized and no mention of farmers' – who are the key drivers in the informal seed system – rights is made. This shows that the proposed EAC seed law only supports the formal seed system with no interest in (recognizing and supporting the) informal seed system. Even the exceptions of plant breeders' rights, cited below, which appears farmer friendly, only applies to breeders' varieties and excludes farmers' varieties:

“Notwithstanding Section 35, for the list of agricultural crops and vegetables with a historical common practice of farmers saving seed, the breeder's right shall not extend to a farmer and to the product of the harvest of a farmer who, within reasonable limits and subject to the safeguarding of the legitimate interests of the holder of the breeder's right, for propagating purposes, plants on own holdings, the protected variety or a variety covered by Section 34 (4)(a) or (b).”

Conclusions

The legislations and policies discussed in this study show that many reforms have occurred in Kenya's seed systems, primarily aimed at enhancing the formal seed sector. It is evident that the government of Kenya and key stakeholders in the formal seed system have been leading these efforts towards reforming the seed systems. The impact of these reforms on the informal seed system has largely been negative. The enactment of a new Constitution in 2010, which devolved agricultural functions to the counties, has created an impetus for the development of new laws, which are in tandem with the needs of specific counties, but that are still skewed towards the formal seed system.

The reforms in legislations and policies at local, national, and regional levels in the seed sector have widened the playing field to accommodate various commercial players in the seed sector. However, this is at the expense of the informal seed system, which, notwithstanding, continues to account for the highest percentage of Kenya's seed supply. Initiatives such as regional integration and increased inter-country trade have also given more space to the commercial seed sector.

In East African countries, the plant breeders' rights exception under the Plant Breeder's Rights Act, is implemented in different ways. In most countries, farmers are allowed to sell produce from saved seeds, but in Kenya it is not allowed. The Seeds and Plant Varieties (Plant Breeder's Rights) Draft Regulations, 2021, limits farmers to commercializing crops produced with farm-saved seed.

This review concludes that there is unfavorable legal environment for the informal seed system in Kenya.

Hence, more reforms that fully recognize and provide for the extensive role of the informal seed systems in Kenya are needed. Efforts to review the Seed Policy, 2010, with the involvement of many stakeholders, were started in 2019, but the process was halted by the COVID-19 pandemic. This review confirms the need to ensure more support for the informal seed system through the collaborative research and funding usually accorded to the formal seed system.

References and sources

- Ayieko, M. W. and Tschirley, D. L. (2006). Enhancing Access and Utilization of Quality Seed for improved food security in Kenya. Tegemeo Institute of Agricultural Policy and Development, Nairobi, Kenya. Working Paper No. 27/2006. https://www.tegemeo.org/images/_tegemeo_institute/downloads/publications/working_papers/wp27.pdf
- COMESA-ACTESA. (2014). COMESA Seed Trade Harmonization Regulations. COMESA-ACTESA, Lusaka, Zambia. <https://www.aatf-africa.org/wp-content/uploads/2021/02/COMESA-Seed-Trade-Harmonisation-Regulations-English.pdf>
- County Government of Nyamira (2019). The Nyamira County Crop Agriculture Act. <https://devolutionhub.or.ke/resource/nyamira-county-crop-agriculture-bill-2019->
- County Government of Migori (2020). The Migori County Agricultural Training Centre (ATC) Act
- East African Community (2018). East African Community Seed and Plant Varieties Bill (2018)
- Food and Agricultural Organization of the United Nations [no date]. International Treaty on Plant Genetic Resources for Food and Agriculture. Available online: <https://www.fao.org/plant-treaty/en/>
- Government of Kenya (1965). Sessional Paper No. 10 of 1965 on African Socialism and its Implication on Planning in Kenya. <http://www.treasury.gov.za/coopbank/publications/Kenya%20document.pdf>
- Government of Kenya (1972). Seeds and Plant Varieties Act. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC037547/>
- Government of Kenya (1981). Sessional Paper No. 4 of 1981 on National Food Policy: <https://repository.kippira.or.ke/bitstream/handle/123456789/2301/Sessional%20Paper%20No%204%20of%201981%20on%20National%20Food%20policy.pdf?sequence=1&isAllowed=y>
- Government of Kenya (1986). Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth. <https://repository.kippira.or.ke/handle/123456789/2679>
- Government of Kenya (2004). Strategy for Revitalisation of Agriculture. <http://www.worldcat.org/oclc/123362592>
- Government of Kenya (2006). Environmental Management and Co-ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, (2006). https://www.nema.go.ke/images/Docs/Regulations/Biodiversitybenefitsharingregulations_1.pdf
- Government of Kenya (2010). Agricultural Sector Development Strategy. https://www.gafspfund.org/sites/default/files/inline-files/5.%20Kenya_strategy.pdf
- Government of Kenya (2010). Constitution 2010. <https://faolex.fao.org/docs/pdf/ken127322.pdf>
- Government of Kenya (2010). National Seed Policy. <http://repository.kippira.or.ke/handle/123456789/1102>
- Government of Kenya (2011). Kenya Plant Health Inspectorate Service Act, (2011). <https://infotradekenya.go.ke/media/Kenya%20Plant%20Health%20Inspectorate%20Service%20Act2012.pdf>
- Government of Kenya (2011). The Seeds and Plant Varieties (Amendment) Act, (2011). <https://www.aripo.org/wp-content/uploads/2018/12/theseedandplantvariety2012.pdf>
- Government of Kenya (2013). Agriculture, Fisheries and Food Authority (AFFA) Act, (2013). <https://fpeak.org/wp-content/uploads/2019/07/Agriculture-Fisheries-and-Food-Authority-Act-No.-13-of-2013.pdf>

- Government of Kenya (2013). The Crops Act, (2013). https://infotradekenya.go.ke/media/CropsAct2013No16of2013_1.PDF
- Government of Kenya (2015). The Seeds and Plant Varieties (Amendment) Act, (2015). http://www.parliament.go.ke/sites/default/files/2017-05/seed_and_plant_varieties_bill_2015.pdf
- Government of Kenya (2016). Seed and Plant Varieties (Variety Evaluation and Release) Regulations, (2016)
- Government of Kenya (2016). Traditional Knowledge and Cultural Expressions Act, (2016). <https://www.wipo.int/wipolex/en/legislation/details/16294>
- Government of Kenya (2019). The Crops (Irish potato) regulations, (2019). [https://npck.org/Books/THECROPS\(IRISHPOTATO\)REGULATIONS2019.pdf](https://npck.org/Books/THECROPS(IRISHPOTATO)REGULATIONS2019.pdf)
- Government of Kenya (2021). Seed and plant varieties (Forest Tree seeds) Draft Regulations, (2021). https://www.kephis.org/images/bills/DRAFT_SEEDS_AND_PLANT_VARIETIES_FOREST_TREE_SEEDS_REGULATIONS_2021.pdf
- Government of Kenya (2021). Seed and plant varieties (Plant Breeder's Rights) Draft Regulations, (2021). https://www.kephis.org/images/bills/Reviewed_draft_Plant_Breeders_Rights_Regulations_2021.pdf

Tanzania

Anna Marwa and Dominic Kimani

Introduction

The agricultural sector has played an important role as a key driver of economic growth in Tanzania since independence. Sixty-five percent of the population depends on agriculture either directly or indirectly. The sector contributes about 28 percent of national GDP and 24 percent of total exports and ensures national food security (United Republic of Tanzania Ministry of Finance and Planning, 2021). Agriculture has been identified as integral to economic transformation that will allow Tanzania to become a middle-income country by 2025 (Tanzania Planning Commission, 2016).

Seeds are a source of food and plant life and play other significant roles such as offering employment for seed producers, diversification of consumption, increasing income through exchange and productivity, and spreading risk, especially when varieties of different origins are used. Seed is the foundation of agriculture; without seed there can be no agriculture, hence no food for humans or domesticated animals. There are two types of seed system in Tanzania that farmers depend on for their seed supply. Seed supply for agriculture is derived from both the formal and informal (also known as farmer-managed) seed systems; 90 percent originates from the farmer-managed seed system while 10 percent stems from the formal seed sector (Tanzania Planning Commission, 2016). The formal sector operates by producing improved varieties of seed—86 percent of which is maize seed—and selling it to farmers (IDLO, 2012). The much more widely adopted practice is the farmer-managed seed system. In this system, farmers are the main seed producers and distribute seeds through local processes of saving, sharing, exchanging and selling. These four functions are recognized as farmers' traditional rights with respect to seed.

Brief history of national seed policy development

Before 1973, the nature of production and seed use in Tanzania was based on the agricultural commons. Two farming systems were encouraged during this time, namely communal farming through Ujamaa villages and state farms under the National Agriculture and Food Corporation (NAFCO) and the National Ranching Company Limited (NARCO). The formal seed sector was established in the 1970s with the support of the U.S. Agency for International Development (USAID). Tanzania was offered seed multiplication aid totaling around USD 14.507 million from 1970 to 1982, with a view to producing foundation seed on a large scale to be used by both large and small-scale farmers. In 1973, the Government of Tanzania legislated the Seeds (Regulations of Standards) Act No. 29. The purpose of this legislation was to control seed quality. Its enactment was simultaneous with establishment of the Tanzania Seed Company (TANSEED) Limited, which was given a mandate to oversee production, processing and marketing of certified seeds. In 1976, Seed Regulations were formulated in order to enforce the Seeds Act (1973). This established the Tanzania Official Seed Certification Agency (TOSCA) as the sole body mandated to undertake regulatory enforcement of the seed industry with regard to seed certification and quality assurance. At the same time, the Ministry of Agriculture declared that it

would provide coordination and monitoring of the seed production in the country through its National Seed Committee (United Republic of Tanzania, 1979a).

In the 1980s, Tanzania consented to the conditions of Structural Adjustment Programs and adopted neoliberalism as a guiding ideology. This led to enactment of the Seeds Act No. 18 (2003) and Seed Regulations (2007). The Seeds Act (2003) repealed the Seeds (Regulations of Standards) Act (1973) to provide an institutional framework for national control and regulation of agricultural seed standards. Tanzania enacted a Plant Protection Act in 1997 (United Republic of Tanzania, 1997b) and the Protection of New Plant Varieties (Plant Breeders' Rights) Act in 2002. This was viewed as an attempt to fulfil international obligations, particularly Article 27.3.b of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which obligates member states to legislate to enhance plant protection whether by patent or by a sui generis Plant Variety Protection program. To some extent, the 2002 Protection of New Plant Varieties (Plant Breeders' Rights) Act considered interests of smallholder farmers. However, it was later repealed and replaced by the 2012 Plant Breeders' Rights Act, which harmonizes with the International Union for the Protection of New Plant Varieties (UPOV) Convention 1991 to which the country acceded in 2015. The adoption of UPOV model law has been an issue of contention regarding smallholder farmers' rights to save, sell and reuse seeds.

Regulating Farmer-Managed Seed Systems under international instruments

Tanzania is a member of the international community and has signed and ratified several international instruments that are relevant to protecting smallholder farmers. Tanzania acceded to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) on April 30, 2004. This is a legally binding instrument that was adopted by the Food and Agriculture Organization of the United Nations (FAO) on November 3, 2001; it entered into force on June 29, 2004 (FAO, no date). The treaty calls for the protection of farmers' traditional knowledge, ensuring that they participate in decision-making processes, and allowing them to share the benefits of genetic resources. Article 9 of the ITPGRFA recognizes farmers' and other local communities' contribution to conserving and developing plant genetic resources and gives governments responsibility to protect and promote such rights. The ITPGRFA requires contracting parties to ensure farmers' rights to save, use, exchange and sell farm-saved seeds and propagating materials.

Regional harmonization of legal frameworks in the seed sector

Tanzania is a member of two regional blocs, the East African Community and the Southern African Development Community (SADC). Tanzania was a member of the Common Market for Eastern and Southern Africa (COMESA) from 1994 until it withdrew its membership in 2000. Countries in these blocs have different national legal systems for seeds that must be harmonized to create common national standards and regulatory procedures.

Unlike neighboring Kenya and Uganda, Tanzania is no longer a member of COMESA but is a member of SADC. In 2008, SADC adopted the Technical Agreements on Harmonization of Seed Regulations in the SADC Region, which cover seed variety release, seed certification and quality assurance, and quarantine

and phytosanitary measures for seeds. The agreements do not oblige members to harmonize national legislation with regional decisions (Mkonda and He, 2018).

Description of regulations that impact Farmer Seed Systems in Tanzania

Tanzania is designated as having a strong legal framework for the regulation of seed variety release, seed certification, and quarantine and phytosanitary measures. The legal regime is comprised of the Seeds Act (2003) together with the Seeds Regulations (2007), the Plant Protection Act (1997) together with the Plant Protection Regulations (1998), and the Protection of New Plant Varieties (Plant Breeders' Rights) Act No. 22 (2002).

National Agriculture Policy (2013)

Tanzania has no specific seed policy. Although some guidelines were formulated for regulating the seed sector, namely the Seed Policy and Implementation Guidelines (1994), these were not developed into a comprehensive policy. In the absence of a specific seed policy, the National Agriculture Policy (2013) provides general guidelines related to seeds in Tanzania. This policy has a neoliberal orientation. For example, it laments challenges in the seed sector such as inadequate knowledge of intellectual property rights, low levels of participation by local and foreign parties in seed production and breeding, and limited private sector involvement in the multiplication of breeder and foundation seed that would enable a more ample supply of improved seeds (ASARECA/KIT, 2014). Various stakeholders from different backgrounds, such as those who support strict seed sector regulation (seed capitalists) and those who advocate for farmers' seed rights, have unsuccessfully lobbied the Government of Tanzania for a specific seed policy. The Seeds Act No. 18 (2003) and a 2013 amendment that is under revision focus on commercial farmers, but have created space for smallholder farmers to produce and market quality declared seed. The Act is otherwise silent on farmers' rights to use, exchange and sell farm-saved seed (Mahop et al., 2015).

The Seeds Act (2003) introduced a new class of seed known as quality declared seed (QDS), which farmers and seed cooperatives can produce, label and sell. This is based on the QDS concept developed by the FAO. It provides opportunities for small-scale seed production and local sale, and therefore improves farmers' access to seed at local levels. Under this scheme, local seed businesses, cooperatives and farmer groups can produce QDS under guidelines developed by the FAO. This accepted set of guidelines on standards and procedures for seed production has been taken up in Tanzania owing to stringent national seed regulations. The National Agriculture Policy (2013) supports farmers to purchase improved inputs in order to encourage their use. The Seeds Act (2003) recognizes and encourages QDS production and empowers the Minister of Agriculture to set rules and procedures for QDS certification and control. Section 10 of the Act established the Tanzania Official Seed Certification Institute (TOSCI) and its functions under the Ministry of Agriculture. TOSCI is responsible for certifying and promoting quality agricultural seed produced or imported into the country for sale.

The QDS system was also introduced to solve problems of seed availability and affordability faced by small-scale farmers. It allows small-scale farmers to produce seed (from no more than five acres of plants) on their own farms, declare the quality of their own seed, and sell to nearby farmers within an administrative area known as a ward or district. TOSCI may periodically inspect these farmers, but the

total amount of seed inspected does not exceed 10 percent of the harvested amount. The system has been operational since 2000 and was legalized by the Seeds Act (2003). The Seeds (Control of Quality Declared Seeds) Regulations (2020) define QDS dealers, producers and growers as any small-scale farmer or group of small-scale farmers producing or processing seed for their own use or for sale to neighboring farmers within the district where the QDS is produced. The regulations restrict production to the village and district and define eligible land size and inspection standards. The model improves accessibility to varieties for climate change adaptation and increases access to diverse seeds.

The Seeds Act (2003) has both positive and negative impacts on smallholder farmer seed systems. Among the proposed amendments are stricter control of formal seed sector quality and some modification of QDS regulations regarding production and marketing. There seems to be no intention to exempt smallholder seed producers from strict seed production regulations, in particular concerning farmer varieties that have not been registered at the national level.

