Agri-food systems that work for people and planet: challenges and opportunities from Ethiopia, Kenya, Rwanda and Uganda

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IKEA Foundation

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Cover image: cultivated hillsides of southwestern Uganda. Credit: Neil Palmer (CIAT), via Flickr, CC BY-SA 2.0

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Preface

The prevailing mode of agriculture around the world is one that drives farmers to produce large amounts of monocrops for low prices. This approach uses up the natural resources that are necessary for a healthy and sustained production and destroys valuable ecosystems in the process. As a result, land becomes degraded, water polluted and weather events more extreme and unpredictable due to climate change. These impacts are making it harder than ever for people to earn a livelihood from agriculture.

The IKEA Foundation is committed to helping people build a better life from planet-positive agriculture. We want to move away from exploitative and extractive processes to systems that are productive and resource efficient, keeping important nutrients and minerals in the loop and benefiting smallholder farmers.

We believe food and land-use systems that have shorter, more local value chains, that are diversified and provide a larger variety and more nutritious food, and that regenerate soils and ecosystems also make smallholder farmers less vulnerable and more resilient to the impacts of climate change and other shocks.

There is no time to waste, but we need to ensure our foundations are strong and take a *festina lente* approach — make haste slowly. Designing programmes and policies that only focus on quick wins can mean that the poorest communities are left behind and long-term environmental costs are not considered.

A planet- and people-positive agri-food system transformation requires a long-term perspective so as not to undermine the human and natural resource base of the agri-food system. We must ALL move together towards planet- and people-positive agriculture and seize this opportunity to create systems that work for future generations.

To understand the opportunities for such a transformation, we asked the International Institute for Environment and Development (IIED) to map the landscape and describe the current state of play in Ethiopia, Kenya, Rwanda and Uganda. What is happening already with regard to planet- and people-positive agriculture in these countries? What policies are in place? Who is involved? What initiatives are promising? How can we build on these? If we want to drive a transformation, we need to be action-focused, and work together at all levels.

Though the study has its restrictions, due to its scope and COVID-related travel and meeting limitations, it gives a good insight into the complexity of the issues. It offers useful observations about the absence of recognition of potential or actual trade-offs between economic objectives (growth), social objectives (inclusion) and environmental objectives (sustainability). The report examines the dominance of the ‘technology adoption’ approach and emphasises the importance of farmers’ understanding and engagement in decision-making processes. It describes country-specific enabling conditions, important agri-food system actors and their roles, and identifies entry points for catalysing a transition towards inclusive, circular and regenerative agri-food systems.

We encourage readers to study these insights and hope that they will help to not only inform but also drive a movement of planet- and people-positive funders, policy makers, practitioners, farmers and businesses. Only then can we achieve a true agri-food system transformation, where people and planet thrive together and where communities flourish.

Petra Hans

Head of Portfolio Agricultural Livelihoods

IKEA Foundation
Executive summary

This report reviews the state of food and agricultural systems in East Africa with a ‘planet- and people-positive’ lens. It explores what is being done to transform systems to provide fair and decent livelihood opportunities for all, while maintaining or enhancing natural resources and ecosystems. It considers what more must be done to achieve these goals in Ethiopia, Kenya, Rwanda and Uganda.

Introducing an ambitious vision for people and planet

Planet- and people-positive agriculture (PPPA) embodies an ambitious vision for agri-food systems. It pushes boundaries to make gains on multiple — often competing — objectives.

‘People’ objectives include food and nutrition security, income and employment, resilience to shocks, and less tangible goals related to fair and equitable participation in the food system. ‘Planet’ objectives comprise soil health, diversified and holistic land and ecosystem management, climate change mitigation and biodiversity conservation. For the agri-food system, ‘planet-positive’ embraces notions of circular economy, such as recycling and using renewable energy.

In practice, trade-offs are made between ‘people-’ and ‘planet-’ positive objectives. We see this, for example, when land use, food and nutrition security require more agricultural land, with negative effects on other ecosystem services; or when small-scale informal agribusinesses increase income for low-income families but produce pollutants.

This report emphasises that actors at all levels must be aware of trade-offs and able to identify solutions that address multiple objectives simultaneously or mitigate the negative effects of pursuing a single goal.

Our key lines of enquiry and top-level findings are outlined below.

Identifying challenges to change

We identified several challenges undermining the success of planet- and people-positive agri-food systems in Ethiopia, Kenya, Rwanda and Uganda. Many cut across one another; causes are multiple and complex.

1. **Climate change** is seen as a key threat to agri-food systems by stakeholders and the literature in all four countries. Small-scale farmers and pastoralists (the majority of producers) are highly dependent on rain-fed agriculture, rendering agri-food systems particularly vulnerable to climatic shocks and unpredictable weather.

2. **Limited access** to crop and livestock insurance, high-quality weather forecasting and agro-advisory services disadvantage small-scale farmers, who also suffer post-harvest losses related to inadequate storage and limited market access. Low access to agricultural inputs is a barrier, although less so in Ethiopia in recent years. Low agricultural productivity and food and nutrition insecurity present a challenge all four countries, but especially Kenya, Uganda and Rwanda.

3. **Agricultural advisory services** have declined in quality and availability, in part due to privatisation (apart from Ethiopia, which has a higher number of extension workers per farmer).

4. **Relevant research is underfunded** in the region and dominated by a focus on high external input technologies, with hardly any involvement of farmers in research design and evaluation.

5. **Multiple challenges** impact micro, small and medium-sized agricultural and food enterprises, including competition from imports, poor access to credit and technical advice, and high levels of bureaucracy and regulation. Informal agri-food businesses are hit even harder by these challenges, despite their important role, especially for poorer households.

With that understanding, we identified a wide range of practices and approaches with potential to benefit people and planet; from specific agricultural techniques and methods to broader frameworks and approaches like conservation agriculture, integrated soil fertility management or climate-smart agriculture.
Gauging climate as a driver for transformation

Across all four countries, we found that concerns about climate change drive the promotion, adaptation and adoption of many of these promising practices. They are often labelled ‘climate-smart agriculture’ — generally understood to promote increased productivity, greater resilience and reduced emissions. In general, climate resilience and adaptation have been emphasised in policy more than mitigation (although practices like agroforestry, promoted in Ethiopia and Rwanda, have significant mitigation benefits).

We found that soil conservation and fertility-management techniques — both developed by farmers and through formal research, and widespread across the region — offer evidence of significant co-benefits for people and planet. Although ‘circular’ farming practices, such as nutrient recycling, are common, we found that circular agribusiness approaches are not yet central to discussions on transforming food and agricultural systems. Likewise, food systems perspectives that consider solutions ‘from farm to fork’ are not dominant in the four countries’ policies or development programming. However, there is a nascent trend towards strategies including ‘nutrition-sensitive agriculture’, which links nutrition and agriculture.

Presenting a picture of current practice

The report summarises the diverse ways in which PPPA is practised across East Africa. We found a patchwork of practices, policies and investments, rather than a joined-up strategy that cuts across different parts of the agri-food system and across different government ministries and policy areas. Policy implementation often depends on donor-funded projects and programmes with limited geographic scale and time frames; we found few attempts to systematically assess performance over time. For lasting impact at the systems level, PPPA approaches such as integrated pest management must be adopted by a critical mass of people. However, data on the scale at which most practices are being used is lacking. The lack of grounded evidence on the status of these practices and approaches, or of their reach and impact, point to some of the challenges of scaling up PPPA in East Africa.

We found that a ‘technology transfer’ paradigm still dominates the region’s policy and development discourse regarding agri-food systems. There is a narrow focus on the ‘adoption’ of specific practices, especially those related to agricultural inputs and agronomic practices. Most projects and programmes still consider adoption rates the main indicator of success, but this simplistic sign of agricultural transformation does not adequately reflect the realities of farmers’ decision-making processes. This is particularly true of smallholder farmers and pastoralists, who often apply only parts of a ‘technology package’. The co-development of PPPA practices and technologies with intended users and beneficiaries appears limited.