Plant Breeders' Rights Act (2012)

Tanzania enacted a new Plant Breeders' Rights Act in 2012, which is in harmony with UPOV 1991 to which the country acceded in 2015. Currently, both the Seeds Act (2003) and the Seeds Regulations (2007) are under review to accommodate related legislation, such as the Plant Breeders' Rights Act (2012), regional and international agreements, and the legal and institutional framework of Tanzania's seed industry. The main purpose of the Plant Breeders' Rights Act (2012) is to provide for the protection of new plant varieties to promote plant breeding activities that will stimulate, facilitate and improve national agricultural research. This will be achieved through granting and regulating plant breeders' rights and establishing a plant breeders' rights registry. The Act came into force on June 1, 2013, and replaces the Protection of New Plant Varieties (Plant Breeders' Rights) Act (2002). However, the regulations, decisions, rules and directions under the 2002 Act remain intact and all decisions made under it are still binding. This represents a bizarre scenario where regulations used to implement the law precede the law itself. The Plant Breeders' Rights Act (2012) safeguards seed saving only for personal use, thus limiting other rights of farmers to share, exchange and sell improved seeds.

Rationale of policy changes and driving forces behind changes

The government launched the National Seed Industry Development Program in 1989, which conformed with the World Economic Reform agenda, emphasizing a move from a state-controlled economy to a free market economy. Private seed companies were allowed to operate in the country. Since the mid-eighties, the Tanzanian economy has undergone gradual fundamental transformation that has redefined the role of the government and the private sector. In this new environment, most production, processing and marketing functions have been assigned to the private sector while the government has retained regulatory and public support functions. These macro changes have had and continue to have a profound impact on the agricultural sector in which agricultural input and output prices have been decontrolled, subsidies removed and cooperative and marketing board monopolies eliminated.

Current policy gaps in the protection of farmer-managed seed systems

The national regulatory framework mainly regulates the formal seed sector, imposing limits on its operations. Government policy and legislation have strongly favored the formal seed sector, which serves only a small minority of Tanzanian farmers. Two particular policy instruments, the Seeds Act (2003) and the Plant Breeders' Rights Act (2012), function to increase commercial producers' control over seed varieties by criminalizing seed sales and strengthening intellectual property rights. These policy instruments were developed to create a favorable environment for private sector investment; the legislation makes no exemptions for farmer-managed seed systems. It erodes farmers' core rights to share, exchange and sell seeds.

Farmers' seed sovereignty is threatened by changes to national legislation. Adoption of the Plant Breeders Rights Act (2012), which complies with the UPOV, was designed to protect the interests and intellectual property rights of large-scale commercial seed companies. These companies are keen to penetrate the African market with hybrid and genetically-modified seeds and are supported by leading governments under the G8 New Alliance for Food Security and Nutrition. In the case of varieties protected under plant breeders' rights, legislative changes criminalize traditional farmers' practices of breeding, saving and exchanging seeds (Mkindi, 2015).

The Seeds Act (2003) disadvantages the farmer-managed seed system. Section 14(6) of the Seeds Act prohibits the sale of uncertified seeds, which could have implications for smallholder farmers as they engage in selling and exchanging their own, uncertified varieties locally. Farmers who sell uncertified seed are to be fined between TZS 100 and 500 million (EUR 50,000 to 250,000) or imprisoned for 5 to 12 years.

Promoting the formal seed sector over the core seed rights of farmers will result in the loss of farmers' varieties and landraces. These varieties are vital for agricultural biodiversity and climate resilience. Attempts by farmer associations and civil society organizations to review the legislation have been ignored.

Government's role in regulating farmer-managed seed systems

In Tanzania, the government has demonstrated willingness to support the production of QDS through the enactment of the QDS Regulations in July 2020. These new regulations clarify hitherto unclear aspects and introduce fees for inspection, germination and moisture tests. The sector has demonstrated steady performance in recent years: QDS production increased five-fold between 2015 and 2019. QDS farmers work closely with the Tanzania Agricultural Research Institute, the Agricultural Seed Agency (ASA) and district agricultural officers to ensure that farmers produce quality seeds.

The QDS system was introduced through the Seeds Act (2003). Its main distinction from the certified seed system is that only a proportion of fields are inspected each season. Local agricultural officers conduct inspections, which reduces travel distances and thus inspection costs. The main requirements are that QDS can only be multiplied from formally registered open-pollinated varieties, and marketing is restricted to the ward in which the seed is produced. The formal sector focuses on breeding and

evaluating improved varieties. The production and sale of seed of these varieties is certified by the government regulator, TOSCI. The formal seed sector comprises government institutions such as agricultural research institutes and ASA, private seed companies and agrodealers, and development agencies.

TOSCI is a government institute under the Ministry of Agriculture that was established by the Seeds Act (2003). It is responsible for certifying and promoting quality agricultural seeds produced or imported for sale. It is also entrusted with safeguarding the farming community from poor quality or fake seeds from farm input vendors. TOSCI is responsible for field and seed inspection, sampling, seed testing, variety evaluation and verification through national performance trials.

ASA was established under the Executive Agencies Act No. 30 (1997). It was launched in June 2006 as a semi-autonomous body under then named Ministry of Agriculture, Food Security and Cooperatives (now the Ministry of Agriculture). ASA took over the responsibilities that were previously assigned to the Seed Unit of the Ministry of Agriculture, Food Security and Cooperatives. The aim of establishing ASA was to ensure high quality agricultural seeds are available to farmers at affordable prices. ASA and TOSCI work together very closely to ensure that seed is verified and available to farmers.

Tanzania agricultural policies in relation to gender equality

The National Agriculture Policy (2013) acknowledges that the majority of Tanzanian farmers are women, that women constitute the majority of the agricultural labor force, and that more than 90.4 percent of active women in Tanzania are engaged in agriculture. To that end, the gender objectives of the National Agriculture Policy are to facilitate equitable participation of men and women in producing agricultural goods and services, while ensuring that the benefits derived from participation are equitably shared. Within the policy's framework, the Agricultural Sector Development Programme Phase II (ASDP II) was finalized in 2016. The goal of ASDP II is to contribute to economic growth, reduced rural poverty and improved food security and nutrition in Tanzania. Gender was mainstreamed across the ASDP II as a crosscutting issue. However, among 23 priority investment areas, ASDP II only identifies one investment that is directly related to gender or women, namely improving benefits to women and youth along various dimensions of the agricultural commodity value chain.

Will policies and regulations benefit farmer-managed seed systems in the future?

Farmer-managed seed systems are diverse and can be adapted to local contexts. They range from simply saving seed from one season's harvest to the next, to sharing based on social obligation, farmer-to-farmer exchange and sales. Farmer seeds are conserved and circulated in farmer-managed seed systems, which strengthens the cultural and social fabric of the community. Over millennia, farmers have developed a wealth of distinctive varieties of crops by selecting and replanting seeds and cuttings from uniquely favorable individual plants—perhaps plants that matured slightly earlier than others, were unusually resistant to pests, or possessed a distinctive color or taste. Subsistence farmers have always been acutely attentive to such varietal diversity, because it helps them to cope with variability in the environment; farmers have developed many varieties or landraces for most major crops (Mkindi, 2015).

There have been some positive developments in Tanzania in support of farmer-managed seed systems, likely due to collaborative advocacy efforts among different actors, which has encouraged policy makers to reconsider current policies, regulations and practices. For example, on January 27, 2021, at the inauguration of the Silayo Tree Farm, in Chato District, Geita, the late President of Tanzania, Dr. John Pombe Joseph Magufuli, expressed satisfaction with the presence of native and modern trees and cautioned against hurried adoption of non-native species. He remarked “Even in our crops, the seeds we plant, we must ensure that our research institutions maintain the natural seeds that are resistant to our environment” (Takwa, 2021). Hopefully, these statements will encourage tangible changes in support of farmer-managed seed systems.

Conclusion

In Tanzania, farmer-managed seed systems have received little recognition or support, although the introduction of the QDS system has been a positive change in favor of more smallholder farmer-oriented regulations and practices. There is a need for recognition in regional and national policy and legislative frameworks of the value and contribution of farmer-managed seed systems, including of varieties that are crucial for food and nutrition security, livelihoods, biodiversity and resilience to climate change. Policies and legislation should embrace a human rights-based approach and provide exceptions and exemptions in national laws to protect farmers’ rights to save, share, exchange and sell their seeds. One key practical way to achieve this would be via registration of farmers’ varieties to allow for their production under the QDS frameworks provided through the FAO.

References

- ASARECA/KIT (2014). Tanzania Seed Sector Assessment: A Participatory National Seed Sector Assessment for the Development of an Integrated Seed Sector Development (ISSD) Programme in Tanzania. April 2014, Entebbe, Uganda. <http://africasoilhealth.cabi.org/wp-content/uploads/2016/10/Synthesis-Report-Landscaping-for-ISSD-Tanzania.pdf>
- Food and Agriculture Organization of the United Nations [FAO]. International Treaty on Plant Genetic Resources for Food and Agriculture. [no date] <https://www.fao.org/plant-treaty/en/>
- International Development Law Organization [IDLO] (2012). Report on the National Rule of Law Stakeholders Forum: Strengthening the rule of law in Tanzania. IDLO, Dar es Salaam, Tanzania. <https://www.idlo.int/sites/default/files/pdfs/events/IDLO%20Tanzania%20Rule%20of%20Law%20Stakeholder%20Forum.pdf>
- Mahop, M.T., Shikoli, A.M., Tejan-Cole, A. (2015). Intellectual Property Protection of New Varieties of Plants in Sub-Saharan Africa. *Bioscience Law Review* 14(4): 130–158.
- Mkindi, A.R. (2015). Farmers' Seed Sovereignty is under Threat. The Example of Tanzania: No Reliable Access for The Farmer Managed Agricultural Sector to Quality Seed. Rosa Luxemburg Stiftung, Berlin. <https://www.rosalux.de/en/publication/id/3969/farmers-seed-sovereignty-is-under-threat>
- Mkonda, M. Y., He, X. (2018). Agricultural history nexus food security and policy framework in Tanzania. *Agriculture & Food Security*, 7(1). <https://doi.org/10.1186/s40066-018-0228-7>
- Takwa, E. (2021, January 28). Tanzania: Magufuli Honours Prof Silayo's Work With Farm Rename. AllAfrica.com. <https://allafrica.com/stories/202101280157.html>
- Tanzania Planning Commission (2016). The Tanzania Development Vision 2025. Tanzania Planning Commission, Dar Es Salaam. https://www.healthdatacollaborative.org/fileadmin/uploads/hdc/Documents/Country_documents/tanzania_development_vision_2025.pdf
- United Republic of Tanzania (1997a). National Agricultural and Livestock Policy, 1997. [https://www.kilimo.go.tz/uploads/regulations/Tanzania_Agricultural_and_Livestock_Policy_\(1997\).pdf](https://www.kilimo.go.tz/uploads/regulations/Tanzania_Agricultural_and_Livestock_Policy_(1997).pdf)
- United Republic of Tanzania (1997b). Plant Protection Act, 1997. https://trade.tanzania.go.tz/media/Plant_Protection_Act%201997_1.pdf
- United Republic of Tanzania (2002). Protection of New Plant Varieties (Plant Breeders' Rights) Act, No. 22 of 2002. https://www.kilimo.go.tz/uploads/regulations/Plants_Breeders_Right_Act_2002.pdf
- United Republic of Tanzania (2003). Seeds Act, No. 18 of 2003. <https://faolex.fao.org/docs/pdf/tan61038.pdf>
- United Republic of Tanzania (2012). Plant Breeders' Rights Act No. 9 of 2012. <https://www.aatf-africa.org/wp-content/uploads/2021/02/Plant-Breeders-Rights-Act-2012-Mainland.pdf>
- United Republic of Tanzania (2003). Seeds Act, No. 18 of 2003. <https://faolex.fao.org/docs/pdf/tan61038.pdf>
- United Republic of Tanzania. Ministry of Finance and Planning. (2021). National Five Year Development Plan 2020/21-2025/26. Realizing Competitiveness and Industrialization for Human Development. Ministry of Finance and planning, Dar es Salaam, Tanzania. <https://effectivecooperation.org/system/files/2022-02/FYDP%20III%20English.pdf>

Uganda

Joyce Adokorach

Introduction

Seed is the key input for agriculture. Throughout the world, it is the farmers themselves who produce the largest quantity of seed for most crops. This farm-saved seed is used for both locally- and scientifically-bred varieties (Louwaars and de Boef, 2012). For instance, in many countries of Asia and Africa, despite substantial funding for strengthening seed supply organizations, the formal sector only supplies a small proportion of the seed that is sown. Most is supplied in the informal seed supply system made up of a network of farmers and small-scale merchants (Witcombe et al., 2010). Seed sourced from the public sector and commercial companies constitutes at most 10% and often as little as 2% of the seed supply in developing countries (Almekinders et al., 1994; CIAT, 1982). Since the formal sector has failed to supply a significant proportion of the seed that is sown, many projects and agencies have attempted to develop local seed supply systems that depend on action by local communities (Witcombe et al., 2010).

The Uganda Vision 2040, which presents the government of Uganda's long-term development vision, aspires to transform its agricultural sector from subsistence farming (currently 68%) to commercial agriculture, and to make agriculture profitable, competitive, and sustainable, with a view to providing food and income security to all the people of Uganda and creating employment opportunities along the entire commodity value chain (National Planning Authority, 2013). The aspiration is guided by the Third National Development Plan (NDP III) 2020/21–2024/25 (National Planning Authority, 2020), and the Agricultural Sector Strategic Plan 2015/16–2019/20 (The Republic of Uganda, 2016), the latter being the flagship Plan for investment and development of the agricultural sector.

Some of the legal frameworks are supportive to the farmer managed seed system, while some others are restrictive, impede commercialization and unjustifiably discriminative the farmer saved seed systems. An analysis and review of the policies, laws and regulations are discussed below.

Policies, laws, and regulations reviewed

- Constitution of the Republic of Uganda, 1995
- National Seed Policy, 2018
- Seed and Plant Act, 2007
- National Biotechnology and Biosafety Policy 2008 and the Biotechnology and Bio-safety Bill 2012
- Plant Variety Protection Act 2014
- National Environment Management Policy (1994) and National Environment Act 1998
- draft Food and Nutrition Bill 2009
- Geographical Indications Act 2013
- National Agriculture Policy 2013

Constitution of the Republic of Uganda (1995)

Chapter fifteen of the Constitution of the Republic of Uganda provides for the utilization of Uganda's natural resources and their management in such a way as to meet the development and environmental needs of present and future generations, and to safeguard and protect Uganda's biodiversity.

Seed and Plant Act (2007)

The Seed and Plant Act (Government of Uganda, 2007) mandates the National Seed Certification Services to monitor the activities of the formal and informal seed sectors, acknowledging that the government of Uganda recognizes the key role played by the informal sector in seed production and its positive impact on farmer seed systems. It demonstrates the government's support and commitment to ensuring that the quality of the seed produced by the informal sector is not compromised. Furthermore, the Seed and Plant Act provides for the release of domestic and imported varieties, which increases the availability of genetic diversity for use by Ugandan farming communities.

The same Act gives the National Seed Board the discretion to grant Breeders' Rights to a variety of seeds on the recommendation of the National Variety Release Committee. Granting breeders' rights is an incentive to both domestic and foreign breeders to develop and/or release varieties; hence, it contributes to increasing the availability of genetic diversity. However, the rights of farmer groups and individual farmers who have conserved their own landraces, are not provided for in this Act.

Article 12(1) of the Seed and Plant Act is unnecessarily restrictive, requiring all seeds offered for sale to be labeled and sealed to national standards. This makes it illegal for farmer-saved seed from community seed banks, and individual farmers operating under the informal seed system to be sold seeds without being properly registered, labeled, and packaged, thus inhibiting free trade of seeds from these stakeholders. In this regard, there is an ongoing policy process to enable the registration and commercialization of farmer-saved seed, since at this moment there is no legal framework for the production and sale of this "potential seed," including unregistered varieties (Longley, 2021), for example, in the hands of community seed banks.

National Seed Policy (2018)

The National Seed Policy recognizes the informal seed sector as a source of seed and planting materials (The Republic of Uganda, 2018). The Ugandan government has therefore put in place strategies to enhance the informal seed system and transform it into a viable commercial sector through farmer-led seed entrepreneurs. The National Seed Policy stipulates that the Ugandan government's role shall be to provide an enabling environment for each seed system that promotes growth for all categories of private sector entities, including large national seed companies, small local enterprises, and private seed service providers, and protects consumers (farmers). This commits the government to providing an enabling environment for the farmer-saved seed system since they are included in the small local enterprises and in the private seed providers. Furthermore, the government is to attract more players in the seed sector and address the huge deficit of quality seed in the country through recognizing multiple seed systems comprising both formal and informal seed systems. The informal seed system allows the farmer-saved seed – from planting to harvesting – to be occasionally sold or exchanged with other farmers, but without any mechanical processing, testing or labeling. In practice, this means there is a supportive policy environment for the farmer seed system in the country.

The National Seed Policy further elaborates that the informal seed system will continue to be a main source for disseminating non-commercial seed varieties and planting materials. Endorsement of the informal seed system through recognition and regulation will ensure that biodiversity and seed distribution channels are maintained for non-commercial varieties with high nutritional and food security value. Here the informal seed system, including farmer-saved seed and community seed banks, is limited to handling non-commercial varieties. This is ambiguous because the dynamics of the market forces might make all food crop varieties commercial at some point. Crops that were never thought to be commercial in the past, such as millet, common bean, banana, and groundnut, now have a good commercial value. This provision therefore is not very enabling to community seed banking or farmer-saved seeds.

In addition to the above, the policy provides for interventions that support farmer groups and seed-producing groups, such as community seed banks to transit to the formal system through registering their businesses/associations and formal listing of the varieties they produce and market. This enables producers to be formally recognized and brought under appropriate regulatory mechanisms to enhance commercialization of the agricultural sector and food security through the availability of high-quality seed and protection of biodiversity. This provision currently enables some community seed banks to produce seed for commercial purposes under the Quality Declared Seed (QDS) system (see next section), for which they have to be registered as a Local Seed Business (LSB). This type of registration could enhance the sustainability of farmer-led seed operations. However, for certified seed to be produced, the varieties will need to be included on the National Varieties Register; landraces or improved landraces – the materials held by community seed banks – are currently not included in the Registry.

Quality Declared Seed (QDS)

The 2018 National Seed Policy recognizes Quality Declared Seed (QDS) as a new commercial class of seed introduced to reduce the use of home-saved seeds as a transition for the major food and cash crops to a commercial and modern agriculture— it should be noted that QDS already existed prior to this formal recognition. QDS are seeds produced locally by trained and registered farmer groups, with field inspections carried out by authorized district agricultural officers and seed testing by the National Seed Certification Services (NSCS) of the Ministry of Agriculture, Animal Industrial and Fisheries (MAAIF). QDS can be marketed within the geographical region in which it is produced. QDS criteria for seed quality control are less strict than for regularly registered and certified commercialized seeds.

In Uganda, the Local Seed Business (LSB) model has been promoted to scale out the national use of QDS. With the support of the Integrated Seed Sector Development program for Uganda, more than 300 LSBs have been established. This achievement suggests that there is demand for QDS as a seed class that is better adapted and satisfies the local demand for seeds of the targeted food crops. Bean is one of the most popular crops for which QDS is produced (Mastenbroek et al., 2021).

According to Mastenbroek et al., 2017, QDS producers have minimal transaction costs and are better able to recognize and meet unique local demands. Therefore, the authors argue that QDS is more cost-effective than certified seed and offers women farmers and youth employment opportunities. The farmer groups that specialize in seed production receive just a tiny increase in income as compensation. The LSBs produce and market quality seed of locally adapted crops and varieties for local markets. LSBs can also produce quality seed of indigenous varieties and sell it based on trust (non-registered varieties cannot be sold as QDS). Nationally active seed businesses are unable to produce at the same costs as farmer cooperatives and would want larger profit margins per hectare than the LSBs.

Under the QDS provision, community seed banks that operate as LSBs are monitored by the seed regulatory institution and their seed is certified. This not only ensures visibility, but it creates more business opportunities for community seed banks thereby enhancing their sustainability. However, for certified seed to be produced, the varieties need to be on the National Varieties Register where the landraces are currently not included. This potentially limits the supply of landraces as certified seed while they remain unregistered and could lead to their becoming threatened or extinct. This is a limitation to farmer-saved seed, including landraces. So far, few community seed banks have ventured into QDS due to the costs and efforts linked to establishing and registering LSBs.

The National Seed Policy also proposes variety development and plant variety protection to protect plant breeders' rights and the local communities' traditional breeding. Farmers are allowed to save, use, exchange, and share farm produce of all protected varieties. This favors farmers and community seed banks considering that many store landraces to which they will be allowed to attach protection and conservation rights.

One of the National Seed Policy's strategies is to promote and build the capacity of farmer and community groups, including those led by women or youth, to conserve crop varieties that have a high food security value. The policy specifically includes support for the development of community seed banks to promote the conservation of local varieties, and indigenous knowledge and practices. However, the policy does not provide any incentives or support for individual farmers and community seed banks to play that role effectively. It may also give rise to the erosion of landraces; since community seed banks can produce certified seed, they might choose to concentrate on producing certified seed of improved varieties in a bid to make money, ignoring their key conservation role, which might entail greater costs.

The National Seed Policy encourages private plant breeding activities and mandates the National Agricultural Research System to maintain sufficient stocks of breeder and basic seed for various crop varieties to be sold and for dissemination of varieties without market value. This will contribute to increasing the diversity of mainly publicly-bred crop varieties leaving out the landraces.

National Biotechnology and Biosafety Policy (2008) and the Biotechnology and Bio-safety Bill (2012)

Uganda's Biotechnology and Biosafety policy provides a framework for the safe application of biotechnology to contribute to Uganda's economic growth and transformation. The policy aims to achieve well-regulated conservation and sustainable utilization of Uganda's natural resources through the use of biotechnology in the conservation of *in-situ* and *ex-situ* genetic resources, and to strengthen legal and institutional arrangements for adherence to the legislation on biodiversity conservation. This implies that the policy is conducive to community seed banking and individual farmers in this regard. However, the policy does not emphasize conservation of original varieties or the gene pools used in breeding, which could lead to the loss of original diversity to be used for breeding.

The objective of the Biotechnology and Biosafety Bill is to provide a regulatory framework that facilitates the safe development and application of biotechnology. This involves the use of genetic engineering techniques to transfer useful characteristics like disease resistance or drought tolerance and to create opportunities to modernize agriculture, protect the environment and enhance public health and industrialization. In principle, this bill grants access to biotechnology that has the potential to increase the level of diversity in the community seed banks in the form of improved varieties; however, because

of their traits, improved varieties could become more popular than landraces or influence them through cross pollination.

Plant Variety Protection Act (2014)

The Plant Variety Protection (PVP) Act provides for promotion and development of new plant varieties and their protection as a means of enhancing breeders' innovations and rewards through granting of plant breeders' rights and other related matters. The Act (i) recognizes and protects breeders' rights over the varieties developed by them; (ii) provides institutional mechanisms for the effective implementation and enforcement of the breeders' rights; and (iii) promotes the supply of good quality seed or planting materials to farmers to strengthen national food security, among other aims. The Act lays out the rights of plant breeders, which include the right to sell and export plant varieties, the exclusive rights to produce or to license other persons to produce reproductive materials of specific plant varieties. The PVP Act promotes the availability of genetic materials by obliging breeders to deliver a specified quantity of plant propagating materials of any new variety to a specified genetic resources center. It also obliges the holder of breeders' rights to stock the market with propagating material at reasonable prices or to grant such licenses as are necessary to stock the market with propagating material on reasonable terms and conditions.

Community seed banks could benefit from the obligation to stock the market with propagating material at reasonable terms and conditions. In this way, they could contribute to enhancing both availability and access to diverse planting materials. The PVP Act allows farmers to exchange the breeders' varieties informally without selling them and provides for a community gene fund, which can support community seed banking, but it is not yet operational. However, the PVP Act does not protect or recognize traditional knowledge held by farmers as a form of intellectual property that needs to be protected.

The National Environment Management Policy (1994) and National Environment Act 1998

The National Environment Management Policy aims to provide a strategy for integrating environmental concerns into Uganda's socio-economic development process towards attaining sustainable development. The overall policy goal is sustainable social and economic development that maintains or enhances environmental quality and resource productivity on a long-term basis, to meet the needs of the present generations without compromising the ability of future generations to meet their own needs. Its objective is to conserve and restore ecosystems and maintain ecological processes and systems that are essential to supporting life on earth, especially conservation of national biological diversity. One of the principles observes that long-term food security depends on sustainable management of environmental and natural resources. The policy recognizes the importance of the agricultural sector in the national economy and in domestic food supply. It therefore calls for the promotion of farming systems and land-use practices that conserve and enhance land productivity in an environmentally sustainable manner. Since the policy emphasizes the importance of agriculture and conservation of biological diversity for food security, and sustainable social and economic development, in principle it supports seed saving by custodians and community seed banks as one of the means for conserving agricultural biodiversity.

The National Environment Act provides for the equitable use and conservation of the Uganda's environmental and natural resources for the benefit of present and future generations, considering both the rate of population growth and the productivity of the available resources. This provision is conducive to custodian farmers and community seed banking as it favors their activities on seed multiplication and variety conservation. The Act has regulations that apply to access to genetic resources or parts of genetic resources whether naturally occurring or introduced, including genetic resources bred for commercialization within Uganda or for export, under either in-situ or ex-situ conditions. The regulations, however, do not apply to the exchange of genetic resources among local communities for their own consumption, or where the exchange is purely for the purposes of producing food or beverages. This does not particularly favor community seed banking – having regulations for informal exchanges at the local level could contribute to the controlling the quality of the seeds exchanged through community seed banking.

Draft Food and Nutrition Bill (2009)

The Food and Nutrition Bill (the Food and Nutrition Policy was adopted in 2003) – formulated in 2009 and still under review – aims to provide for the right to food, establish a food and nutrition council, as well as food and nutrition committees and their relevant functions, at the county and sub-county level. It proposes that everyone has a right to food and be free from hunger and under-nutrition, and places the duty to fulfill this right on the state. It prohibits any activities that may affect the enjoyment of the right to food or activities that are detrimental to one's nutrition status. This Bill, once passed, will enable community seed banking, as it supports activities that enhance the nutritional status of Ugandans, which community seed banking does through enhancing farmers' seed sovereignty and by promoting crop diversity.

Geographical Indications Act (2013)

The Act provides for the protection and registration of geographical indications (GIs). The rationale for the Geographical Indications Act was that countries were taking advantage of the lack of legal framework in Uganda governing geographical indications to adopt or promote Ugandan products as their own. Proponents of the law argued that viable geographical indications essentially build a legally-protected brand and a reputation in the marketplace. Geographical indications are also necessary to ensure quality control; they have boosted customer confidence in and the quality of the products. This makes them very conducive to seed production as a business within farmer-managed seed systems and community seed banks. It also enables seed consumers to trace the seeds' origin and monitor the seed quality. The protection of GIs can be considered a sustainable development tool capable of protecting traditional knowledge and promoting the conservation of landraces by seed custodians and community seed banks.

National Agriculture Policy (2013)

This policy guides all existing and future agriculture related sub-sector plans, policy frameworks, and strategies, with an overall objective of promoting food and nutrition security and household incomes through coordinated interventions that focus on enhancing productivity and value addition, providing employment opportunities, and promoting domestic and international trade. One of its specific objectives is to ensure sustainable use and management of agricultural resources and it pledges, among other things, to promote and support the dissemination of technologies and practices for soil and water conservation and maintenance among all categories of farmers. The policy commits to enhancing research capacity to generate new knowledge and the technologies needed for agricultural development. Overall, the policy is conducive to farmer seed systems in the broad sense.

Conclusion

The policy and legal framework in Uganda support farmer seed systems. The policy statements and strategies clearly state that government will support the development of farmer- and market-preferred varieties for commercial, food, and nutrition-security crops. Also, the government will strengthen the capacity to produce quality seed for crops that have low profit margins for seed companies. In addition, the government will provide an enabling environment for each seed system that matches its characteristics; this can be seen as very supportive of the farmer seed system in Uganda. The recognition of QDS in the seed policy as a new class of seed introduced to reduce the use of home-saved seeds as a transition for the major food and cash crops has encouraged local seed businesses amongst the farmer groups. The LSB model has proven to be suited to meeting local needs with regard to the production and distribution of seed of chosen food crops.

Furthermore, conservation of the original varieties/gene pools is very important and necessary, as biotechnology could modify Uganda's native biodiversity resources, causing crop diversity loss.

What is needed to strengthen the country's conservation efforts are incentives and support for individual farmers and community seed banks to play their conservation role more effectively.

References

- Almekinders, C.J.M., Louwaars, N.P., and de Bruijn, G.H. (1994). Local seed systems and their importance for an improved seed supply in developing countries. *Euphytica* 78:207–216
- CIAT (1982). Proceedings of the Conference on Improved Seed for the Small Farmer, 9–14 August, Cali, Colombia
- Longley, C, S. Ferris, A. O'Connor, M. Maina, J.C. Rubyogo, and N. Templer (2021). Uganda seed sector profile. A Feed the Future Global Supporting Seed Systems for Development activity (S34D) report. Baltimore, Catholic Relief Services. <https://cgspace.cgiar.org/handle/10568/119639>
- Louwaars N.P. and de Boef, W.S. (2012). Integrated Seed Sector Development in Africa: A Conceptual Framework for Creating Coherence Between Practices, Programs and Policies. *Journal of Crop Improvement*, 26:39–59. DOI: 10.1080/15427528.2011.611277
- Mastenbroek, A., Oyee, P., and Gildemacher, P. (2017). ISSD Uganda: Bridging the Gap of Quality Seed; Final program report for Integrated Seed Sector Development Programme in Uganda. Centre for Development Innovation, Wageningen University and Research, the Netherlands
- Mastenbroek, A., Otim, G., and Ntare, B.R. (2021). Institutionalizing Quality Declared Seed in Uganda. *Agronomy* 11, 1475. <https://www.mdpi.com/2073-4395/11/8/1475>
- National Planning Authority (2013). Uganda vision 2040. National Planning Authority. Kampala. <http://www.npa.go.ug/uganda-vision-2040/>
- National Planning Authority (2020). Third National Development Plan (NDP III) 2020/21–2024/25. National Planning Authority, Kampala. http://www.npa.go.ug/wp-content/uploads/2020/08/NDPIII-Finale_Compressed.pdf
- The Government of Uganda (2007). The Seeds and Plant Act, 2006. <https://ugandatrades.go.ug/media/Seeds%20and%20Plant%20Act.%202006.pdf>
- The Republic of Uganda. Ministry of Agriculture, Animal Industry and Fisheries (2016). Agriculture Sector Strategic Plan 2015/16–2019/2020. Ministry of Agriculture, Animal Industry and Fisheries, Entebbe, Uganda. <http://npa.go.ug/wp-content/uploads/2016/08/ASSP-Final-Draft.pdf>
- The Republic of Uganda. Ministry of Agriculture, Animal Industry and Fisheries (2018). National Seed Policy. Ministry of Agriculture, Animal Industry and Fisheries, Entebbe, Uganda. <https://data.unhcr.org/en/documents/details/69638>
- Witcombe, J. R., Dvekota, P., and Joshi, K.D. (2010). Linking community-based seed producers for a sustainable seed supply system. *Experimental Agriculture* 46(4): 425–437. doi:10.1017/S0014479710000061

SOUTHERN AFRICA



Photo 3. Crop and varietal diversity are at the heart of farmer-managed seed systems. Diversity fair in Chimikuko, Zimbabwe. Credit: Bioversity International/R. Vernooy

SOUTHERN AFRICA

Alfios Mayoyo

List of Acronyms and Abbreviations

AFSA	Alliance for Food Sovereignty in Africa
CBD	Convention on Biological Diversity
CBI	Crops Breeding Institute (Zimbabwe)
CIMMYT	Centro Internacional de Mejoramiento en Maíz y Trigo
COMESA	Common Market for Eastern and Southern Africa
CTDO	Community Technology Development Organisation (Zimbabwe)
CTDT	Community Technology Development Trust
DAFF	Department of Agriculture, Forestry and Fisheries (South Africa)
DALRRD	Department of Agriculture, Land Reform and Rural Development (South Africa)
DFID	Department for International Development (United Kingdom)
DR&SS	Department of Research and Specialist Services (Zimbabwe)
DUS	Distinct, Uniform, and Stable
ESAFF	Eastern and Southern Africa Small-scale Farmers Forum
FAO	Food and Agriculture Organization of the United Nations
FFS-PPB	Farmer Field Schools for Participatory Plant Breeding
FFS	Farmer Field School
FMSS	Farm-managed Seed System
GDP	Gross Domestic Product
GVRT	Golden Valley Research Trust
HSRS	Harmonized Seed Regulatory System
IARC	International Agricultural Research Centre
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
LFSP	Livelihoods and Food Security Program (Zimbabwe)
MoU	Memorandum of Understanding
NAPF	National Agriculture Policy Framework
NARS	National Agricultural Research Systems
NGO	Non-governmental Organization