Understanding context: what’s helping, what’s hindering?

We analysed the four countries’ socio-political and economic context to better understand the factors enabling or disabling a transition towards PPPA; these are noted below. More generally, conditions enabling a transition include:

- Government commitment to prioritising long-term solutions over quick growth
- Laws and regulations incentivising investments in long-term solutions
- Organisational capacity within implementing agencies to co-develop solutions with all agri-food system actors (in particular, small-scale farmers and micro, small, and medium-sized enterprises)
- Infrastructure investments to increase market access.

The policy context is also only partially enabling a transition to PPPA; perhaps unsurprising given the countries’ emphasis on modernisation, commercialisation and reliance on external inputs. Even so, all four have some relevant progressive policies or strategies which could be mainstreamed. Policy implementation is the region’s greatest obstacle to transition, particularly in Kenya and Uganda; this is often related to issues around financing, technical and institutional capacity and governance.

Regional market functionality is also only partially enabling a transition: many market opportunities that could support PPPA are geared towards export or niche regional markets, which multiple challenges prevent smallholders from accessing.
Recognising allies and appreciating difference

We found a wide range of local, national and international stakeholders involved in transforming East African agriculture, each embodying a different vision. Transformative ‘planet-positive’ players include:

- National environment ministries and, less so, forest departments
- International NGOs, such as Care International, and local civil society organisations and fora
- Some international development funders, including the Packard Foundation, Sida (Swedish International Development Cooperation Agency) and IKEA Foundation, and UN organisations.

Actors emphasising ‘people-positive’ goals (such as greater productivity and employment) include:

- Agriculture ministries
- Most international development funders, including the Alliance for a Green Revolution in Africa (AGRA) and the United States Agency for International Development (USAID); these actors usually champion sustainable intensification through use of external inputs and technologies, and formal value-chain development
- Agricultural research organisations and advisory services (also often productivity focused)
- Private-sector actors and interest groups; some international non-governmental organisations (INGOs); most national non-governmental organisations (NGOs) and community-based organisations (CBOs) including farmer organisations. All emphasise inclusive livelihoods, employment and incomes, but low membership of formal groups among smallholder producers suggests inadequate representation of their interests in policy development and programming. Ensuring the voices of smallholder and marginal agri-food-systems actors are heard in the transition to PPPA remains a key gap.

Bringing people- and planet-friendly actors on board

Finally, the report identifies entry points for actors who are keen to support a transition to PPPA in Ethiopia, Kenya, Rwanda and Uganda. While differing by country, they broadly fit into seven categories:

1. Increasing the capacity of agri-food system actors to co-develop and support relevant PPPA innovations
2. Piloting and experimenting novel approaches that offer long-term benefits to people and planet
3. Strengthening and supporting civil society organisations that promote PPPA
4. Building networks and platforms for knowledge and lesson sharing
5. Addressing disconnected environmental, agricultural and social policies
6. Developing and using relevant data and other information, and
7. Scaling proven PPPA approaches.

In conclusion

This report provides a contemporary picture of PPPA’s status in East Africa and the context it operates in. It builds on some existing evidence of what is working — and what is missing — to guide stakeholders interested in promoting a transition. Although a systematic assessment of the reach, impact and performance of individual practices and approaches was beyond the scope of the review, we suggest several areas for potential future focus. These include assessing the financial and economic viability of regenerative agriculture models and improving the understanding of innovation in capacity development for farmers.
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<td>AEAS</td>
<td>agricultural extension and advisory services</td>
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<td>AEZs</td>
<td>agroecological zones</td>
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<td>AFAAS</td>
<td>African Forum for Agricultural Advisory Services</td>
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<td>AFAP</td>
<td>African Fertiliser and Agribusiness Partnership</td>
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<td>AFSA</td>
<td>Alliance for Food Sovereignty in Africa</td>
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<td>AGRA</td>
<td>Alliance for a Green Revolution in Africa</td>
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<td>ASAL</td>
<td>arid and semi-arid lands</td>
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<td>ASARECA</td>
<td>Association for Strengthening Agricultural Research in Eastern and Central Africa</td>
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<tr>
<td>ASGTS</td>
<td>Agriculture Sector Transformation and Growth Strategy</td>
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<td>ATA</td>
<td>Agricultural Transformation Agency</td>
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<tr>
<td>AUC</td>
<td>African Union Commission</td>
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<td>AUDA</td>
<td>African Union Development Agency</td>
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<td>AWAN</td>
<td>Africa Women Agribusiness Network</td>
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<td>CA</td>
<td>conservation agriculture</td>
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<tr>
<td>CBO</td>
<td>community-based organisation</td>
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<tr>
<td>CCF-E</td>
<td>Climate Change Forum — Ethiopia</td>
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<tr>
<td>CFSA</td>
<td>comprehensive food security and vulnerability analysis</td>
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<tr>
<td>CGIAR</td>
<td>Consultative Group on International Agricultural Research</td>
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<tr>
<td>CIAT</td>
<td>International Centre for Tropical Agriculture</td>
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<td>CIP</td>
<td>International Potato Centre</td>
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<td>COMESA</td>
<td>Common Market for Eastern and Southern Africa</td>
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<td>CRGE</td>
<td>Climate-Resilient Green Economy</td>
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<tr>
<td>CSBAG</td>
<td>Civil Society Budget Advocacy Group (of Uganda)</td>
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<tr>
<td>CSA</td>
<td>climate-smart agriculture</td>
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<td>CSA-E</td>
<td>Central Statistical Agency of Ethiopia</td>
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<tr>
<td>CSO</td>
<td>civil society organisation</td>
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<tr>
<td>DFID</td>
<td>Department for International Development, UK (now Foreign, Commonwealth &amp; Development Office)</td>
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<tr>
<td>DREA</td>
<td>Department of Rural Economy and Agriculture</td>
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<tr>
<td>DeSIRA</td>
<td>Development Smart Innovation through Research in Agriculture</td>
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<tr>
<td>EAC</td>
<td>East African Community</td>
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<td>EAFF</td>
<td>East African Farmer Federation</td>
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<td>EU</td>
<td>European Union</td>
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<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<td>FDRE</td>
<td>Federal Democratic Republic of Ethiopia</td>
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<td>GCRF</td>
<td>Global Challenges Research Fund</td>
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<tr>
<td>GDP</td>
<td>gross domestic product</td>
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<td>GGGI</td>
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<td>GHG</td>
<td>greenhouse gas</td>
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<td>GIZ</td>
<td>Deutsche Gesellschaft für Internationale Zusammenarbeit</td>
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<td>GTP</td>
<td>Growth and Transformation Plan</td>
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<td>ha</td>
<td>hectare</td>
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<tr>
<td>ICT</td>
<td>information and communications technology</td>
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<td>ICT4RAG</td>
<td>National Information and Communication Technology for Research in Agriculture</td>
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<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
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<td>IFPRI</td>
<td>International Food Policy Research Institute</td>
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<td>IITA</td>
<td>International Institute for Tropical Agriculture</td>
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<tr>
<td>INDC</td>
<td>Intended Nationally Determined Contributions</td>
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<td>INGOs</td>
<td>international non-governmental organisations</td>
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<td>IPM</td>
<td>integrated pest management</td>
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1 Introduction

1.1 Objectives and scope

Agri-food systems in Eastern Africa are under pressure to deliver outcomes for both people (food, income, employment) and the planet (carbon sequestration and natural resource conservation). The immediate needs of citizens — affordable food, income and employment from agricultural value chains — are often at the forefront of decisions taken by policymakers, politicians, and development actors. But there is an increasing awareness that existing agri-food systems do not deliver the expected benefits to society, while they undermine the long-term natural resource base the system depends on. Many are making the call to transform agri-food systems to ensure food security for all in a way that protects or even regenerates the agricultural landscape, emphasising that ‘business as usual’ is not an option. So what is happening in Eastern Africa to bring about that transformation, and what are the entry points to support this agenda?