NNPSP	National Nutrition Policy and Strategic Plan (Malawi)
NPPO	National Plant Protection Organization (Zambia)
NUS	Neglected and Underutilized Species
OPV	Open-Pollinated Variety
PAA Africa	Purchases from Africans for Africa program
PGR	Plant genetic resources
PGRC	Plant Genetic Resources Centre (South Africa)
PGRFA	Plant genetic resources for food and agriculture
PELUM	Participatory Ecological Land Use Management (Malawi)
PVS	Participatory Variety Selection
PVE	Participatory Varietal Enhancement
QDS	Quality Declared Seed
SADC	Southern Africa Development Community
SCCI	Seed Control and Certification Institute (Zambia)
SDGs	United Nations' Sustainable Development Goals
SDHS	Sowing Diversity = Harvesting Security program
SFHC	Soils, Food and Health, and Communities project (Malawi)
SIDA	Swedish International Development Agency
SKI	Seed and Knowledge Initiative
UPOV	International Union for the Protection of New Varieties of Plants
WFLAT	Women Farmers, Land, and Agricultural Trust
WFP	World Food Program
WTO/TRIPS	World Trade Organization's Trade-Related Agreement on Intellectual Property Rights
ZAAB	Zambia Alliance for Agro-ecology and Biodiversity Conservation
ZAGP	Zimbabwe Agricultural Growth Programme (EU-funded)
ZIMSOFF	Zimbabwe Smallholder Organic Farmers' Forum
ZSSP	Zimbabwe Seed Sovereignty Programme

Background

All 14 Southern African countries have agricultural policies governing national agricultural production. There are, however, two parallel farming systems operating in each country: a commercial farming system and a smallholder farming system. Both farming systems are supported by two seed supply systems: the commercial seed sector, which concentrates on the supply of commercial hybrid seed and the local (or informal) seed system, also known as the farm-managed seed system (FMSS). The commercial seed system is well articulated, recognized, and supported by agricultural policies. The FMSS mostly relies on supplying local, traditional, or farmer varieties (landraces), including open-pollinated varieties (OPVs) and varieties improved by farmers, e.g., through participatory crop improvement. Some authors differentiate between farmer seed systems, community seed systems, and relief seed systems (Hlatshwayo et al., 2021). Relief seed systems often involve gene banks in re-introducing lost local materials, together with non-governmental organizations (NGOs) or other agencies acting as intermediary seed multipliers and distributors.

Over the years, although agriculture and seed policies have largely addressed the commercial seed sector, the importance of FMSS has been recognized to some extent, in particular due to the effects of climate change and the notable contribution of local landraces to climate-change adaptation for food and nutrition security. FMSS integrate farming activities with local and context-specific knowledge and uphold the benefits of seed diversity for nutritious and culturally-appropriate food production systems and for their resilience. Seeds in the FMSS are purposefully diverse and heterogeneous, and are planted and replanted, season after season, sometimes in mixtures of varieties and with other crops, thus increasing resilience and overall productivity. Smallholder farmers' seeds are nurtured differently than the "sow-once" industrial seeds that are genetically modified and designed for monocultures, manufactured and grown (GRAIN and AFSA, 2018). Smallholder farmers' seeds are also an important source of neglected and underutilized species (NUS), a primary source of food and nutrition security in many rural households.

The farmer seed system uses varieties such as landraces, traditional vegetables, mixed races, and vegetatively propagated crops. The advantages of farmer seed systems are that they have dynamism, flexibility, can evolve over time to respond to external changes, and are also a crucial element of a demand-driven seed market system. The farmer-based seed system usually includes the distribution of large numbers of relatively small samples of improved seed varieties as a way of introducing new varieties and quality seed into local seed systems, assuming further dissemination via farmer-to-farmer exchange. Community seed banks can support the storage of seed reserves and contribute to improving production practices and (communal) storage. Potentially, community seed banks improve access to seed for the poorest farmers; they can be an entry point for farmer organizations to access seed and provide capacity building in seed multiplication, and generally serve as local germplasm collections to improve farmers' access to genetic diversity.

Over time, farmers' control over their seeds has come under threat from changes to national, regional, and international legislation, as a result of the harmonization of seed laws and the introduction of plant breeders' rights that protect commercial breeders. Seed policies and laws at large, as they are being developed across Africa and globally, neither recognize nor support farmers' seed systems. However, some initiatives/organizations working to support farmer-managed seed systems are employing a variety of methods to advance smallholder farmers' interests, such as:

- Working with farmers to influence seed-related policies
- Seed distribution to farmers
- Capacity building for smallholder farmers on seed multiplication and quality management
- Empowering smallholder farmers in local seed business
- Conducting research on seeds
- Building linkages between seed-related government institutions and smallholder farmers, and facilitating farmer-to-farmer knowledge and seed sharing (GRAIN, 2018).

Analysis of the inclusion of farmer-managed seed systems in national policies and support for their development

Malawi

Malawi's economy is predominantly agriculture based, with agriculture accounting for 30 percent of its gross domestic product (GDP), generating over 80 percent of export earnings, employing 64 percent of the country's workforce, and contributing to the country's food and nutrition security. The following policies and strategies govern the production, multiplication, and marketing of seed in the country:

- The Malawi Growth and Development Strategy III (2017–2022)
- The National Agriculture Policy (2016–2021)
- The National Agriculture Investment Plan (2017–2022)
- The National Irrigation Policy (2016–2022)
- The National Master Plan and Investment Framework (2015–2035)
- The National Rice Development Strategy (JICA Malawi Office, 2022)

Farm-saved seed is widely acknowledged as the major source of seed for smallholder farmers in Malawi (Government of Malawi, 2016). However, the government of Malawi encourages planting of improved seeds by stating: "As part of the envisioned modifications to agricultural subsidies, the Ministry will support efforts to encourage smallholder farmers to use improved seeds, irrigation, integrated soil fertility management techniques, and other modern farm technologies, as well as restructure the Seed Services Unit to make it semi-autonomous for improved seed certification and quality control". It also has a strategy that seeks to "facilitate private sector imports of germplasm, foundation seed and varieties that have been tested, approved and certified in other SADC and COMESA countries" (Malawi National Agriculture Policy, 2016).

The National Nutrition Policy and Strategic Plan (NNPSP) lends great political will to ensuring nutrition security by offering policy solutions that include educational programs on nutrition with a focus on diversifying diets, also using indigenous and traditional foods. Although the government partially recognizes the role of farmers in maintaining a diverse genetic resource base, the importance and complexity of FMSS is poorly appreciated.

Namibia

Agriculture is one of Namibia's most important sectors, with the majority (70 percent) of Namibia's population directly or indirectly dependent on the agricultural sector for their livelihoods, while one third of the workforce is employed by agricultural enterprises. Agriculture's contribution to the country's GDP (excluding fishing) over the last five years has been just over 4 percent. Livestock farming comprises approximately two-thirds of agricultural production, with crop farming and forestry making up the remaining third of production (International Trade Administration, 2021a). In communal areas in particular, agricultural production still largely consists of subsistence-based farming with low crop yields, a high dependency on rainfall, limited water access, significant post-harvest losses, and poor rangeland management practices. Processing capacities and marketing opportunities for smallholder farmers in rural areas are limited (GIZ, 2021).

The Government of the Republic of Namibia is guided by long-term development objectives as outlined in National Development Plans (NDPs) and the Vision 2030 strategy. The Ministry of Agriculture, Water and Land Reform's mandate is to promote, develop, manage and use of agricultural, water, and forestry resources. It is the government's objective to ensure agricultural productivity and food security in line with Vision 2030. The desired outcome for the agricultural sector and food security in Namibia's Fifth National Development Plan (NDP5) 2017/18 – 2021/2022 is to reduce the proportion of food-insecure individuals from 25 percent in 2016 to 12 percent in 2022, and to increase food production by 30% cumulatively between 2017 and 2022 (Business Scouts for Development/GIZ, 2022).

The government of Namibia encourages the planting of improved seeds as stated in its Crop Production Strategies: "Implement the Dry Land Crop Production and support farmers through the provision of subsidized fertilizer, improved seeds as well as weeding and ploughing services." In addition, it states: "Promote the participation of more farmers and seed cooperatives in order to ensure adequate seed production" (Namibia Agriculture Policy, 2015).

The following policies and laws concern seeds:

- Namibia National Strategic Action Plan for Plant Genetic Resources for Food and Agriculture 2016–2026.
- Namibia's Second National Biodiversity Strategy and Action Plan 2013–2022
- Access to Biological and Genetic Resources and Associated Traditional Knowledge Act, No.2 of 2017
- Seed and Seed Variety Act, No 23 of 2018
- Namibia Seed Policy 2013
- Plant Quarantine Act, Act No. 7 of 2008
- Environmental Management Act, Act No. 7 of 2007.

South Africa

South Africa's agricultural sector is one of the world's most diversified sectors, consisting of corporate and private intensive and extensive crop farming systems, including vegetable, fruit, nuts, and grain production. The well-developed commercial farming sector in South Africa is the backbone to the country's agricultural economy and in 2020 showed the best growth rate of all economic sectors, at 13.1 percent. The agricultural sector contributed around 10 percent to South Africa's total export earnings in 2020 with a value of \$10.2 billion. There are approximately 32,000 commercial farmers in South Africa, of which between 5,000 and 7,000 produce approximately 80 percent of its agricultural output (International Trade Administration, 2021b).

South African policies do not recognize the informal seed system as one of the contributors to food security. The seed laws and policies at national level do not recognize, protect, support or strengthen the production of informal systems, especially regarding the requirement for seed to be distinct, uniform, and stable (DUS). Plant Improvement Act No. 11 of 2018 is South Africa's governing seed law and focuses exclusively on the commercial seed sector's requirements (Republic of South Africa, 2018). The law does not allow farmers to sell unregistered seed. The DUS criteria for the legal recognition of a variety and listing on the national varietal list are too static and inappropriate to accommodate farmer-generated seed, which is heterogeneous and adapts to dynamic production conditions over time. DUS entrenches genetic uniformity and monocultures. There is no clarity about at what point farmers and/or farmer collectives will be required to register as businesses to produce and sell seed (African Centre for Biodiversity, 2018).

Zambia

The Zambian agricultural sector comprises crops, livestock, and fisheries, operating under three broad categories of farmers: small-, medium-, and large-scale. Agriculture contributes about 19 percent of Zambia's GDP and employs three quarters of the population (International Trade Administration, 2021c). The national policy on agriculture recognizes the importance of the informal seed sector, stating that maintaining agricultural biodiversity and promoting conservation are among the strategies adopted to achieve the policy objective of food security. Objective 7: To improve food and nutrition security reads: "Promote access to bio fortified seed or vines for the production of nutrient enhanced varieties" (Zambia National Agriculture Policy, 2016). However, the [Plant] Breeders' Rights Act prohibits farmers from exchanging seed, which is a core component of farmers' seed systems.

Zambia has a formal seed system that is regulated by the government and focuses on breeding, producing and selling certified seeds by registered seed companies. A number of policies and legislations govern the production, multiplication, and marketing of seed in the country. The policies include:

- National Seed Policy (2004)
- Plant Variety and Seeds Act (CAP 236)
- Plant Breeders' Rights Act (No. 17)
- Plant Variety and Seeds Regulations
- Customs and Excise Act

Other relevant policies include: Revised National Agriculture Policy (2012–2020), National Biodiversity Strategic Action Plan (2018–2030), The Protection of Traditional Knowledge, Genetic Resources and Expressions of Folklore Act (2016), Biotechnology and Biosafety Policy (2007), Biosafety Act (2007).

Nonetheless, an informal seed system exists, made up of unregistered seed producers. In the informal seed system, farmers conserve, multiply, and exchange seeds of food and subsistence crops using a mixture of bartering and cash. Informal systems of seed provision are important mechanisms by which farmers produce different types seed, which are necessary to select, improve, and conserve traditional varieties that are well adapted to the local environment where they occur.

Zimbabwe

Zimbabwe's economy is agriculture based. Agriculture, largely rain-fed and highly sensitive to a variable climate, is the backbone of Zimbabwe's economy and on average accounted for 10–15 percent of its GDP between 2012 and 2020. Nearly 80 percent of the country's 16.1 million people – the majority of whom (70%) live in rural areas – depend on rain-fed farming and livestock rearing for their livelihood. The country has a fairly well-developed seed sector; yet a significant number of households use retained seed for crop production (groundnut 54%, finger millet 52%, pearl millet 51%, and cowpea 46%)(ZimVAC, 2020). A number of policies and legislations govern production, multiplication, and marketing of seed in the country. The policies include:

- Plant Breeders' Rights Act (Chapter 18:16)
- Seeds Act of Zimbabwe (Chapter 19:13)
- National Development Strategy 1 (NDS1): 2021–2025
- Food and Nutrition Security Strategy

Under the National Agriculture Policy Framework (NAPF) that is currently being implemented, the following pillar activities support the advancement and recognition of FMSS:

Pillar I: Food and Nutrition Security and Resilience

Strategic Objective 1 reads: "Facilitate the implementation of policies that recognize and promote alternative agriculture practices enhancing crop diversity and availability of nutritious food moving away from maize centric interventions and maximize on low entry barriers for resource-poor farmers". To aid this objective, a Strategic Initiative that aims to promote access to bio-fortified seed or vines for the production of nutrient-dense varieties has been included under Investment and Operations.

On Agriculture and biodiversity management, the policy quotes that the "[...] framework endeavors to continue supporting conservation of genetic resources and its associated knowledge, as well as afford the smallholder farmers to participate in equitable sharing of benefits arising from the use of their genetic resources and the knowledge associated with their genetic resources for food and agriculture".

Pillar II: Agricultural Knowledge, Technology and Information Systems

The policy statement reads: "Increase investment in agricultural research and development, technology and extension systems and adoption of climate- and business-smart technology and innovation".

Pillar III: Production and Supply of Agricultural Inputs

Indigenous farmer systems are being promoted under Strategic Objective 5 that reads: "To support the development of local indigenous farmer systems". This is amply aided by the Strategic Initiatives that reads: "The need to strengthen seed selection, seed preservation and storage of farmers' indigenous seeds".

Country outline of the support rendered to farmer-managed seed systems, as stated in the national agricultural policies

Across the five countries included in the Southern Africa report, some policies recognize the informal sector's important role and promote support to agriculture in areas such as extension, training schemes for farmers, community seed banks, germplasm conservation, seed regeneration, and seed quality control (FAO, 2015).

Zambia

Local farming communities are an important source of readily-available and good-quality seed. Through the quality declared seed (QDS) system, local farmers can collect, improve, and sell locally-developed varieties that meet the required standards, although such seed may not qualify under the seed certification process. QDS is seed that has undergone quality control measures in compliance with QDS quality requirements. QDS is often considered a locally-based and less-stringent alternative to seed certification. The seed is still subject to inspection and certification, but the QDS requirements are less demanding than those for formal certified seed.

Notably, local farmers' varieties tend to be diverse and constantly evolving, thus it can be a challenge for such varieties to pass the DUS test, regardless of whether they are of high quality and highly commercial. As a result, farmers' local varieties usually fail to qualify under the variety release system and cannot be certified for sale. Reforming the legal framework to allow for additional novel systems to record local lineages would help ensure quality in the local seed supply and biodiversity. This would open the door for greater formal recognition of the varieties, particularly if scientific solutions like gene fingerprinting are used. Recognizing these varieties will be an important step towards fulfilling obligations under international treaties like the Nagoya Protocol (under the Convention on Biological Diversity) and International Treaty on Plant Genetic Resources for Food and Agriculture (Kuhlmann et al., 2019).

While national and international companies engaged in global value chains are required to certify commercial seeds, a community-based system (comprising civil society and small-scale private seed enterprises) manages the exchange and marketing of food crops, of both local and improved varieties. A separate entity (comprising NGOs and the public sector) provides healthy planting material for roots and tuber crops only during times of drought or occurrence of disease. The intervention of this latter entity has been key when the yield of hybrid maize crops has dropped due to drought and farmers opt for the cassava planting material available. Quality control is also subsidized by the government, allowing small-scale seed producer associations access to testing facilities. The Seed Control and Certification Institute (SCCI), under the Ministry of Agriculture and Livestock, provides capacity building services to seed companies and seed producer associations. Local seed businesses are being promoted and emerge from community-based systems.

Controls involving variety performance tests and fees, followed by government committees deciding if varieties will be useful for farmers and therefore permitted for seed sale, as well as stringent quality control needed to introduce new varieties were considered lengthy and costly, discouraging private sector participation. To address this, Zambia adopted a system equivalent of standard seed, which is QDS but also certified, although sampling for testing is done in smaller proportions.

Zimbabwe

Policy and institutional support for the farmer-managed seed supply system is weak in Zimbabwe. Article 17 of the Plant Breeders' Rights Act of Zimbabwe allows small-scale farmers (with less than 10 hectares) to propagate the seed of a protected variety on their own land and allows farmers who derive at least 80 percent of their income from farming on communal land to exchange such seed with any other farmer.

Zimbabwe's Seeds Act (Chapter 19:13) stipulates that the obligation to register "shall not apply to the sale of seed which is grown by any farmer and sold by him to a person for use as seed by such person" (i.e., by another farmer). Small-scale farmers in the UMP and Tsholotsho districts have established community seed banks, where they save, use, exchange, and sell farm-saved seeds. In 2013, Zimbabwe Super Seeds – a community-owned cooperative in Zaka district – counted 450 members and certified seeds of cowpea, sugar bean, maize, sorghum, and rice for sale in the local market (Mutonhori and Muchati, 2013).

Compulsory seed certification has been reported to act as a disincentive for local seed companies to invest in low-value, non-hybrid seeds such as sorghum, millet, soyabean, and groundnut (Mutonhori and Muchati, 2013). In Zimbabwe, seed fairs play a crucial role in facilitating the exchange, barter or sale of seeds from one small-scale farmer to another, thereby falling under the exemptions for traditional activities.

Pillar 8 (Resilient Sustainable Agriculture) – that supports multi-stakeholders collaboration among government, civil society, the private sector, farmers, and development partners – quarterly meetings are held to strengthen research on traditional grains vis-à-vis seed production and development, as well to promote the reduction of drudgery in output processing by smallholder farmers.

The Agriculture and Food Systems Transformation Strategy, the country's agricultural policy strategy promotes the production, certification, marketing, and trading of farmer-managed seeds. The Seed Services Directorate of the Department of Research and Specialist Services provides inspection services to farmer-produced seed for a minimum fee.

In addition, to promote their adoption, the government includes farmer-produced seed in government programs, such as the Climate-proofed Presidential Inputs Scheme (Pfumvudza). These programs supply small-grains seed such as cowpea and sorghum, among others and create a market for the farmer-managed seeds, hence encouraging their production.

The Ministry of Lands, Agriculture, Water Fisheries, and Rural Resettlement, in collaboration with the Community Technology Development Organisation (CTDO), developed a new Agriculture Education, Extension, and Research strategy, under the umbrella policy Zimbabwe Vision 2030. The strategy formulation process was supported by the European Union, through the Zimbabwe Agricultural Growth Programme (ZAGP) (The Herald, 2020). Support includes funds to establish two fully-equipped Agricultural Centers of Excellence: one serving the north of the country and prioritizing crop, horticultural, and relevant livestock value chains; the other serving south Zimbabwe, prioritizing large and small livestock value chains and drought-tolerant small grains.

NGOs such as the CTDO, in collaboration with government departments, run and manage the Farmer Field Schools (FFSs) that empower farmers through field-based experiential learning. FFS training enables farmers to make their own observations and analyze them to use the results as a basis for decision making. The Farmer Field Schools for Participatory Plant Breeding (FFS-PPB) field guide used by the CTDO addresses the problem of decreasing plant genetic resources (PGR) and strengthens farmers' seed systems in Zimbabwe. It focuses on two main activities: (i) Participatory Variety Selection (PVS) and (ii) Participatory Varietal Enhancement (PVE). In PVS, farmers test, under local growing conditions, the performance of stable and advanced lines obtained from the breeding stations of the Crops Breeding Institute (CBI), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and the International Maize and Wheat Improvement Center (CIMMYT), aimed at increasing the diversity of local genetic resources. In PVE, farmers will select desirable traits and enhance the genetic homogeneity of the most popular but 'deteriorated' varieties (i.e., not homogeneous, exhibiting suboptimal traits) used in their community.

Through ongoing government engagements through Pillar meetings with the Ministry of Agriculture, the commercialization of small grains is being promoted under public-private partnership arrangements to overcome the problem of processing drudgery. This is also being done in an effort to encourage the Grain Marketing Board – the sole trader of grains – to devise different grading standards such as for the highly-nutritious orange maize to distinguish it from less-nutritious yellow maize, hence creating a price premium for orange maize and other nutritious products like iron-rich beans, orange-fleshed sweet potatoes, and other biofortified products.

Community seed banks are seed collections that are maintained and administered autonomously by the community. Community-level seed enterprises, which are allowed by the government under certain conditions, are an alternative for new, non-hybrid crop varieties with NGO and/or project staff organizing farmers in a village to work as a group. The farmers are provided with source seed, usually acquired from the national agricultural research system, and trained in seed multiplication techniques. The farmers are expected to use part of the seed and distribute/sell the rest to neighboring farmers. The assumption is that this activity will evolve into a financially viable village-level enterprise, capable of recovering the costs of the source seed and advisory services. The Zimbabwe Super Seeds company (a farmer-owned seed enterprise) produces and markets specific varieties that are better adapted to local conditions such as high-saline soils (GRAIN and AFSA, 2018).

Country identification and explanation of some of the good practices that have been supported by the national agricultural policies for the advancement of farmer-managed seed systems

Malawi

Participatory Ecological Land Use Management (PELUM) in Malawi is part of a regional network grouping of non-state actors in Eastern and Southern Africa that advocates for agroecological farming, especially for the resource-poor farmers, to secure food security and improved incomes while also conserving natural resources. PELUM's main focus is conservation of natural resources such as soil, forests, and water in farming, and the promotion of organic farming.

The Purchase from Africans for Africa (PAA Africa) program is being implemented by national governments in Ethiopia, Malawi, Mozambique, Niger, and Senegal, with technical expertise from the Food and Agriculture Organization of the United Nations (FAO) and the World Food Programme (WFP), and financial support from the Brazilian government and the UK's Department for International Development (DFID). By the end of 2014, governments had engaged 5,500 small-scale farmers to supply public institutions with food. In addition to improving small-scale farmer livelihoods, PAA Africa seeks to strengthen markets for traditional crops, diversify diets and stimulating small-scale farmer innovation. The pilot project in Malawi, in particular, procured a diversity of crops (maize, beans, groundnuts, sweet potatoes, onions, tomatoes, banana) and animal proteins (goat meat, fish, and milk) for school feeding programs, a unique aspect relative to existing public procurement programs (Quaker United Nations Office, 2016).

In Malawi, the Biodiversity for Food and Nutrition initiative, titled "The Soils, Food and Health, and Communities (SFHC) project" worked with small-scale farmers in northern Malawi to select and test varieties of legume species to intercrop with maize varieties. Intercropping has reduced land and soil degradation and reduced rates of 'hidden hunger' from vitamin A, zinc, and iron deficiencies. The use of grain legumes has produced ecological and nutritional benefits such as greater availability of iron and zinc, and has enhanced soil fertility, reduced the incidence of pests and diseases, and created more resilient farming systems. The project has since been scaled up and presented to the Malawi Parliament, which has shown interest in promoting the integration of a wide range of food legumes into the national farming system to improve soil fertility and nutrition.

Concern Worldwide, an international humanitarian organization, is promoting the cultivation of orange-fleshed sweet potato, in collaboration with the International Potato Centre (CIP) with the aim of creating decentralized vine multipliers.

Biofortification is embedded in the following key policy documents:

- National Agriculture Investment Plan 2018–2023
- National Multi-Sectoral Nutrition Policy (2017–2021)
- National Integrated School Health and Nutrition Policy
- Malawi Growth and Development Strategy III (2018–2020)
- National Multi-Sectoral Nutrition Strategic Plan (2018–2020)

This demonstrates the government's level of commitment to scaling up biofortification through key public sector players. Further biofortification scaling up activities to reach the targeted rural and peri-urban communities, within the existing policy framework, can be achieved through:

- Integrating nutrient-enriched crops in key public seed and food systems through deliberate policies such as:
- School Feeding Program (biofortified school meals)
- Grain aggregating agencies and programs
- Affordable Input Program
- Agriculture Nutrition-Sensitive Programs
- Private sector participation in the delivery program (seed companies, agrodealers, processors, private aggregators etc.)
- Development partners to incorporate biofortified nutrient-enriched crops in their nutrition-sensitive agriculture programs

In Malawi, the concept of the community seed bank involves the provision of seed on loan to the farmers and a return of seed to the community seed bank of an agreed amount, usually twice the borrowed quantity, whilst the farmers retain the extra harvest. The seed that is paid back is then provided to other farmers. The community seed bank operates on the banking system principle of loans and payback with interest. ICRISAT Malawi has developed another model for community seed banks that integrates farmers, farmer associations, partners, seed source providers, thus enabling seed regeneration and dissemination flow through the community seed banks.

Namibia

The Farming for Resilience (F4R) project (2020–2024) supports the Ministry of Agriculture, Water, and Land Reform (MAWLR) in strengthening the resilience of the agri-food sector with a focus on climate change adaptation capacity among small-holder farmers in communal areas. The project addresses policy and institutional aspects and four main intervention areas: (1) seed production and multiplication; (2) climate-adapted production; (3) agri-business and marketing; and (4) food and nutrition security. The project is jointly implemented by the MAWLR and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in collaboration with the Agricultural Bank of Namibia (Agribank), the Namibian Agronomic Board (NAB), institutions of higher and vocational education, farmers' unions and regional farmer associations, other Ministries, and private sector and non-governmental organizations operating in the sector (GIZ, 2021).

South Africa

In South Africa, most smallholder farmers practice informal seed systems, and more than 90 percent of their needs are met through these informal channels (Van Mele et al., 2011). Informal seed systems are recognized as a major source of neglected and underutilized crop species, e.g., Bambara (ground)nut, vegetatively propagated crops (cassava and sweet potato), medicinal plants (ginger and garlic), pigeon pea, and leaf amaranth, which are all important contributors to nutrition and dietary diversity in rural households.

Farmer-led seed systems, as an effective and proactive response to looming ecological and social crises, require support. Although there is an international push to adopt seed laws and regulations that favor private commercial plant breeders and tend to ignore and undermine farmers' rights, there is, however, a global momentum to promote agroecology, conservation, and sustainable use of plant genetic resources, and farmers' rights. To secure food and seed sovereignty, South Africa urgently needs specific policy and programming to support farmer-led seed systems (Biowatch, 2021). The government of South Africa could develop culinary tourism strategies and use government websites to promote the country as a tourist destination for its local cuisine and food culture.

The NGO Biowatch works to support a just transition to agroecology in South Africa. It has reported outcomes of more people practicing agroecology, more civil society organizations learning and working together to advocate a just transition to agroecology, and more people increasingly valuing the ethical growing, buying, and eating of good food. Biowatch participated in developing an African response to the UN Food Systems Summit. It criticized the African Union's common position regarding the Farmer Seed Systems developed without civil society; and produced a "No to corporate food system. Yes, to Food Sovereignty," declaration.

The government of South Africa, through the Department of Agriculture, Land Reform and Rural Development (DALRRD; formerly the Department of Agriculture, Forestry, and Fisheries (DAFF)), in collaboration with the Alliance of Biodiversity International and CIAT, established three community seed banks in South Africa, which resulted in:

- Training staff of the National Plant Genetic Resources Centre (NPGRC) under the DAFF/DALRRD of the Republic of South Africa (responsible for implementing the initiative) in the effective and efficient technical and organizational aspects of community seed bank management;
- Increased access to and availability of diverse, good-quality seed, and knowledge and seed exchanges among community seed banks and between the NPGRC and community seed banks. The overall aim is to scale these out in the coming years and set up several more, eventually forming a network of community seed banks in the country (Mokoena et al., 2019).

Through DAFF/DALRRD, the Government of South Africa is considering community seed banks as a means to strengthen informal seed systems, support the conservation of traditional farmer varieties, and maintain seed security at district and community levels.

Community seed banks function as an emergency seed supply when farmers experience a shortage of seeds as a result of crop failure due to flooding, droughts, or destruction of crops from pests and diseases. They also serve as a channel to restore 'lost' varieties within the community. Community seed banks are mainly informal institutions, locally governed and managed, whose core function is to preserve seeds for local use. They have existed for about 30 years, conserving, restoring, revitalizing, strengthening, and improving local seed systems, especially, but not solely, focused on local varieties. They are known by a variety of names: community gene banks, farmer seed houses, seed huts, seed wealth centers, seed savers' group, seed associations or networks, community seed reserves, seed

libraries, and community seed banks. Many community seed banks annually regenerate the seeds they conserve, so that they remain well-adapted to local conditions (Vernooy et al., 2019).

DAFF/DALRRD is also supporting participatory variety selection (PVS), which refers to approaches that involve close collaboration between researchers and farmers, and potentially other stakeholders, to bring about plant genetic improvements within crops. PVS uses both scientists' and farmers' knowledge to develop improved crop varieties that are suited to particular agroecological zones (Mokoena et al., 2019). The three community seed banks supported by DAFF/DALRRD, are conducting PVS experiments.

Zambia

Apart from yield, farmers also value other traits in their varieties, such as taste and maturity time. In Zambia, PELUM is an association that works with local seed companies on community seed multiplication and building capacity for setting up community seed banks. The Golden Valley Research Trust (GVRT), a partnership between the government of Zambia and the National Farmers' Union, undertakes research on sustainable production systems. GVRT conducts research on conservation agriculture, development of smallholder livestock systems, and production systems for local crops, including indigenous vegetables (GRAIN and AFSA, 2018).

CTDO is a member of the Zambia Alliance for Agro-ecology and Biodiversity Conservation (ZAAB) and has expertise and experience in FMSSs. It is a not-for-profit NGO registered in 2009 with the objective of contributing to the livelihoods of rural communities through interventions aimed at promoting biodiversity conservation and natural resources management in food production practices. CTDO promotes the management of agricultural biodiversity to enhance sustainable livelihoods through intervention strategies aimed at facilitating restoration and enhancement of traditional plant varieties and animal breeds (GRAIN and AFSA, 2018).

CTDO promotes cultivation of a wide diversity of crops and varieties to contribute to household food and nutrition security. This involves cultivation of crops from the different nutrition groups of starches (maize, sorghum, millet, and cassava), proteins (groundnut, cowpea, Bambara nut, beans, and pigeon pea), minerals and vitamins (traditional vegetables, such as Amaranthus, Hibiscus, Corchorus, and various cucurbits including cucumbers, pumpkins, and gourds). For many of the programs to succeed, they will need to be supported by the right policies. CTDO is thus actively involved in influencing policy on biodiversity through policy engagement, formulation, implementation, and capacity building for relevant stakeholders. CTDO engages in policy advocacy and lobbying designed to bring the voice and experience of local communities to the attention of policymakers. This includes informing seed policies and laws, as well as seed regulations, aiming to bring them in line with FMSS (GRAIN and AFSA, 2018). Zambia's Seventh National Development Plan (2017) notes the importance of the informal farmer seed sector in support of its aim of creating a "diversified and resilient economy for sustained growth and socioeconomic transformation". To address the DUS requirement, Zambia adopted a system equivalent to standard seed, i.e., QDS but certified, although sampling for testing is done in smaller proportions.

Zimbabwe

The Livelihoods and Food Security Program (LFSP) under FAO, working in partnership with the Zimbabwe government, raised awareness on nutrition issues among the population regarding the consumption of bio-fortified crops. Bio-fortification promotion through the LFSP was through:

- Policy and advocacy
- Seed multiplication and delivery
- Demand
- Monitoring and evaluation

The main objective of the LFSP Program was to scale up production and consumption of bio-fortified food in Zimbabwe. LFSP partners based their activities on evidence-based interventions to tackle micronutrient malnutrition and its health effects, as well as assessing factors influencing production and consumption of biofortified crops in Zimbabwe, whilst the breeding and delivering of biofortified crop varieties fell under the Department of Research and Specialist Services (DR&SS).

Most of the sorghum, pearl and finger millet, and legumes, such as Bambara (ground)nut, cowpea, and indigenous vegetables are sourced from farmer-managed seed systems (Visser, 2017).