This report seeks to answer this question in four countries in the region: Ethiopia, Kenya, Uganda and Rwanda. It summarises some of the main challenges faced by agri-food systems and reviews practices and approaches used to address these challenges in a way that provides benefits to both people and planet. It analyses the enabling environment for the development, adaptation, uptake and use of practices and approaches to realise planet- and people-positive agriculture (PPPA), and maps the main stakeholders currently involved in this process. It identifies entry points to support a transformation of agri-food systems that work for people and the planet.

Box 1 Agri-food systems defined

The food system includes “the entire range of actors, including small-scale farmers and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, socio-cultural and natural environments in which they are embedded” (FAO, 2018a). Agricultural or farming systems are “a population of individual farm systems that may have widely differing resource bases, enterprise patterns, household livelihoods and constraints” (Giller, 2013). The term ‘agri-food system’ or ‘food and agriculture system’ are often used but are less strictly defined. In FAO (2018a), the agricultural (or farming) system is a sub-system of the food system that relates to production. Elsewhere, ‘food and agriculture system’ refers to a system in which inputs, agriculture, food and end uses are distinct components. Most commonly, the term seems to be used interchangeably with ‘food system’, and it simply emphasises the fact that agriculture has relevance beyond the production of food: as a form of livelihood for many, and as a source of non-food products such as fibre, fuel and construction materials.

The study did not allow for a more thorough exploration of practices adopted informally by farmers on the ground; this includes farmers’ own innovations which are likely to be just as promising as technologies developed and promoted by the formal system for agricultural research for development. A lack of detailed data on the practices and techniques developed, adopted and adapted by farmers themselves remains a major obstacle to assessing the state of PPPA in Ethiopia, Kenya, Rwanda and Uganda, and requires in-depth primary research. However, in part due to the COVID-19 travel restrictions in place at the time of research, this level of research was outside the scope of the study.

The focus of this study on agri-food systems includes the overlaps between food systems and agricultural or farming systems. While ‘agri-food systems’ is the more inclusive term for this study, as it encompasses the production of non-food items, most elements of the food systems framework still apply, as shown in Figure 1. A food system usually has the value chain at its core: this refers to the physical movement of goods from producers to consumers, with different types of intermediary steps such as post-harvesting processing, transportation, aggregation, marketing and retailing.

2 For example, in a module on Food and Agriculture Systems of the Department of Geography, Pennsylvania State University, https://www.e-education.psu.edu/geog30/node/363
1.2 Planet- and people-positive agriculture

The IKEA Foundation and other organisations with a similar focus on sustainability have used the concept of PPPA to describe an agricultural system that meets the needs of both people and planet. PPPA seeks to balance two sometimes competing aims:

- Agri-food system environmental sustainability through, for example, regenerative agriculture, agroecology and circular agri-based systems, and
- Positive social and economic outcomes such as food and nutrition security, agricultural income, and employment, in particular for poor people, through inclusive agri-value chains.

The focus of PPPA is on the performance of the whole system, not individual components, acknowledging the interactions between food systems and agricultural or farming systems.

There are many concepts and approaches that could generate positive outcomes for both planet and people with regards to agri-food systems. No one would argue with the ambition that agri-food systems should be sustainable — a concept that already encompasses dimensions of wellbeing for people (social and economic) and planet (environment). Similarly, climate-smart agriculture (CSA) aims to support people’s livelihoods (via productivity enhancement and adaption to climate change), while improving

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conditions on the planet overall (by reducing greenhouse gas (GHG) emissions).\textsuperscript{4} Agroecology, in its wider interpretations such as that of the UN’s Committee of World Food Security (CFS), can be “an innovative approach to sustainable food systems for food security and nutrition” (HLPE, 2019), encompassing human wellbeing principles of secure social equity and social responsibility. Even the concept of \textit{regenerative agriculture}, which initially focused primarily on environmental outcomes (carbon sequestration, increased biodiversity, improved soils, enhanced ecosystem services), increasingly includes human wellbeing and justice dimensions, as reflected in the principle to “ensure and develop just and reciprocal relationships amongst all stakeholders” (Terra Genesis International, no date).\textsuperscript{5}

These approaches are broadly based on a set of principles, which may translate into different practices on the ground, depending on local agroecological, climatic and socioeconomic conditions. Likewise, while most practices have the potential to be both planet- and people-positive, the extent to which they benefit either will depend on how they are implemented, alongside a range of other factors. What all these concepts have in common is that they do not favour one dimension (either people or planet) over the other. The implicit challenge is to address them simultaneously.

However, in many cases, benefits cannot be maximised simultaneously for both people and planet, because to do so would exceed what is feasible with current resources and technologies (see Figure 2 for an example, looking at land use trade-offs). So benefits can only be optimised, in a given context at a given scale, usually via a negotiating process between those with different objectives. In some cases, it may be possible to meet both people and planet objectives through the same actions, and such synergistic practices and approaches are the most promising.

There is currently no commonly agreed definition of PPPA and its components, nor a set of indicators that could be used to assess whether a particular outcome or set of outcomes could be considered planet- and people-positive. Hence, during conversations with stakeholders in the four countries covered by this report,\textsuperscript{4} See the online FAO sourcebook on CSA for further details: \url{http://www.fao.org/climate-smart-agriculture-sourcebook/en}  
\textsuperscript{5} \url{http://www.regenerativeagriculturedefinition.com/}, showing the result of a crowd-sourcing process to develop and refine a definition for Regenerative Agriculture.

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\textsuperscript{4} See the online FAO sourcebook on CSA for further details: http://www.fao.org/climate-smart-agriculture-sourcebook/en

\textsuperscript{5} http://www.regenerativeagriculturedefinition.com/
no one disagreed with the principles of PPPA — no matter their specific interests and objectives. Even though the term PPPA was not known and used by the stakeholders interviewed during this study, the notion that agri-food systems must be environmentally sustainable, while also producing economic and social benefits to farmers and other value-chain actors, was universally accepted. At this general, aspirational level, respondents considered PPPA to be similar to other concepts they were more familiar with, such as ‘sustainable food systems’ or ‘sustainable agriculture’. However, there were clearly differences in perspectives in terms of stakeholders’ priorities — whether people or planet should come first — and time scales. Consequently, the notion of trade-offs outlined above (Figure 2) became relevant in our discussions, with most stakeholders emphasising the need for short- to medium-term economic and social benefits from agri-food systems in order to address the challenges of widespread poverty and food insecurity. Ideally, these benefits would not be at the expense of environmental sustainability, but some of our respondents were sceptical that this is feasible.

Table 1 Aspirations for/characteristics of a planet- and people-positive agri-food system in relation to Sustainable Development Goals (SDGs)

<table>
<thead>
<tr>
<th>People-positive attributes</th>
<th>Planet-positive attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides food and nutrition security for all (SDG2 and 3) and promotes sustainable consumption (SDG12)</td>
<td>Maintains or enhances soil health and reduces soil erosion/land degradation (SDG15)</td>
</tr>
<tr>
<td>Provides decent work along the value chain (SDG8), particularly for youths</td>
<td>Reduces GHG emissions (SDG13)</td>
</tr>
<tr>
<td>Supports inclusive and sustainable economic growth (SDG8)</td>
<td>Reduces pollution from agrochemicals, transportation, processing, and marketing of produce (SDG12)</td>
</tr>
<tr>
<td>Increases resilience, particularly of poorer households, and reduces poverty (SDG1)</td>
<td>Improves water quality above and below ground (SDG15, 14)</td>
</tr>
<tr>
<td>Reduces the reliance on external inputs where feasible (to support SDG12)</td>
<td>Protects key biodiversity hotspots, halts loss of natural habitats and biodiversity (SDG15, 14), including agrobiodiversity</td>
</tr>
<tr>
<td>Supports gender equality (SDG5)</td>
<td>Reduces waste and promotes sustainable production (SDG12).</td>
</tr>
<tr>
<td>Encourages citizen participation to build strong institutions (SDG16).</td>
<td></td>
</tr>
</tbody>
</table>

Broadly, FAO (2018a) defines a sustainable food system as “a food system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised”. This is a reference to the three pillars of sustainability:

1. Profitability = economic sustainability
2. Broad-based benefits for society = social sustainability
3. A positive or neutral impact on the natural environment = environmental sustainability.