In order to share seeds and knowledge more widely, farmers organize seed fairs, build community seed banks, and visit centers of agricultural excellence, like the Shashe Agroecology School in Zimbabwe, where they are given hands-on training in the use of traditional practices of seed saving and seed management (GRAIN, 2018). To avert the effects of climate change, farmers make use of indigenous seeds that can withstand harsh climate conditions. They are producing local drought-tolerant varieties of crops such as pearl millet, finger millet, sorghum, cowpea, bean, sesame, and groundnut (*Vigna subterranea*, also known as Bambara nut) (GRAIN, 2018). In Zimbabwe, *rapoko* or finger millet (*Eleusine coracana*) can be used to treat wounds. Across the continent, different millet varieties play a critical role in different ceremonies and occasions. In Zimbabwe, *rapoko* is the chief ingredient in a traditional beer used in rituals and cultural ceremonies (GRAIN and AFSA, 2018).

The Zimbabwe Seed Sovereignty Programme (ZSSP), an alliance of seven Zimbabwean civil society organizations, is working towards greater seed sovereignty in Zimbabwe. ZSSP places strong emphasis on being farmer-led and strengthening women farmers' voices at the regional level through collaboration with farmers' organizations, civil society organizations, research institutions, and academia in Malawi, South Africa, Zambia, and Zimbabwe.

Zimbabwe Smallholder Organic Farmers' Forum (ZIMSOFF) is a national organization that works in different rural areas of Zimbabwe and promotes organic farming as a sustainable and just way forward for farming. ZIMSOFF is an active founding partner of the Zimbabwe Seed Sovereignty Programme (ZSSP). It is structured into regional clusters of local farmers' organizations. In each cluster, households are organized into groups or clubs. A number of these form a community of agroecological practices, also known as a smallholder farmer organizations, and several of these form a cluster. ZIMSOFF sustains that this model addresses basic human rights issues, such as access to adequate and nutritional food, and access to clean water and air. ZIMSOFF supports its advocacy work with strong evidence from the field, with good internal information flow, and a well-conceived communication strategy, working with a number of stakeholders and allies at different levels from the grassroots up to the national level.

At the regional level, ZIMSOFF has become an active participant in the regional Seed and Knowledge Initiative (SKI), through collaboration with farmers' organizations, civil society organizations, research institutions, and academia in Malawi, South Africa, Zambia, and Zimbabwe. ZIMSOFF is a member of the Eastern and Southern Africa Small-scale Farmers Forum (ESAFF) and of La Via Campesina. As a member of La Via Campesina Southern and Eastern Africa region, ZIMSOFF is participating in the regional collectives on climate justice and agroecology, seeds, and biodiversity, including the women and youth articulations. The farmers' organizations' leaders are also active in the advocacy and campaigns of the Alliance for Food Sovereignty in Africa (AFSA). In 2017, ZIMSOFF was the international winner of the

US Food Sovereignty prize for its role in empowering rural farmers in the struggle for seed and food sovereignty (GRAIN and AFSA, 2018).

CTDO Zimbabwe authored the farmers' rights regulations in Zimbabwe and have worked extensively on farmer-managed seed systems. They have been instrumental in facilitating participatory variety improvement. Umguza Rural District Council worked with CTDO in building community resilience from shocks and hazards through crop and livelihood diversification, supported by funding from donor communities under the Zimbabwe Resilience Building Fund titled "Matebeleland Enhanced Livelihood and Nutrition Adaptation", targeting vulnerable rural members including women and the elderly. CTDO has supported FFSs including in the following areas: include Tsholotsho, Mutoko, and Mudzi.

In consultation with government agencies and farmer communities, CTDO initiated an intervention that would prevent further losses to farmers' PGR, prevent genetic erosion, and act as a risk-aversion measure against the effects of climate change by constructing a community seed bank. The purpose of community seed banks is to facilitate conservation, promote on-farm use and easy access to locally-preferred crop varieties. The other important aspects relate to ownership and control of local germplasm by smallholder farmers. These facilities enhance information, knowledge, and seed exchange, farmers' local seed experimentation, and promote community germplasm conservation. By 2018, CTDO and partners had overseen the construction of 15 community seed banks. CTDO engaged the National Gene Bank of Zimbabwe to train project staff, Agritex officers, and community seed bank committees on germplasm collection, storage, and on how to receive or request materials from the national gene bank. CTDO has developed a unique approach to community seed banking through the FFS approach and by complementing conservation of agricultural biodiversity with participatory crop improvement and farmer seed production and distribution. One of the aspects that make Zimbabwe successful in implementing community seed banks is the close collaboration between all stakeholders, including the Ministry responsible for Agriculture, the National Gene Bank, NGOs, local government, research institutions, and the extension services, among whom resources are shared towards a common goal.

CTDO continues to use farmer field-based demonstration plots to showcase new technologies and varieties from the National Agricultural Research Systems and International Agricultural Research Centres. CTDO established the Champion Seed farmer cooperative company to enhance the livelihoods and seed security of smallholder farmers, especially women, by producing and marketing high-quality seeds of diverse crops and varieties through public-private partnerships (CTDO, 2016). CTDO are engaging with smallholder farmers in successful practices that increase crop diversity in farming communities in marginal areas by gaining access to diverse and adaptable crop varieties under the Sowing Diversity = Harvesting Security (SDHS) program.

The CTDO Policy and Advocacy Programme is implementing the Rural Livelihoods Improvement and Advocacy to Strengthen Food Sovereignty in Zimbabwe project in three districts of Zimbabwe: Chegutu, Goromonzi, and Uzumba Maramba Pfungwe. The aim of the project is to improve food self-sufficiency for households through a subsidized agricultural input, establishing FFSs to improve smallholder farmers' knowledge base, and carrying out farmer trainings, particularly on the concept of contract farming. The project further seeks to ensure that civil society organizations, local authorities, and communities are actively engaged in negotiations with the government on policies concerning the conservation and sustainable use of natural resources found within their areas and are empowered to regulate access to genetic resources, and the fair and equitable sharing of benefits arising from their use.

ZimAgriHub is an integrated online knowledge and innovation service platform providing knowledge resources for agricultural research, education, extension officers, and farmers. ZimAgriHub is therefore the third Virtual Agriculture Centre of Excellence complementing the two physical Agriculture Centers

of Excellence, with the aim of bringing together agricultural research, education, and extension through knowledge sharing and exchange.

CIMMYT's germplasm development work provides improved, adapted, and stress-tolerant varieties with particular benefit to resource-poor farmers. CIMMYT has produced both OPVs and hybrids of maize suited to various agroecological zones. It gives preference to applicants from national organizations given its mandate to work in the public interest and its knowledge of the local seed industry and regulatory framework. NARS partners are generally the preferred candidate for ensuring that improved maize hybrids reach the target beneficiaries (CIMMYT, 2021).

Interrogation of the involvement of each country in the regional seed policy harmonization protocol

At the international level, the World Trade Organization's Trade-Related Agreement on Intellectual Property Rights (WTO/TRIPS), which most African countries are party to, states that members must implement some degree of intellectual property protection on plant varieties. This has been interpreted by some (seed) industries as the requirement of states to join the Union for the Protection of New Varieties of Plants (UPOV), which protects the rights of industrial plant breeders and restricts farmers' rights to freely use and exchange seeds (GRAIN and AFSA, 2018).

Zimbabwe has not yet acceded to UPOV; however, consultations to review the Plant Breeders Rights Acts (Chapter 18:1) and ensure that Zimbabwe joins UPOV are at an advanced stage.

Most African states are also parties to international agreements designed to protect agricultural biodiversity and sustain the diversity of farmers' seeds. Such agreements include the Convention on Biological Diversity (CBD), which also recognizes indigenous peoples' and local communities' rights to resources and knowledge, and had a target of zero losses of biodiversity by 2020, in addition to the International Plant Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), which covers 64 agricultural plants and recognizes farmers' rights to their seeds and associated knowledge and to participate in policy and decision making (GRAIN and AFSA, 2018).

Only seven (Burundi, Kenya, Malawi, Rwanda, Uganda, Zambia, and Zimbabwe) out of the 21 states in the Eastern and Southern Africa region have so far harmonized their national seed regulations with the Regional Seed Trade Harmonization regulations (Namibia and South Africa have not done so). The harmonization of seed regulations only perpetuates the dissemination of commercial hybrid seed, not benefitting FMSS, as there are no common standards among member states to aid trade. Zambia has domesticated all three elements of the regulation and boldly claims that their seeds can be freely traded within the region.

In 2013, two-thirds of SADC countries signed the Memorandum of Understanding (MoU) to operationalize the SADC Technical Agreements on Harmonization of Seed Regulations with the intent of facilitating the movement of high-quality seed across national borders. The SADC Harmonized Seed Regulatory System (HSRS) establishes commonly-agreed standards, rules, and procedures related to Seed Variety Release, Seed Certification and Quality Assurance, and Quarantine and Phytosanitary Measures for Seed. The concept of 'harmonization' in this context emphasizes the need to integrate smaller national

seed markets into larger regional markets, ease movement of seed across borders, increase availability and diversity of seed, and expand farmers' access to improved seed. Integrating smaller national seed markets into larger regional markets might be an attractive idea, but the high costs and time requirements pose considerable barriers to entry.

For the SADC HSRS to succeed, it is critical that the SADC Member States turn their signatures into action, first reviewing their existing seed trade laws and policies, then aligning them with the guidelines. In some instances, Member States may choose to go one step further and develop a national seed law that is fully aligned with the SADC HSRS, domesticating the regional guidelines as enacted law.

Malawi

The HSRS is a SADC-wide policy that establishes elevated standards for seed production and trade among all 16 SADC nations, and allows improved, high-quality seed to move quickly across SADC national borders. To date, Malawi has signed the SADC HSRS MoU, and has made significant progress towards national adoption of all three elements of the regional policy: variety release, seed certification and quality assurance, and quarantine and phytosanitary measures for seed. Malawi is anticipated to enact a seed bill, making it the second SADC nation (after Zambia) to fully adopt the HSRS (Feed the Future Southern Africa Seed Trade Project, 2021).

Zambia

By 2018, Zambia had adopted two out of three of the SADC HSRS components, the Seed Variety Release and Seed Certification and Quality Assurance, leaving only the Quarantine and Phytosanitary Measures for Seed unimplemented. The Zambian Ministry of Agriculture's National Plant Protection Organization (NPPO) developed three Statutory Instruments to cover the last component of the SADC HSRS: Pest Risk Analysis, Surveillance, and Phytosanitary Procedures. As a result, on June 18, 2020, the Ministry of Justice approved the final version of the Statutory Instruments, known as the Phytosanitary Certification Regulations 2020 (Surveillance, Pest Risk Analysis, Phytosanitary Procedure, and Phytosanitary Services Fees), and published them in the Government Gazette, making Zambia the first SADC nation to fully adopt the SADC HSRS on August 14, 2020 (Nagarajan et al., 2020).

Zimbabwe

Zimbabwe has harmonized its national seed regulations with the regional seed trade harmonization regulations (SADC HSRS) and is striving towards adoption of its elements.

Gender and women's empowerment

Fifty percent of farmers around the world are women, yet they are rarely recognized for their contributions to food production and security. In most developing countries, women still cannot own land or make decisions regarding their households and family farms. Men remain the principal receivers of agricultural resources, deciding what crops will be grown, how they are sold, and what the family can do with the profits. Progress has been made at varying levels in the five countries under study to address these gender disparities, but much work still needs to be done towards gender equality and equity.

Malawi

Despite their critical role in food production for their households, Malawian women have little control over land, even when it is their own. The lack of access to economic resources is frequently cited as a major impediment to gender equality and women's empowerment, and is a particularly important factor in making women vulnerable to poverty. The National Gender Policy (2011) aims to raise awareness on gender matters, women's legal rights, diet and the efficient use of food for nutrition, and women's economic empowerment, in conjunction with the poverty alleviation program. To address some of the challenges cited above, USAID in partnership with the Government of Malawi and a wide variety of Malawian institutions, is promoting gender equality and women's empowerment by mainstreaming gender issues in activities across sectors. In addition, USAID/Malawi has included women's empowerment and adolescent girls' activities in the sustainable economic growth, democracy and governance, and education sectors. ICRISAT Malawi's strategic focus has been on women and youth to unlock the potential of legume-based farming systems. Importance is given to strengthening the seed supply by promoting second generation (basic) seed production through farmer clubs.

Namibia

To achieve women's empowerment and gender goals in Namibia, the Co-operatives Act (1996) was adopted, which requires a substantial number of women to form cooperatives. The Employment Act, Communal Land Reforms Act, and the Labor Act all favor women's participation in the economic sphere. In addition, the government introduced the Build Together Programme to help single mothers. Namibia developed and adopted its first National Gender Policy (NGP) in 1997, which was reviewed in 2020. This aimed to close the gaps created by the socio-economic, political, and cultural inequalities that existed previously in Namibian society. To ensure the implementation of the policy, a National Gender Plan of Action was developed in 1998.

Despite these policies and enactments, high levels of inequality prevail, especially evidenced by the high levels of violence against women and children, and the feminization of HIV and AIDS. Achievement of women's full empowerment in Namibia is still a long way off. Legal equality has not transformed into structural equality. Women remain subject to the lowest levels of employment and struggle with practical impediments that limit their economic independence and self-sufficiency. Despite there being no legal barriers, women's access to land is also limited, due to continuing discriminatory practices, and limited implementation and awareness of existing laws and rights.

South Africa

Acknowledging the evident gender and racial disparities in South Africa, in 2016 the government gazetted the national policy framework for women's empowerment and gender equality. This policy framework recognizes that women should not be classed as a homogenous group. This principle must inform and form core of all policies and programs that will lead to gender equality and address economic poverty and social disparities. Distinctions – based on race, class, sexuality, disability, age, and other variables – should not be overlooked or taken for granted, and similarities should also be harnessed to strengthen initiatives designed to reverse past gender discrimination. In 2020, the government approved a women's empowerment policy proposing that 50 percent of the allocation of agricultural farming land under the Redistribution Programme should be destined for women, 40 percent for youth, and 10 percent for people with disabilities.

In support of the country's farmer-managed seed systems, DAFF/DALRRD and Bioversity International (now the Alliance of Bioversity International and CIAT) have made some strides in women's empowerment through a local community seed-banking system. In Gumbu, Limpopo province, a community seed bank was established with the full involvement of women. Women give priority to nutritious and tasty crops and varieties, which have long-term storage properties. According to Gumbu's women, the seed bank is not only a repository for their seeds, but also a platform for women to meet, interact and act on other village matters.

Zambia

In Zambia, as in many other countries, the government, together with NGOs, have launched certain policies and programs aiming to encourage women's participation in development activities. The government of Zambia now has a gender policy in place, which is backed by the Zambia national agricultural policy 2012–2030 – a cross-cutting policy that envisions a competitive and diversified agricultural sector driven by equitable and sustainable agricultural development, among other strategies, through improving access to productive resources and services for small-scale farmers, especially women and young farmers. However, even though measures have been established to increase women's involvement in different activities, participation levels remain low. Development agencies continue to play significant roles in advancing women's empowerment in agricultural and farmer-managed seed systems. AgriSmart Zambia works to better empower women agricultural producers to reach their potential. The institution promotes women's leadership in agriculture, fosters policy changes that increase women's access to land and other assets, and strengthens women's access to financial and extension services. AgriSmart encourage women to play a decisive role in food security, dietary diversity and children's health. The Swedish International Development Agency (SIDA) Agricultural Support Programme Zambia, within the Ministry of Agriculture, has effectively reached women and transformed gender relations at the household level, resulting in women's economic empowerment and improving their position within the community.

Zimbabwe

Whilst there are many gender gaps across various countries in Africa, Zimbabwe has made strides in addressing gender disparities. According to the National Gender Profile of Agriculture in Zimbabwe (2018), rural women constitute 70 percent of household and family labor in rural communities. In ensuring that the economic empowerment of rural women is realized, the government has initiated

different laws, policies, and projects that directly benefit women, especially those in rural areas. These efforts are being echoed in the Zimbabwean laws pertaining to agricultural land.