Using this definition, it is possible to list the general aspirations for such an agri-food system (see Table 1). However, because of different perceptions and priorities of various stakeholders and some inherent trade-offs between PPPA objectives, it is not possible to define an ideal agri-food system in a particular national or local context. Similarly, there are many different ways that each attribute can be measured, using different indicators at different scales. So currently, it is not possible to measure the extent to which an agri-food system is planet- and people positive in an objective way.

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6 See Gusenbauer and Franks (2019) for a summary of key concepts relating to trade-offs and synergies, including trade-off analysis and management options that consider the different perspectives of stakeholders with regards to land use.
1.3 Methodology

This study is based on analysis of selected documentation that is largely publicly accessible, and expert opinion. It is not a complete and systematic review of all aspects of the agri-food system in the four countries. Teams of consultants from the four countries and IIED researchers wrote the country chapters and co-developed the overall framework and methodology.7

The questions guiding the different steps of the study in each of the four countries are shown in Figure 3 and include the following:

1. **What are the priority challenges in the agri-food system that affect people and planet?** This question was a starting point, because ultimately a transition to a more sustainable agri-food system must address the multiple challenges that are resulting in the current status of the agri-food system.

2. **What type of practices and approaches can address these challenges in a planet- and people-positive way?** Given the breadth of the study, the emphasis here was on broad sets of practices such as soil and water conservation, integrated pest and disease management, or off-grid, decentralised energy supply, rather than on specific practices adapted to a specific local context.

3. **What enabling environment is required for such practices and approaches to succeed?** This included a rapid assessment of the policies, institutions and services required to support the development, adaptation and adoption of practices that have potential to increase agri-food system sustainability.

4. **Who is already working on these and how? Where are the gaps?** The focus here was on analysing the interests and influence of different types of stakeholders, and relevant existing/ongoing or recent interventions by them that support (or hinder) an agri-food system transition towards PPPA.

5. **What are the entry points to support a PPPA transformation?** This was done at a country level, acknowledging the differences in context between the countries.

The researchers undertook a desk review of relevant documents (government policies, strategies and frameworks; academic studies; project and programme reports; guidelines and manuals; workshop and conference reports), largely using documents available in the public domain. Through this they identified agri-food system challenges, PPPA practices and approaches addressing these challenges (or having the potential to address them) and enabling and supporting factors for bringing about positive change. In the absence of a clear PPPA definition, the researchers classified practices and approaches according to their potential contribution to people and planet, based on the literature and the expert opinion of the team, key informants and stakeholders.

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7 The whole team agreed on the structure and topics to cover in the country sections, but inevitably there are differences between them as a result of differences in context, emphasis and available information.
The researchers discussed emerging findings with key informants via telephone interviews, with the aim of improving the analysis and validating conclusions and recommendations. These interviews helped to substantiate the needs of agri-food system actors and entry points to support a transition to PPPA. They also discussed reflections and lessons on enabling contextual factors, such as indirect and direct drivers and existing constraints/challenges and opportunities to promote and scale up PPPA approaches and practices. Likewise, through the interviews it was possible to identify the impacts of the coronavirus pandemic on food-system actors and the interactions of that crisis with the effects of other crises impacting the agri-food systems in the countries (in particular, the impacts of climate change).

Finally, we organised workshops (face-to-face in Ethiopia; online elsewhere) with key informants to validate main findings, discuss possible avenues for system-wide change in the next five to ten years and thereby identify entry points for transitioning to PPPA.

There are clear limitations to this study, which was undertaken between May and December 2020 during the COVID-19 pandemic. Analysing the entire agri-food systems of four countries from a PPPA perspective, based on a limited document review and discussions with key informants, cannot produce a comprehensive picture. Moreover, the focus on individual countries misses some important dynamics, such as often-informal cross-border trade between countries in Eastern Africa (FEWS NET, 2020), or global food price volatility. Solving the longstanding challenge of low agricultural productivity in any one of the four countries studied will therefore not automatically lead to widespread food and nutrition security for all, as availability is only one of dimension of FNS. However, most agricultural policies and strategies in the four countries fail to properly account for the role of trade or price volatility in shaping agri-food systems at the national level. Little attention is given to the shifting dynamics of processing and consumption in the countries and the region, including a shift towards purchased and processed foods in both urban and rural areas (FAO, 2017). These trends challenge conventional wisdom about food production and consumption in Africa. The potential impacts of anticipated future changes in food consumption have not been considered in this report.

In addition, due to the limited scope of this study and COVID-19 constraints on travel, it was not possible to meaningfully engage with and incorporate the many diverse agricultural voices on the ground. In particular, this report does not reflect the views of small-scale farmers, pastoralists, traders and food processors who are central to a successful transition to PPPA. Nonetheless, this report provides initial orientation and entry points and will trigger further discussions within the four countries, at the regional and international levels, on ways to support an agri-food system that works for both planet and people.
2 Agricultural transformation in the Eastern African region

2.1 Regional context

Ethiopia, Kenya, Rwanda and Uganda are part of the Eastern Africa region, sharing a number of characteristics and contextual factors that impact their ability to develop a planet- and people-positive agri-food system (Table 2). Being able to ensure food and nutrition security for all without an excessive dependence on food imports, and doing so in a way that preserves the natural resource base for future generations, is at the forefront of government and societal concerns in all four countries.

Table 2 Main challenges and opportunities shared by the four countries

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid population growth until 2065 …</td>
<td>… but declining dependency ratios(^8)</td>
</tr>
<tr>
<td>Rapid urbanisation stretching urban services …</td>
<td>… but enabling land consolidation(^9) in rural areas</td>
</tr>
<tr>
<td>Climate-change impacts …</td>
<td>… but commitment to green growth.</td>
</tr>
<tr>
<td>Slow structural change, such as the contribution of different sectors to the economy; agriculture remains the main employer …</td>
<td>… but high economic growth (compared to Africa overall)</td>
</tr>
<tr>
<td>Environmental degradation and biodiversity loss …</td>
<td>… but some strong commitments made to biodiversity conservation and land rehabilitation</td>
</tr>
<tr>
<td>Food and nutrition insecurity continues, including stunting(^10) (double burden of malnutrition) …</td>
<td>… but a range of policies and programmes are starting to address these, including support for early childhood nutrition, crop diversification etc.</td>
</tr>
<tr>
<td>Capacity gaps in agri-food system institutions …</td>
<td>… but innovative investments are happening, for example at the Rwanda Institute for Conservation Agriculture (RICA).</td>
</tr>
</tbody>
</table>

There are also significant differences between the countries. Rwanda is particularly affected by a very high population density, and has small farms, but in all four countries there are pockets where it is becoming difficult for farmers to feed themselves, let alone produce a surplus. Population growth is particularly high in Uganda, which also has the lowest gross domestic product (GDP) of the four. Rwanda has performed particularly well with regards to key continental development targets\(^11\) in recent years.

\(^8\) The dependency ratio relates the number of children (0–14 years old) and older persons (65 years or over) to the working-age population (15–64 years old). A high dependency ratio means that each working adult has to support a high number of dependents, making it harder to achieve food security and prosperity. As Africa’s population stabilises, dependency ratios will decline. (Organisation for Economic Co-operation and Development (OECD), 2017)

\(^9\) Farm sizes in the region are reducing every generation because of farms being split up. More off-farm employment and business opportunities in urban and rural areas can reduce or even reverse this trend, resulting in more viable holdings. (Asiama et al., 2020)

\(^10\) Stunting is the impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation. Children are defined as stunted if their height-for-age is more than two standard deviations below the WHO Child Growth Standards median. (World Health Organization, 2015)

\(^11\) These include in particular the targets with regards to the “Malabo declaration on accelerated agricultural growth and transformation for shared prosperity and improved livelihoods”, signed in 2014 by African heads of state and the government of the African Union. Performance assessments are linked to commitment number seven of the Malabo Declaration: Mutual Accountability for Actions and Results. See https://www.nepad.org/file-download/download/public/118136 for details.
Table 3  Overview of main characteristics of the four countries included in this study

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Ethiopia</th>
<th>Kenya</th>
<th>Rwanda</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area [sq. km]</td>
<td>1,104,300</td>
<td>580,370</td>
<td>26,338</td>
<td>241,550</td>
</tr>
<tr>
<td>Population [million] — 2019</td>
<td>112.08</td>
<td>52.57</td>
<td>12.63</td>
<td>44.27</td>
</tr>
<tr>
<td>Population density [person per sq. km of land area]</td>
<td>97</td>
<td>90</td>
<td>499</td>
<td>213</td>
</tr>
<tr>
<td>Population growth rate [annual %] — 2019</td>
<td>2.6</td>
<td>2.3</td>
<td>2.6</td>
<td>3.6</td>
</tr>
<tr>
<td>GDP per capital [current US$] 2019</td>
<td>855.8</td>
<td>1,816.5</td>
<td>820</td>
<td>794.3</td>
</tr>
<tr>
<td>Agriculture as share of GDP 2019</td>
<td>33.5</td>
<td>34.1</td>
<td>23.1</td>
<td>23.5</td>
</tr>
<tr>
<td>Life expectancy at birth [years] 2018</td>
<td>66</td>
<td>66</td>
<td>69</td>
<td>63</td>
</tr>
<tr>
<td>Prevalence of stunting among children under the age of 5 years [%]</td>
<td>36.8</td>
<td>26.2</td>
<td>28.9</td>
<td>36.9</td>
</tr>
<tr>
<td>Prevalence of undernourishment 2017 [%]</td>
<td>20.6</td>
<td>29.4</td>
<td>41.0</td>
<td>36.8</td>
</tr>
<tr>
<td>Malabo declaration performance 2019 [x/10]</td>
<td>5.31</td>
<td>4.88</td>
<td>7.24</td>
<td>5.68</td>
</tr>
<tr>
<td>Agenda 2063 score [%]</td>
<td>60</td>
<td>40</td>
<td>73</td>
<td>35</td>
</tr>
<tr>
<td>Gini index of inequality</td>
<td>35.0</td>
<td>40.8</td>
<td>43.7</td>
<td>42.8</td>
</tr>
<tr>
<td>Governance score — 2017</td>
<td>46.5</td>
<td>59.8</td>
<td>64.3</td>
<td>55</td>
</tr>
</tbody>
</table>

2.2 Africa’s vision of agricultural transformation

It is important to acknowledge that African states have developed their own vision of an agricultural transformation. This may not always align in all aspects with the notion of inclusive and environmentally sustainable agricultural development embodied in the PPPA concept designed primarily by specialists in developed states. African governments face high levels of poverty and unemployment, rapid population growth and now the impacts of the COVID-19 pandemic (potentially translating into reduced aid funding). So they are turning increasingly to the private sector to initiate investments, build agricultural value chains and provide the urgently needed income and jobs that ultimately provide stability and prosperity.19

At the continental level, the main framework for Africa’s development is the Agenda 2063 (AUC, 2015), developed in 2015 by the African Union and African governments to spell out their vision for the continent. The intention is to complement, not replace the SDGs.

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14 FAO, ECA and AUC (2020)
15 AUC (2020)
16 African Union Development Agency (AUDA-NEPAD) & AUC (2020)
17 Gini index measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. Data from Index Mundi, https://www.indexmundi.com/facts/indicators/SI.POV.GINI/rankings/africa
18 Mo Ibrahim Foundation (2019)
19 See, for example, https://www.growafrica.com/news/mobilizing-private-sector-investments-african-agriculture
The first of seven aspirations is for “A prosperous Africa based on inclusive growth and sustainable development”, reflecting the ambition of inclusivity and sustainability. This includes the following goals:

- Modern agriculture for increased productivity and production, with this priority area:
  - Agricultural productivity and production

- Environmentally sustainable and climate-resilient economies and communities, with these priority areas:
  - Sustainable natural resource management
  - Biodiversity conservation, genetic resources and ecosystems
  - Sustainable consumption and production patterns
  - Water security
  - Climate resilience, natural disaster preparedness and prevention, and
  - Renewable energy.

The other aspirations relate to some PPPA enabling factors identified in this study, in particular good governance and citizen participation. Hence, Agenda 2063 provides a suitable basis for PPPA policies, if the inherent tensions between growth and sustainability can be addressed through appropriate policy.

At the regional level, the COMESA has the mission “to achieve sustainable economic and social progress in all Member States through increased cooperation and integration in all fields of development particularly in trade, customs and monetary affairs, transport, communication and information, technology, industry and energy, gender, agriculture, environment and natural resources” (COMESA, 2016). All four countries in this study are members of COMESA, but Ethiopia is not a member of an important sub-group, the East African Community (EAC). The EAC integrates markets, customs, monetary and political issues across its six member states, which include Kenya, Uganda and Rwanda. These organisations are important for agri-food systems because they push for increased cross-border trade and harmonisation of agricultural policies. EAC’s vision of agriculture (EAC, 2017) focuses on agricultural productivity enhancement and value-chain development, with no clear linkages to the priorities related to environment and natural resources management. This separation and potential lack of integration between environmental and agricultural and food policies appear to be an important issue affecting national and regional policy frameworks.

2.3 Regional organisations relevant to the agri-food system

With support from African governments and development partners, a number of continental and regional organisations, networks and platforms have emerged in recent decades to support regional cooperation and joint advocacy for agri-food system sub-sectors. These provide an important mechanism for intra-Africa exchange of ideas and best practice. In particular, they can help smaller countries address their limited professional capacity to access expertise, such as via collaborative research, and to benefit from economies of scale for advocacy and capacity strengthening (see Box 2).

All four country studies identified capacity gaps in agricultural research, agribusiness, farmer organisational development and agricultural advisory services. Because the regional/continental organisations operate at a larger scale and have an explicit mandate to support their members, working with them and supporting their programmes and capacities can be a good entry point for donors interested in having a broad impact across several countries via social-learning approaches.

The following four chapters present a more detailed analysis of the agri-food systems in the four countries, the specific challenges these systems face, the practices and approaches promoted to address these challenges, the enabling environment for these interventions, the types of stakeholders promoting them, and entry points to support a transition to planet- and people-friendly agri-food systems.
Box 2 PPPA-relevant regional and continental organisations and networks

**Agricultural research:** The Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), based in Uganda, is a not-for-profit sub-regional organisation. It was founded by the national agricultural research institutes of its current 11 member countries (including the four countries in this study), but has since widened its remit to include agricultural advisory services, private-sector organisations involved in research and farmer organisations. Its mission is “to enhance regional collective action in agricultural research for development, extension and agricultural training and education to promote economic growth, fight poverty, eradicate hunger and enhance sustainable use of resources in Eastern and Central Africa”.

ASARECA was the lead agency for the East African Agricultural Productivity Programme (EAAPP), which aimed to increase regional specialisation and collaboration in agricultural research, and support information and knowledge transfer across national boundaries (Wellard et al., 2015). It operated a regional grant programme that funded a number of innovative research projects, some of them involving the Consultative Group on International Agricultural Research (CGIAR) research centres. ASARECA is also the Eastern African partner of the European Commission (EC) funded project Development Smart Innovation through Research in Agriculture (DeSIRA). National agricultural research institutes pay an annual membership fee to ASARECA, but most of its funding comes from development partners.