Regarding land access, only 10 percent of the land under Zimbabwe's land reform programme (known as Fast Track Land Resettlement programme) (2000) was allocated to women, falling short of the 20 percent quota stipulated in Zimbabwe's constitution. This is mainly due to cultural practices whereby land is only accessible to women through patrilineage. However, section 17 of the constitution is transparent about repealing harmful customary and cultural practices that hinder gender equality and women's rights, referring specifically about women having equal access to opportunities and, in this case, land. Control of agricultural land remains in the hands of traditional leaders, some of whom may not be necessarily implementing gender-inclusive policies regarding land distribution and allocation.

Zimbabwe's National Gender Policy importantly provides guidelines and the institutional framework to engender all sectoral policies, programs, projects, and activities at all levels of society and the economy. In 1995, the Ministry of Women's Affairs, Gender Small to Medium Enterprises and Community Development was created to oversee coordination of all gender programs and to facilitate gender mainstreaming in all ministry sectors. However, despite Zimbabwe being an agricultural economy, the national agricultural policy framework (2018–2030) only mentions gender mainstreaming (in all its sectors) without determining an explicit set of priorities for women.

Despite this shortfall in the policy framework, several organizations have championed women's empowerment in agriculture. These include:

- The Women Farmers, Land, and Agricultural Trust (WFLAT) in Zimbabwe, which is providing training and support networks for women farmers so they can become a successful part of the agricultural community. Those being helped by the organization attend workshops and receive training in their local communities. Participants are encouraged to meet with other women farmers to share knowledge, ideas, and solutions.
- The Community Technology Development Organisation (CTDO), which is working with women farmers in various communities towards resilience building for sustainable livelihoods. CTDO is also advocating for the national recognition of farmer-managed seed systems. The organization is currently working through FFSs in advancing participatory varietal selection and evaluation of farmer-preferred varieties, some of which have reached varietal release stage. Through the championing of farmer seed systems, CTDO through OXFAM sponsored a woman farmer from Murewa to represent farmers at the UN Food Systems Convention.
- Zimbabwe Smallholder Organic Farmers' Forum champions farmer-managed systems through agroecological farming systems across Zimbabwe.

The ZAZI Growers' Network is a social venture aimed at empowering women in the Zimuto area of Zimbabwe so that they also become competitive in the agricultural sector regardless of their background. This is done by providing agricultural inputs, offering technical support to improve farm yields and increase produce quality, as well as helping with marketing agricultural products and connecting women with Zimbabwean agricultural organizations.

Conclusions and recommendations

Recognition of the complementarity of the formal and informal seed sectors offers opportunities to improve seed supply by supporting farmers' seed production. The current legislative frameworks in the

five countries analyzed significantly limit these possibilities for support. There is then an urgent need to re-orient this framework to improve seed supply among all farmers.

An analysis of strengths and weaknesses of both the informal and formal seed sectors reveals important complementarity and opportunities for strengthening the informal sector. Weaknesses have been identified in the areas of seed technology, introduction of new materials and genes, and in barriers to seed dissemination. These weaknesses present opportunities to improve the informal seed sector, particularly since they are the points on which the formal sector does hold a comparative advantage.

The recognition of complementarity opens possibilities to define and structure a formal seed sector that effectively operates to meet local farmers' seed needs. Building on the strengths of the farmers' seed system and considering farmers as an integral part of the seed supply chain/system offers the formal sector opportunities to focus on the key activities of national seed supply, for which they have expertise and are well equipped. The impacts of COVID-19 and awareness of the immense health benefits flowing from farmer seeds, reveal a need to upscale and commercialize farmer seed production, and to reduce processing drudgery of the final products for the benefit of all.

Agricultural biodiversity is critical for food security where smallholder farmers use both 'improved' crop varieties, as well as locally-developed varieties. Poor smallholder farmers cannot afford the more expensive, improved varieties. On the other hand, access to local varieties is limited due to inadequate local seed availability, resulting in farmers planting whatever seed is available and not necessarily because this is the optimal seed choice.

Agricultural biodiversity and its management will be enhanced through successful use of (i) community seed banks; (ii) online knowledge and innovation service platforms that provide knowledge resources for agricultural research, education, extension, and farmers; (iii) centers of excellence; (iv) seed fairs; (v) demonstration plots; (vi) dissemination of quality declared seed (QDS); and (vii) up-scaling collaboration between government, civil society, farmers, and private players.

The ITPGRFA recognizes the important role of farmers in the conservation and use of crop diversity through the concept of Farmers' Rights. It is up to national governments to promote legislation and measures that include:

- Protecting traditional knowledge relevant to plant genetic resources for food and agriculture
- Asserting the right to equitably participate in sharing benefits arising from the use of plant genetic resources
- Asserting the right to participate in making decisions on matters related to the conservation and sustainable use of plant genetic resources
- Asserting the right to save, use, exchange, and sell farm-saved seed.

There is a need to recognize farmer-managed seed systems and provide policy and legislative support that should address increasing the availability of seed of a wide range of crop varieties (Nkhoma and Nagamba, no date).

Closing the gender gap in agriculture will require action on multiple fronts. The first is land rights. In most of sub-Saharan Africa, women rarely own land. Instead, women farmers usually access land through a male relative, most commonly a husband, brother, or father. This arrangement leaves them highly vulnerable; a death, divorce, or simply a man's change of mind can leave a woman farmer landless overnight. Considering that women are the major players in agriculture, enabling women farmers to control their resources is important for achieving not only United Nations Sustainable Development Goal (SDG) 5 – gender equality and empowerment of women and girls – but also many others, including eliminating poverty (SDG1) and ending hunger (SDG2).

References and resources

- African Centre for Biodiversity (2018). Towards national and regional seed policies in Africa that recognise and support farmer seed systems: Policy discussion document. African Centre for Biodiversity, Johannesburg, South Africa. <https://acbio.org.za/wp-content/uploads/2022/04/Seed-Policies-in-Africa-report-WEB.pdf>
- African Centre for Biodiversity (2019). South Africa's new seed law and its impacts on farmer seed systems and agricultural biodiversity. African Centre for Biodiversity, Johannesburg, South Africa. South Africa's new seed law and its impacts on farmer seed systems and agricultural biodiversity | ACB (acbio.org.za)
- Biowatch (2021). Biowatch Briefing. Farmer-led Seed Systems: Securing food sovereignty in the face of looming ecological and social crises. <https://biowatch.org.za/download/farmer-led-seed-systems/>
- Business Scouts for Development/GIZ (2022) Sector brief Namibia: Agriculture. GIZ, Eschborn, Germany. <https://www.giz.de/en/downloads/giz2022-en-namibia-agriculture.pdf>
- CIMMYT (2021). Acquisition and Use of CIMMYT Maize Hybrids and OPVs for Commercialization. Acquisition-and-use-of-CIMMYT-maize-hybrids-and-OPVs-for-commercialization-v2021-08-19.pdf
- Community Technology Development Organisation [CTDO] (2016). 2016 Annual Report. CTDO, Harare, Zimbabwe. <http://www.ctdt.co.zw/wp-content/uploads/2018/03/CTDO-ANNUAL-REPORT2016Final-.pdf>
- Callo Jr, D., Visser, B. Salazar, R., Manicad, G. (2016). Facilitators' Field Guide for Farmer Field Schools on Participatory Plant Breeding in Maize, Pearl Millet, Sorghum and Groundnut. CTDT, Harare, Zimbabwe. Facilitators' Field Guide for Farmer Field Schools on Participatory Plant Breeding in Maize, Pearl Millet, Sorghum and Groundnut.pdf (greenbrownblue.com)
- FAO [Food and Agriculture Organization of the United Nations] (2015). Voluntary guide for national seed policy formulation. FAO Commission on Genetic Resources for Food and Agriculture. FAO, Rome, Italy. <https://www.fao.org/3/i4916e/i4916e.pdf>
- Feed the Future Southern Africa Seed Trade Project (2021). Food for Thought from Malawi's Dr. Grace Kaudzu: Raising up Women through Agriculture. Agrilinks. <https://agrilinks.org/post/food-thought-malawis-dr-grace-kaudzu-raising-women-through-agriculture?msclkid=848ceb5ca68e1ec8144cb01a5d094a5>
- GIZ [Deutsche Gesellschaft für Internationale Zusammenarbeit] (2021). Improving rural livelihoods in Namibia with Farming for Resilience (F4R). GIZ, Eschborn, Germany. <https://www.giz.de/en/worldwide/97268.html>
- Government of Malawi (2010). National Agriculture Policy. Ministry of Agriculture and Food Security, Malawi. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC141073/>
- Government of the Republic of Zimbabwe. Ministry of Lands, Agriculture and Rural Resettlement (2018). National Agriculture Policy Framework (2018-2030). Ministry of Lands, Agriculture and Rural Resettlement, Harare, Zimbabwe. <http://www.livestockzimbabwe.com/Updates/Draft-%20Zimbabwe%20Agriculture%20National%20Policy%20Framework.pdf>
- GRAIN and the Alliance for Food Sovereignty in Africa (AFSA) (2018). The real seeds producers: Small-scale farmers save, use, share and enhance the seed diversity of the crops that feed Africa. GRAIN, Barcelona. <https://grain.org/en/article/6035-the-real-seeds-producers-small-scale-farmers-save-use-share-and-enhance-the-seed-diversity-of-the-crops-that-feed-africa>
- Hlatshwayo, S.I. Modi, A.T., Hlahla, S., Ngidi, M., Mabhaudhi, T. (2021). Usefulness of seed systems for reviving smallholder agriculture: A South African perspective, *ajfand*, Volume 21 No. 2. 10.18697/ajfand.97.19480
- International Trade Administration (2021a). Namibia - Country Commercial Guide. International Trade Administration, Washington D.C., USA. <https://www.trade.gov/country-commercial-guides/namibia-market-overview>
- International Trade Administration (2021b). South Africa - Country Commercial Guide. International Trade Administration, Washington D.C., USA. <https://www.trade.gov/south-africa-country-commercial-guide>

- International Trade Administration (2021c). Zambia - Country Commercial Guide. International Trade Administration, Washington D.C., USA. <https://www.trade.gov/zambia-country-commercial-guide>
- JICA Malawi Office (2022). Sector position paper. Agriculture. <https://www.jica.go.jp/malawi/english/activities/c8h0vm00004bpzlh-att/agriculture.pdf>
- Kuhlmann, K., Zhou, Y., and Keating, S. (2019). Seed Policy Harmonization in COMESA and SADC: The Case of Zambia, Working Paper, Syngenta Foundation for Sustainable Agriculture. https://www.syngentafoundation.org/sites/g/files/kgtney976/files/document/sites/g/files/zhg576/f/zambia_case_study_final_edit_8_march_2019_clean.pdf
- Mokoena, M.L., Sema, P.R., Maluleke, N.L., Tjikana T.T, Dibiloane, M.A., Vernoooy, R. (2019). Strengthening the community seed banks in South Africa. Bioversity International, Rome, Italy and Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. <https://cgspace.cgiar.org/handle/10568/105804>
- Mutonhori S. and Muchati J. (2013). A situational analysis of the scope for smallholder seed development and marketing. Working Paper. Ruzivo Trust. Harare. Zimbabwe.
- Nagarajan, L., Naseem, A., Carl Pray, C. (2020). Seed Policy Reforms in Zambia. *Agrilinks*. <https://agrilinks.org/post/seed-policy-reforms-zambia?msclid=74716db4a68d1eca3998e4c837271cf>
- Republic of Namibia. (2015). Namibia Agriculture Policy, 2015. <https://www.fao.org/faolex/results/details/es/c/LEX-FAOC175768/#:~:text=The%20Namibia%20Agricultural%20Policy%202015,promote%20development%20of%20national%20agriculture>
- Nkhoma, C.N., Nangamba, J. [no date] Farmer seed systems (FSS) in Saharan Africa: A case study on Farmer-managed seed Systems in Zambia. Zambia Alliance for Agroecology and Biodiversity, Lusaka, Zambia. https://grain.org/system/attachments/sources/000/005/838/original/Zambia_report_-EN-.pdf
- Plant Breeders Rights Acts (Chapter 18:1), Zimbabwe. <https://faolex.fao.org/docs/pdf/zim36503.pdf>
- Quaker United Nations Office (2016). Dialogue to Action Series Consultation on: Small-scale farmers, agricultural biodiversity and the role of the public sector: Government means of supporting small-scale farmers and agricultural biodiversity. QUNO, Geneva and New York. <https://quno.org/sites/default/files/resources/Government%20Means%20of%20Supporting%20Small-Scale%20Farmers%20and%20Agricultural%20Biodiversity.pdf>
- Republic of South Africa (2018). The Plant Improvement Act No. 11 of 2018 (English/isiZulu). <https://www.gov.za/documents/plant-improvement-act-11-2018-english-izulu-29-mar-2019-0000>
- Republic of Zambia (2016). Second National Agricultural Policy. <http://cbz.org.zm/public/downloads/SECOND-NATIONAL-AGRICULTURAL-POLICY-2016.pdf>
- The Herald (2020). Ministry Formulates Policy to Develop Agricultural Education. <https://www.herald.co.zw/ministry-formulates-policy-to-develop-agricultural-education/>
- USAID (2020). Zambia first nation to domesticate regional seed trade policy: The Case for Seed Trade Harmonization. <https://www.usaid.gov/zambia/news/zambia-first-nation-domesticate-regional-seed-trade-policy>
- Van Mele, P., Bentley, J.W. and Guei, R.G. (eds.) (2011). African seed enterprises: sowing the seeds of food security. CABI, Wallingford, UK
- Vernoooy, R., Matelele, L.A Sema, R.P., Mokoena, M.L. Maluleke, N.L., Tjikana, T., Phora, G. Dibiloane, A. (2019). Green shoots. Community seedbanking in South Africa: Endeavours and outcomes 2016-2019. Bioversity International, Rome, Italy and Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. <https://cgspace.cgiar.org/handle/10568/101495>
- Visser, B. (2017). The impact of national seed laws on the functioning of small-scale seed systems: A country case study. Scientific Advisor Diversity =Harvesting Security, Oxfam Novib, The Hague, the Netherlands. <https://sdhsprogram.org/document/the-impact-of-national-seed-laws-on-the-functioning-of-small-scale-seed-systems-a-country-case-study/>
- ZimAgriHub (2021). Virtual Agriculture Centre of Excellence. <https://www.zimagrihub.org.zw/news/centres-excellence-critical-agric-transformation>

Zimbabwe Seeds Act (Chapter 19:13). <https://zimlil.org/akn/zw/act/1965/40/eng%402016-12-31>

Zimbabwe Vulnerability Assessment Committee (ZimVAC) (2020) Rural Livelihoods Assessment Report. ZimVAC, Harare, Zimbabwe. <https://docs.wfp.org/api/documents/WFP-0000119650/download/>



Photo 4. Farmer-managed seed systems deserve more recognition and support. Jericho community seed bank, South Africa. Credit: Bioversity International/R. Vernooy

SYNTHESIS AND CONCLUSION: FARMER-MANAGED SEED SYSTEMS IN AFRICA LEFT ON THE FRINGES

Ronnie Vernooy, Joyce Adokorach, Dominic Kimani, Anna Marwa, Alfios Mayoyo, Daniel Nyadanu

What can be concluded from this review of seed-related policies and laws in 14 African countries, regarding the role of farmer-managed seed systems in national seed sector development and transformation, and in agricultural development? Is there any form of practical support for farmer-managed seed systems in terms of (i) recognition; (ii) appreciation and valuation; (iii) political, technical, organizational, and financial support; or (v) incentives? If not, are there any recent examples of revisions to policies and laws that centralize farmer-managed seed systems in national seed sector development? What are the most important issues faced by farmer-managed seed systems that are addressed in these revisions?

Overall assessment: lack of recognition of and support for farmer-managed seed systems

Table 1 presents the overall assessment of seed-related policies and laws, based on eight dimensions: (i) acknowledgement of the existence of diverse farming/seed systems; (ii) recognition of the role played by farmer-managed seed systems; (iii) support for farmer-managed seed systems; (iv) recognition of and support for community seed banks; (v) recognition of and support for local seed businesses; (vi) an alternative variety registration system; (vii) referral to farmers' rights regarding seeds; and (viii) recognition of and support for women's roles in agriculture and seed systems.