**Agricultural advisory services:** The African Forum for Agricultural Advisory Services (AFAAS), also based in Uganda, is a continental umbrella organisation that aims at strengthening national agricultural extension and advisory services (AEAS). Its mission is to promote lesson learning and add value to initiatives in AEAS through policy advocacy and lobbying, sharing knowledge and information through increased professional interaction among AEAS providers. AFAAS operates via county forums that include all AEAS actors — all four countries in this study have established such a forum.

**Farmer organisations:** The East African Farmer Federation (EAFF) is a non-political, non-profit democratic apex organisation of all farmers of Eastern Africa. Its role is to voice the legitimate concerns and interests of the farmers of the region with the aim of enhancing their regional cohesiveness and socioeconomic status. The federation also endeavours to promote regional integration of farmers through trade and good neighbourliness.

**Women agribusiness entrepreneurs:** The Africa Women Agribusiness Network (AWAN) is a non-profit network comprised of individual businesses including producers, processors, aggregators, export companies and input suppliers among others across the continent and globally. Economic inclusion and market access for women are their main concerns. The organisation provides women-owned and youth-owned agribusinesses with an e-hub, which is a repository of information on agriculture along value chains and supply chains.

**Agroecology:** The Alliance for Food Sovereignty in Africa (AFSA) is a broad alliance of civil society actors promoting food sovereignty and agroecology in Africa. These include African farmer organisations, African NGO networks, specialist African NGOs, consumer movements in Africa, international organisations that support AFSA’s vision, and individuals. Its members represent smallholder farmers, pastoralists, hunter-gatherers, indigenous peoples, faith-based institutions and environmentalists from across Africa. They are actively involved in advocating for agroecology in policy and practice, gathering evidence for a transition to agroecology.

Similarly, the Participatory Ecological Land Use Management Association (PELUM) is a network of civil society organisations/NGOs working with small-scale farmers in Eastern, Central and Southern Africa. The network promotes participatory ecological land-use management practices, builds the capacity of members and partners to respond appropriately to community needs, increases the visibility of the small-scale farmers, promotes sharing of information of development experiences, innovations, and best practices and strengthens linkages and collaboration through action learning among partners and members.
3 Main findings from the four countries

3.1 Challenges facing the food and agricultural systems in the region

Across the four countries, the researchers identified several longstanding, often complex and interrelated challenges that continue to hamper the ability of agri-food systems to support both people and planet. Many of these problems are crosscutting and intersect with challenges in other parts of the system, underscoring the importance of taking a systems approach in identifying solutions. While there are important differences in how these challenges manifest, both within and across the four countries, a number of common themes have emerged.

Some of these challenges are characteristics of the agri-food system, while others are drivers impacting the system in a more diffuse way. Through conversations with stakeholders it became apparent that climate change is perceived as one of the biggest threats to agri-food system functioning. This shows up most clearly in variations in rainfall and temperature patterns, and increasingly frequent and severe flooding and droughts. Given the high dependence on rainfed agriculture among most small-scale farmers in the region, agricultural production in the many areas of the four countries is particularly vulnerable to extremes in weather. While some agroecological areas and crops may be positively affected in the short term, most long-term projections suggest that climate change will adversely impact agricultural yields and productivity, with knock-on effects for rural livelihoods, food prices and food and nutrition security (Case, 2006). In this context, researchers identified the absence of high-quality weather forecasting and agro-advisory services as an important vulnerability for smallholders, together with limited access to crop and livestock insurance. Extreme weather events also indirectly impact food systems by damaging crucial rural infrastructure such as roads and irrigation, with important implications for agricultural value chains.

Land degradation and soil erosion are persistent problems in all four countries. These are linked to agricultural production practices and land use. They are also linked to deforestation, a particular challenge for Uganda. It lost half of its forest cover between 1990 and 2015, due in large part to agricultural expansion and the need for cooking fuel (Mwangi et al., 2018). As noted in the introduction, in all four countries population growth puts pressure on available agricultural land. Combined with a lack of non-farm opportunities, this is increasingly driving the conversion of land for agriculture. Moreover, deforestation and climate change also contribute to biodiversity loss, which in turn leaves agricultural landscapes more vulnerable to the impacts of climate change. In Ethiopia, reforestation is an important strategy for rehabilitating degraded land and carbon sequestration, but planting trees does not replace complex forest ecosystems lost to agricultural expansion.

Aside from Ethiopia, where maize yields have doubled since the 1990s (Tesfaye et al., 2018), low agricultural productivity remains a challenge for all countries studied, where outputs of a number of staple crops, especially food crops, have remained stagnant or declined. Low productivity contributes to low farm income and thus impacts FNS. Within the literature and among our informants, the dominant explanation for low yields or yield gaps tends to be related to poor irrigation, climatic effects, and low and/or inadequate use of improved seeds, feed, fertiliser and pesticides. The latter results from high prices for these inputs and/or inadequate access to agricultural loans. While access to inputs has improved in Ethiopia, their high cost and the difficulty in accessing them for smallholder farmers remain important obstacles to increased productivity in all four countries. The use of organic soil-fertility-management practices, in particular of farmyard manure and compost, is widespread but has not received much attention from agricultural research and advisory services as a means of maximising productivity with minimal additional labour costs.

The impacts of low productivity are aggravated by post-harvest losses. Although the drivers of post-harvest loss are many and complex, lack of adequate storage and limited access to markets are among

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20 See Table 1 for the criteria used.
the main causes. The latter two are particular challenges for micro, small and medium-sized enterprises (MSMEs),
which make up most agribusinesses in the four countries.

In Kenya, Rwanda and Uganda, food and nutrition security continue to dominate the agenda of national
governments. In Uganda, the prevalence of undernourishment nearly doubled from 24.1% in 2005 to 41%
in 2017, due to low productivity arising from climatic shocks in 2016–17, combined with an influx of
refugees (FAO & ECA, 2018). By contrast, in Ethiopia the prevalence of undernourishment nearly halved
during the same period, due to inclusive agricultural growth strategies and increases in productivity,
particularly of maize (FAO, ECA & AUC, 2020). Despite these achievements, dietary diversity remains low
among infants, children, and adult women. Ethiopia launched a National Nutrition Sensitive Agriculture
Strategy in 2016 to address this (Bossuyt, 2019). Despite high performance on a number of SDGs and
Agenda 2063 targets, Rwanda still has a high level of stunting in children. Kenya is the only country on
track to meeting WHO nutrition targets on stunting, breastfeeding, anaemia, and child mortality. Its
progress is best explained by strong nutrition policies and social protection programmes, as well as laws
on fortified wheat and maize (FAO, ECA & AUC, 2020).

A recurrent theme across all countries was the underfunding of research institutions and, more
generally, agricultural development programmes. This is linked to challenges around the agricultural
extension system. Ethiopia comes close to achieving the FAO’s recommended ratio of one extension
worker for every 400 farmers, while for Rwanda the ratio is as low as 1:1500 and in Uganda 1:1800
households (Agricultural Transformation Agency, Ethiopia, 2014; Wasswa, 2020). Therefore, a high
proportion of smallholders may be beyond the reach of extension workers, relying more on farmer
organisations and other farmers for advice, knowledge and support. However, even where there is a high
ratio of extension workers to farmers, obstacles and limitations around the content and quality of advice
continue to hamper progress. The trend towards privatising agricultural advisory services, as promoted by
some donors and development agencies, may improve access and quality services for those farmers able
to afford them, but is likely to leave out poorer farmers and those producing primarily for their own
consumption (Nwafor & Nwafor, 2020). However, it is not just about quantity of research and extension;
quality matters just as much. National agricultural research organisations increasingly receive funding from
organisations such as AGRA that promote a pathway to productivity increase that relies on external inputs.
This includes seed research and seed systems development (GRA, no date), which risk marginalising
local seed systems that have supported agro-biodiversity conservation. Similarly, agricultural extension
staff and agro-input dealers have been trained in agro-industrial input use and not in knowledge-intensive
practices, and they rely to a large extent on local resources, such as ISFM. The training has been carried
out by AGRA and the African Fertiliser and Agribusiness Partnership (AFAP). While such initiatives can
boost the capacity of advisory services and research, they often skew towards a heavy reliance on
external inputs rather than a circular, regenerative way of farming.

3.2 PPPA practices and approaches

The review found many different practices and approaches with the potential to contribute to planet- and
people-positive agriculture. These range from specific agricultural techniques such as mulching to broader
frameworks such as CSA. Due to the lack of systematically collected information about the performance or
degree of use of these practices, the research team could not evaluate which of these have had success
at scale or have the potential to do so. The documents reviewed and interviews with diverse stakeholders
reveal a patchwork of initiatives, programmes and projects rather than a concerted, systematic effort. The
absence of overwhelming evidence about frontrunner practices is itself an indication of the complexity and
challenges of scaling PPPA practices. Below we outline some emerging trends in PPPA approaches in the
four countries and their implications.

Concern for climate change underlies many of the approaches. Several of the practices identified fall
under the label of CSA (even if the term itself is not always used), meaning that they promote one or all the
objectives of increased productivity, greater resilience and reduced emissions (FAO, 2013). As mentioned
above, climate change is a critical issue in the four countries, and the team found several policy

21 The term MSMEs is being used in particular in Africa and India, recognising the fact that most businesses in
these countries are below the small-business threshold (which varies between countries and is defined as fewer
than ten employees in Kenya). Increasingly, the term MSMEs is replacing the more commonly used term SME
(small and medium-sized enterprise), with the World Bank increasingly using the term MSME when discussing
access to finance. For example, see: https://www.worldbank.org/en/topic/smefinance
The degree to which these objectives are addressed varies across countries and among different practices. The objectives are interrelated, so it is not possible or practical to separate them, but in our analysis some trends become apparent. The main emphasis across countries seems to be on resilience: the team found evidence of a wide array of practices aiming to increase resilience, particularly to drought. These include the use of indigenous crops, drought-tolerant improved varieties and traditional varieties, water harvesting and water-saving techniques. They also include tree planting/agroforestry systems that can influence the microclimate and provide both fodder and fuel. Grain storage and warehouse-receipt systems were cited as additional practices used in the four countries to increase resilience in the face of climate unpredictability, albeit at a limited scale. Climate change mitigation appears to be less of a priority, which makes sense given that the four countries have relatively small per capita emissions. But several practices such as agroforestry, habitat restoration and reforestation have positive mitigation benefits and are particularly promoted in Ethiopia and Rwanda as part of their Climate-Resilient Green Economy strategies.

We found that soil and water conservation and soil fertility management were used to improve productivity and reduce costs, with substantial environmental co-benefits. A number of erosion-control and land-rehabilitation practices are used in the highland and hilly parts of the four countries, using both traditional and improved methods, including incorporation of trees or grasses. Some of these interventions date back to the colonial era, while others are more recent. The main focus of past programmes has been on hillside farms cultivated for cereals or higher-value food crops such as pulses and vegetables. These sites are more prone to erosion, with adoption levels generally higher where higher-value crops are grown. In all countries we found practices that fall under the umbrella of CA, meaning they involve zero/minimum tillage and crop rotation, and improve soil cover. The researchers identified initiatives that reduce inorganic fertiliser use or increase the efficiency of its use in all four countries, with several mentions of using manure and other types of organic fertilisation, as well as micro-dosage of inorganic fertiliser to reduce leaching. However, application rates are still very low in all four countries (African Fertilizer and Agribusiness Partnership, no date), despite an overall promotion of increased use of inorganic fertiliser.

We identified examples of integrated soil-fertility management and its related practices, such as crop rotation and local breeding across the countries. Integrated pest management (IPM) is also commonly promoted as an approach to reduce reliance on pesticides and their negative environmental and human-health impact. Agriculture ministries generally undertake promotion of these practices, with few or no linkages to initiatives by environment ministries, even though these often focus on similar objectives such as land rehabilitation or pollution control.

The concept of ‘technology adoption’ (as a result of a technology-transfer process) does not reflect the realities of smallholder farmers’ decision-making processes. Proposed alternatives, such as those of Glover et al., (2019), emphasise technological change as a complex process (beyond a binary choice of ‘adopt/don’t adopt’) and see farmers as having agency over their choices. But in the four countries, the vast majority of development actors, from government to civil society, still focus primarily on ‘scaling out’ practices or packages of practices. Even this review has used the concept and language of technology adoption, reflecting the dominant thinking of the vast majority of agri-food system stakeholders, including most donors, government agencies, agribusinesses, and NGOs.

However, our findings confirm that farmers often use only parts of a technology package. For example, they may use crop rotation, but not minimum tillage, as a component of CA. They may grow a particular crop variety on part of their land, or apply an agronomic practice to certain crops only. These choices are based on farmers’ priority objectives and the outcomes expected from different practices, against a backdrop of constraints and opportunities specific to each farm household (including the availability and use of labour, capital, land or knowledge). A smallholder farm household may well prefer to reduce labour inputs on their land in order to send their children to higher education. To secure land rights for the next generation, they may choose to cultivate a larger area of land extensively, rather than focusing on a smaller area and increasing factor productivity on that piece of land. Research in Burkina Faso, Ghana, and Malawi (Adolph et al., 2020) showed that farmers’ choices reflect their priorities, desired outcomes and resources — which may be different from those of outsiders. Hence entry points for a transition to a more sustainable agri-food system need to start by supporting farmers in making the best choices within...
their context, by co-developing solutions with them and other value-chain actors. This means providing a basket of options from which farmers can pick the one(s) that fit with their context.

**Scale matters.** To have a lasting impact at the system level, the majority of practices and approaches must be adopted by a critical mass of users. Examples include:

- **IPM.** The build-up of beneficial insects is achieved most effectively when large areas of farmland are cultivated in a way that provides a suitable habitat for these, and insecticide spraying is stopped not just on one farm, but in an extended area.

- **Soil and water conservation,** where practices of upstream farmers bear directly on run-off and erosion on lower parts of the slope.

- **Investments in equipment and material,** such as for CA, biogas production and irrigation.

- **Watershed and landscape approaches.** These have been used in Eastern Africa for decades and have proven more effective in soil and water management than working at the individual or community level alone.

- **Working with groups or networks of farmers, MSMEs or other stakeholders.** This is less costly than working with individuals and can produce a context conducive to sustainable change, as supportive institutions are built. However, evidence of the scale to which PPPA practices and approaches are used by farmers and other value-chain actors and the impact this use has had on their livelihoods (people) and the environment (planet) is currently not available. This is due to the challenges with the concept and practice of technology adoption outlined above.

Despite the widespread adoption of ‘circular’ farming practices such as the use of organic fertiliser, we did not find that the circular agribusiness approach is central to discussions around a transition to PPPA. Circular economy principles were more commonly emphasised within environmental, rather than agricultural policies across the four countries; an example is Rwanda’s National Environment and Climate Change Policy. However, the concept of resource efficiency was more widely embraced in a range of policies, such as the judicious use of fertiliser and water, and reduced postharvest losses, suggesting an enabling environment for this approach. Circular-economy terminology and approaches may be favoured more by donor organisations than by African governments and private entrepreneurs, and tend to focus on practices such as converting waste into energy or fertiliser. For example, a BMZ-funded project in refugee camps in Ethiopia, Kenya and Uganda (2019–2022) combines agroforestry and resource-recovery practices to restore soil health and create alternative sources of cooking fuel (Watson, 2019).