Table 1: Assessment of support for farmer-managed seed systems in 14 African countries' seed-related policies and laws

	Acknowledgement of existence of diverse farming/ seed systems	Recognition of farmer-managed seed systems' roles	Support for farmer-managed seed systems	Recognition of and support for community seed banks	Recognition of and support for local seed businesses	Alternative variety registration system	Referral to farmers' rights regarding seeds	Recognition of and support for roles of women in agriculture/ seed systems
Benin	No	No	No	No	No	No	No	Yes (general)
Burkina Faso	Yes	No	No	No	Yes	No	No	No
Burundi	Yes	No	No	No	Yes	No	No	No
Ghana	Yes	Yes	No	No	Yes	No	No	Yes (general)
Kenya	No	No	No	No	No	No	No	No
Malawi	Yes	Yes	No	No	No	No	No	Yes (general)
Mali	Yes	Yes	Yes	No	Yes	No	No	Yes (seeds)
Namibia	Yes	Yes	No	No	Yes	No	No	Yes (general)
Nigeria	Yes	Yes	Yes	No	Yes	No	Yes	Yes (general)
South Africa	Yes	No	No	Yes	No	No	No	Yes (land)
Tanzania	No	No	No	No	Yes, QDS	No	No	Yes (general)
Uganda	Yes	Yes	Yes	Yes	Yes, QDS	Not yet	No	Yes (general)
Zambia	Yes	Yes	Yes	Yes	Yes, QDS	No	No	Yes (agriculture)
Zimbabwe	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes (land)

QDS: Quality declared seed

Although most of the seed-related policies and laws reviewed for this study acknowledge that farmer-managed seed systems exist, the 14 country reviews do not offer many positive results related to the recognition of and concrete support (policy, legal, technical, operational, and financial support) for farmer-managed seed systems. For the most part, the seed-related policies and laws that have been or are being developed across the 14 countries in Western, Eastern, and Southern Africa do not describe the roles and contributions, nor express the value, of farmer-managed seed systems as part of the national seed sector. Minor exceptions are Mali, Uganda, Zimbabwe, and, to a lesser extent, Nigeria and Zambia. In Mali, there is some recognition of the roles of farmer-managed seed systems, including the functions of conservation, improvement, and provision of plant genetic resources. In recent years, a more supportive environment has emerged in Uganda, with attention paid to the importance of farmer varieties. In Zimbabwe, a more supportive environment has been in place for some time, with acknowledgement of the role and value of indigenous seeds. Nigeria has recently embraced the notion of a pluralistic seed sector and Zambia has some recognition of farmer-managed seed systems. These findings do not substantially differ from those of an earlier review of African seed laws, which was narrower in scope but broader in geographic coverage (all African countries were included) (Herpers et al., 2017), indicating little improvement in the last five years.

Detailed assessment

The predominant narrative does not seriously address the roles of farmer-managed seed systems (Box 1); consideration is fleeting or negative and directs these systems towards “modernizing” and becoming commercial. Although farmers across Africa continue to rely heavily on seed of farmers’ varieties and farmers in many countries have successfully improved these varieties, seed-related policies and laws continue to ignore this. The development potential of improved farmers’ varieties is hindered by this lack of recognition and support.

Box 1: Resilient food systems require resilient seed systems

Well-functioning farmer-managed seed systems can be resilient and contribute to resilient food systems by:

- Ensuring access to seeds in terms of preference, affordability, and temporal availability.
- Ensuring availability in terms of production and distribution.
- Guaranteeing seed quality in terms of adaptability, safety, and longevity.
- Guaranteeing seed choice and diversity.
- Producing crops that underpin a healthy diet.
- Recognizing and respecting seed as social and spiritual capital (Subedi and Vernooy 2019).

There has been some improvement in the recognition of and support for community seed banks in recent years. Community seed banks have gained governments recognition in South Africa, Uganda, and Zambia. Through the operations of national plant genetic resource units – PGRC in Uganda and South Africa, and the National Gene Bank under the Zambia Agricultural Research Institute in Zambia – community seed banking is receiving institutional (organizational, technical, and financial) support.

In Zimbabwe, community seed banking receives technical support from the National Gene Bank and governmental crop research units as part of a collaborative agreement with CTDO, the champion NGO of national community seed banking. CTDO currently supports 14 community seed banks. However, community seed banks have not obtained legal status in any of these countries. This seriously hinders further development, e.g., opening a bank account, preparing and presenting funding proposals, and applying for government or international support (Box 2). In Kenya, formal collaboration between the National Gene Bank and community seed banks and seed savers (led by the Seed Savers Network of Kenya) is incipient, with first meetings held and joint activities organized in 2021 and 2022.

Box 2: Empowering community seed banks

Community seed banks could be empowered to serve as coordinating or nodal platforms bringing together farmers, plant breeders, gene bank managers, and others, thereby becoming integral parts of national conservation systems (Vernooy et al., 2015). This would require:

- Legitimization of community seed banks as local organizations for the conservation of agricultural biodiversity, organization of seed fairs, participatory seed exchanges, and community seed production and distribution.
- Support for the conservation and revival of existing varieties, by providing access to and improving the availability of rare and unique local varieties.
- Support for participatory variety selection to generate added value for cultivation and use of existing varieties.
- Support for participatory plant breeding to develop new varieties and provide options for access to new diversity to cope with adversity and strengthen farmers' selection skills.

Support for local seed business development is more common – including for the last decade in Uganda, through the Integrated Seed Sector Development program funded by the government of the Netherlands. Local seed business development support includes the use of QDS in Tanzania, Uganda, and Zambia. However, QDS in these countries does not include unregistered farmers' varieties of either local or improved types (e.g., developed through participatory variety selection or participatory plant breeding). This represents a huge development gap and a missed opportunity to recognize and reward the value of local varieties and the contributions of farmers and their organizations (e.g., community seed banks) to seed conservation, sustainable use, and improvement (Box 3; see also De Jonge et al., 2021; Vernooy et al., 2022).

Box 3: Supporting farmer-led seed production and marketing

Viable seed enterprising requires (Vernooy et al., 2022):

- Sustained demand for quality seed, fueled by high demand for farmer produce, and/or support for farmer- and community-based seed development.
- Availability of improved varieties from public sector breeding programs.
- Technical skills (seed production, conditioning, quality control, and certification), entrepreneurship (planning, management, monitoring, networking, accounting) and institutional capacities (design, review, implementation, and monitoring of policies and laws);
- Ownership and recognition of the roles of women and profitability.
- Connections with the formal seed, seed conservation, and plant breeding sectors
- Access to affordable support services, e.g., extension, credit.
- Effective communications, appealing branding, and agile marketing.
- Conducive agricultural and seed policy environment that is supportive of the nature and scale of the seed enterprise envisaged. This includes recognition of farmers' privilege (the right to save, exchange, and sell seed, including commercial varieties) for farmer-based seed enterprises, support for privatization and commercialization of agricultural services, and the recognition of plant breeders' rights. It will require novel seed quality control and variety registration criteria and procedures that recognize and reward responsible seed stewardship.

Seed-related policies and laws in all of the countries assessed do not explicitly refer to farmers' rights as described in Article 9 of the ITPGRFA, to which 12 of the 14 countries are parties. National implementation of farmers' rights remains a major task. In Zimbabwe, CTDO has led a process to "domesticate" (their own term) farmers' rights. Some progress has been made in recent years through active engagement with government agencies, e.g., in drafting access and benefit-sharing regulations, a review of legislation concerning the conservation and sustainable use of biodiversity, and, most promisingly, work on a Farmers' Rights policy and law. Zimbabwe is the only country among the 14 where this is happening.

Concerning gender and women's empowerment, some attention is being paid to the roles of women in agriculture at large and a number of women-centered initiatives have been designed in 11 of the 14 countries. However, the overall assessment is that effective implementation is largely absent. Only Mali pays specific attention to women's roles within seed systems.

Country review: Snapshots

Noteworthy elements among the 14 national reviews are presented below.

From the Ghana review: Ghana's seed policy recognizes the informal seed sector and the community-based seed system. However, all improvement efforts have focused on the formal seed sector. Project 9 in the National Seed Plan aims to support the informal seed sector to become more useful as a source of quality seeds to the large majority of farmers who depend on it, to systematically strengthen linkages with the formal sector, and contribute to national seed industry growth. This intervention has

created a hybrid seed system, where farmers are supported with foundation seed and other inputs to multiply and distribute to other farmers in their communities. However, the passing of the Plant Variety Protection Bill (2020) has constrained farmer-based systems as it bans local farmers from multiplying and distributing improved seeds. The Plants and Fertilizer Act (2010) also criminalized the sale of seed without appropriate labels and packaging, thereby rendering the farmer-based seed exchange and sale system illegal.

From the Mali review: Mali's current seed policy focuses more on the formal than the informal seed system. However, Article 51 of the Agricultural Orientation Law (2006) provides for food sovereignty as part of national agricultural development policy. Thus, the State recognizes past, present, and future contributions of Malian smallholder farmers to the conservation, improvement, and provision of the agricultural and food plant genetic resources necessary to achieve food sovereignty. Farmer-managed seed systems will be recognized and supported to enable farmers to maintain, improve, and sustainably use plant genetic resources, knowledge, and innovations. In 2011, the government passed its National Gender Policy to address issues faced by women when accessing the seed system. The policy states that all women must have access to seed resources for agricultural commodity production nationwide, but implementation has been slow and is poorly monitored.

From the Nigeria review: The National Seed Policy (2014) contains a provision giving farmers the right to use, exchange, share or sell their farm-saved seeds among themselves without restrictions. Local seed producers help to supply seeds for crops that are not in mainstream seed production programs. Farmers' rights are protected under the National Seed Policy, which has given local farmer groups the impetus to improve community-based seed production.

From the South Africa review: The government of South Africa, through the Department of Agriculture, Land Reform, and Rural Development (DALRRD)—formerly the Department of Agriculture, Forestry, and Fisheries, DAFF)—in collaboration with the Alliance of Bioversity International and CIAT, established three community seed banks in South Africa, which::

- Trained staff of the National Plant Genetic Resources Centre (NPGRC) under DAFF—who were responsible for the initiative's implementation—in effective and efficient technical and organizational aspects of community seed bank management;
- Increased access to and availability of diverse, good-quality seed, and exchanges of knowledge and seed among community seed banks, and between the NPGRC and community seed banks. The overall aim is to scale these community seed banks in the coming years and set up several more, eventually forming a network across the country.

From the Tanzania review: Tanzania's legal and policy landscape for the agricultural sector has progressively incorporated a gender dimension, albeit with varying levels of responsiveness. However, implementation of laws and policies that uphold and protect women's rights and gender equality has been inadequate. There is also a lack of gender-disaggregated data that would facilitate a better understanding of women's issues and processes of gender inequality in Tanzania, and would provide a foundation for the development of evidence-based policies, programs, and projects. Appropriate, disaggregated data could underpin a rigorous monitoring and evaluation framework capable of demonstrating results that are needed for the inclusion of gender-responsive planning, budgeting, and implementation.

From the Uganda review: The National Seed Policy (2018) recognizes the informal seed sector as a source of seed and planting materials. Cognizant of this fact, the Government of Uganda has established strategies to enhance the informal seed system and transform it into a viable commercial sector through farmer-led seed entrepreneurs. The policy provides for seed-producing groups to transition to the formal system through registration of their businesses or associations and formal listing of the varieties

they deal with. This provision has enabled some community seed banks to produce seed for commercial purposes under the QDS system, after registration as local seed businesses. For QDS production, the varieties must be on the National Varieties Register; landraces or improved landraces held by community seed banks are currently not on this registry.

From the Zambia review: Zambia's Seventh National Development Plan (2017) notes the importance of the informal farmer-managed seed sector in support of its aim of creating a "diversified and resilient economy for sustained growth and socioeconomic transformation". Quality control is subsidized by the government, allowing small-scale seed producer associations to access testing facilities. The Seed Control and Certification Institute, under the Ministry of Agriculture and Livestock, provides capacity building services to seed companies and seed producer associations. Local seed businesses are promoted and emerge from community-based systems.

From the Zimbabwe review: Indigenous farmer systems are promoted under the National Agriculture Policy Framework (NAPF) that is currently being implemented. This is aided by the Strategic Initiative that recognizes the need to "strengthen seed selection, seed preservation, and storage of farmers' indigenous seeds".

The Agriculture and Food Systems Transformation Strategy promotes the production, certification, marketing, and trading of farmer-managed seeds. The Seed Services Directorate of the Department of Research and Specialist Services provides inspection services for a minimal fee to farmers producing seed. CTDO engaged the National Gene Bank of Zimbabwe to train project staff, Agritex (extension) officers, and community seed bank committees on germplasm collection, storage, and on how to receive or request materials from the National Gene Bank.

In addition to promoting their adoption, the government includes farmer-produced seed in government programs, such as the Climate-proofed Presidential Inputs Scheme (Pfumvudza). These programs provide small grains seed such as cowpea and sorghum, among others. These programs create market for the farmer-managed seeds and hence encourage their production.

Positive examples from practice that could inform policy and legal revisions

Despite the overall negative situation concerning seed-related policies and laws, all 14 countries have one or more initiatives supporting farmer-managed seed systems. These feature the active involvement of civil society organizations, sometimes in collaboration with government agencies, universities and training centers, and international organizations (NGOs, CGIAR Research Centers, UN agencies). The initiatives use a variety of methods to more broadly advance smallholder farmers' interests in seed and agriculture and deserve much more recognition and support than they are currently given (Greenberg et al., 2021). They can inspire policies and laws revisions toward a more supportive environment for farmer-managed seed systems, as they concern key elements of resilience in such systems. The initiatives include:

- Policy analysis and advocacy, working with smallholder farmers and their organizations to influence seed-related policies and laws at national or subnational levels (e.g., on alternative farmer variety certification and registration systems/procedures, see De Jonge et al., 2021);
- Policy analysis and advocacy to advance gender inclusion, and women's interests and empowerment in agriculture and rural development, and resilient seed systems in particular;

- Distributing quality seed (promising varieties, advanced lines) to farmers for evaluation, multiplication, or production (e.g., different forms of participatory variety testing; but also through emergency seed aid that delivers crops and varieties that respond to farmers' interests and needs);
- Capacity building for smallholder farmers on quality seed conservation, multiplication, and distribution/marketing (when allowed);
- Empowering smallholder farmers in local seed business development (e.g., training in QDS production and marketing);
- Carrying out research on seed management (e.g., use of new conservation technologies and practices);
- Building linkages between seed-related government institutions and smallholder farmers (e.g., collaboration between national gene banks and community seed banks) and facilitating farmer-to-farmer knowledge and seed sharing (e.g., seed web platform for seed exchanges in Kenya, national platform for community seed banks in Uganda).

References

- De Jonge, B., López Noriega, I., Otieno, G., Cadima, X., Terrazas, F., Hpommalth, S., van Oudenhoven, F., Shrestha, S., Pudasaini, N., Singh Shrestha, D., Gauchan, D., Kasasa, P., Bwerazuva, T., Mujaju, C., Manjengwa, S. Advances in the Registration of Farmers' Varieties: Four Cases from the Global South. (2021). *Agronomy* 11, 2282. <https://doi.org/10.3390/agronomy11112282>
- Greenberg, S., Pelser, D. and Ranqhai T. (2021). Farmer-led Seed Systems. Securing food sovereignty in the face of looming ecological and social crises. Biowatch Briefing. Biowatch South Africa: Durban. <https://biowatch.org.za/download/farmer-led-seed-systems/>
- Herpers, S., Vodouhe, R., Halewood, M., De Jonge, B. (2017). The support for farmer-led seed systems in African seed laws. ISSD Africa. <https://cgspace.cgiar.org/handle/10568/81545>
- Subedi, A., Vernooy, R. (2019). Healthy food systems require resilient seed systems. In Bioversity International, *Agrobiodiversity Index Report 2019: Risk and Resilience*. Bioversity International: Rome, Italy, 2019, pp. 127–134. <https://hdl.handle.net/10568/100820>
- Vernooy, R., Rana, J., Otieno, G., Mbozi, H., Shrestha, P. (2022). Farmer-Led Seed Production: Community Seed Banks Enter the National Seed Market. *Seeds* 2022(1): 164–180. <https://www.mdpi.com/2674-1024/1/3/15>
- Vernooy, R., Sthapit, B., Shrestha, P. (2015). Epilogue. Visions of the future. In Vernooy, R; Shrestha, P; Sthapit, B. (eds.) *Community seed banks: Origins, evolution and prospects*. Routledge, Oxon, pp. 259–261.



The Alliance is part of CGIAR, the world's largest agricultural research and innovation partnership for a food-secure future dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resources.

www.alliancebioversityciat.org

www.cgiar.org

ISBN: 978-92-9255-281-7