**Food systems perspective lacking?** Despite the systems framing of PPPA, this study did not find that a food-systems perspective featured in the dominant narratives of agricultural transformation in the four countries. This is not unusual. In most countries, food-system components are organised along sub-sector lines and only recently has a more joined-up approach gained impetus. Central to a food systems perspective is the idea of multiple and interacting food systems that exist at many scales, from the local to the global (Garnett et al., 2016). However, the existing policy, programme and research agendas of the countries in this study tend to treat agri-food systems as closed systems and are often limited in the extent to which they consider interactions between actors, processes and flows between different parts of the system. Adopting a food-systems perspective is often seen as too complicated and costly (Dekeyser et al., 2020). However, failing to account for both intra-system dynamics and inter-system drivers and challenges is a clear obstacle to systemic agri-food system transformation.

The majority of approaches identified in this study are relatively siloed in the agriculture/production part of the food system. We didn’t find strong evidence of ‘farm-to-fork’ approaches; in fact, consumption-based practices are thin in this report. In general, consumer demand doesn’t appear to be a big driver of these practices. Moreover, the production of more diverse or sustainable crops will not immediately or necessarily translate into increases in their consumption, especially not by the poorest. Amongst urban consumers, there is clearly more awareness about food safety and nutritional value; a number of consumer organisations are advocating for improvements in the two; these include ADECOR, the Rwanda

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22 There are examples of inter-ministerial working groups, such as those facilitated by the UNN-REACH programme on improving nutrition governance (https://www.unnetworkforsun.org/unn-reach-facilitation), which operated in Rwanda.
Consumer’s Rights Protection Organization. Considering the enormity of the nutrition challenges facing the four countries, a more integrated approach linking production and consumption — such as nutrition-sensitive agriculture — is not only desirable but imperative.

The PPPA approaches most commonly found in the four countries have short- or at least medium-term benefits for producers and their livelihoods in their immediate surroundings. Examples include:

- **IPM**, which reduces crop losses to pests and diseases, and enables reducing the amount and types of plant protection chemicals used, thus saving costs.
- **Soil fertility management and soil and water conservation.** These increase yields in the medium to long term and reduce reliance on inorganic fertilisers in the short term. The role of government- or NGO-managed projects and programmes is often to introduce such practices and to support the start-up costs — for example, by providing equipment for zero tillage.

With the exception of organic production, which targeted wealthy markets in Kenya, Rwanda and Uganda, there is no obvious transmission of sustainability price premiums to consumers. This is partly due to the informal nature of markets in the region, and the lack of certification and other standards for the domestic market. However, all four countries produce certified organic produce for the export market, in particular tea, coffee and a few other high-value products. The demand for organic produce from domestic (in particular urban) consumers is on the rise, providing a market for smaller producers who are not producing sufficient quantities for the export market.23

Despite ongoing hunger and malnutrition, **nutrition did not feature prominently** among the PPPA practices reviewed. We found examples of fortification and nutrient-dense crops, but the link between agriculture and improved nutrition is surprisingly weak. **Kitchen gardens**, which were mentioned in all countries, are the clearest example of nutrition, livelihoods and environment coming together. They are a practice that has proven benefits, and where women’s agency is crucial. The potential for replication and enhancement is very promising.

This report provides an overview of the diverse PPPA practices and approaches, but it doesn’t provide a clear sense of scale, impact or area covered. We have some tentative evidence about adoption levels in different countries. The country reports indicate whether adoption is low, medium or high, but this is a limited assessment based on the perceptions of the key informants interviewed. Similarly, some of the practices described here were mentioned by stakeholders in all countries, suggesting broad adoption, but this may again reflect the researchers’ sampling bias. An additional challenge with regards to tracking adoption levels and impacts lies in the fact that farmers often adopt specific parts of an approach, adapt the approach to suit their specific context, or use a combination of different practices on different parts of their farm. For example, with regards to CA, farmers often do not adopt the ‘soil cover’ component because of competition for residues for different uses (mulching, livestock feed and fuel).

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4 Towards a food system transition

4.1 Enabling conditions for PPPA

To drive the adaptation and adoption of PPPA practices, smallholder farmers and value-chain actors need a supportive, enabling environment that provides the required incentives to change actions at individual, community and organisational level. For the PPPA practices outlined in Section 3.2, a number of generic conditions must be in place:

(a) **Government commitment and political will** not only to formulate supportive policies, but also to implement them. This requires the will and ability to use evidence in decision making, challenging attitudes and perceptions and taking a firm long-term perspective. While this is important for any type of agricultural development, it is particularly relevant for PPPA, which often requires initial investments that only pay back over time. This includes investments in renewable energy and soil and water conservation.

(b) **A supportive regulatory and legal environment** that responds to the needs of agri-food system stakeholders in a transparent and equitable way, including secure land tenure, which is strongly linked to investment in sustainable agriculture (Singirankabo & Ertsen, 2020). This includes also a free and fair operating environment for civil society organisations (CSOs). Again, this is not specific to PPPA: MSMEs, farmer organisations and CSOs are particularly well suited to support a PPPA transition via a decentralised network of innovation, experimentation and provision of locally relevant inputs and services.

(c) **Organisational and institutional capacity in implementing agencies**, including those in government, civil society and the private sector. This includes the capacity to work across sectors and stakeholder groups, balancing the interests of different groups and developing consensus on priorities. Importantly, the PPPA transition requires an explicit acknowledgement of the potential trade-offs between environmental and socioeconomic objectives, and between short- and long-term impacts.

(d) **Investments to support hard and soft infrastructure.** This refers not only to roads, irrigation systems, warehouses and research laboratories, but also to technical and managerial capacities and effective systems and processes for joined-up planning, implementation and review of development actions. For PPPA to succeed, a main requirement is local-government capacity to respond to the needs of farmers and other value-chain actors operating in a particular context.

Together, these conditions can underpin the movement towards more sustainable agri-food systems. However, this report’s analysis (based on the literature and stakeholder interviews) suggests that a paradigm shift is needed, from a top-down, donor- and government-driven process of technology transfer, towards a more contextualised, bottom-up approach that builds on local knowledge, resources, capacities and priorities. An important element of such a transformation process is experimentation, with individuals, groups, communities, and wider networks trying out different options, adapting them, sharing this learning with others and thus moving towards a more sustainable system. This also involves making mistakes and discarding seemingly effective solutions because they do not fit the context.

The enabling conditions, services and institutions required for this include:

1. **The ‘right’ type of agricultural knowledge and technology**, developed and promoted through farmer innovation, formal agricultural research and advisory services or a combination of both. This includes the use of information and communications technology (ICT) and other tools of experiential learning (learning to by doing) to identify PPPA practices that work for different types of farmers in different contexts. Such learning processes will normally result in baskets of options suitable for different wealth categories of farmers and will require a commitment to farmer-led experimentation and adaptation, rather than rolling out blueprints. Examples from Kenya (section 7.2) show this is possible and can be effective.

2. **Farmer and value-chain-actor participation via inclusive organisations.** These must have effective governance mechanisms through which the interests of their members are represented effectively, while upholding a commitment to long-term objectives of inclusion and sustainability. Also, consumer and value-chain-actor groups must be able to hold governments to account and advocate for the rights
of their constituents, in particular those at the bottom (marginalised individuals and groups unable to benefit equally from mainstream development interventions). Examples include the Rwanda Organic Agriculture Movement (ROAM).24

3. **Agricultural and agro-industrial inputs**, which must include both organic and inorganic options. There must be specific support for the development and distribution of economically viable organic options such as bio-pesticides, organic soil amendments based on organic waste and environmentally friendly processing and packaging technologies that use locally available materials.

4. **Energy**, with a focus on decentralised (off-grid) and ideally renewable sources that enable smallholder farmers and MSMEs to increase productivity, reduce drudgery and compete with at least some larger businesses and imports.

5. **Financial resources for investments along the value chain** from farm to fork. This includes agricultural insurance schemes for smallholder farmers and MSMEs. For the adoption of soil and water conservation practices, which are vital in addressing land degradation in all four countries, financial incentives may be required to assist farmers with the initial investments.

6. **Markets (domestic, regional, and international)**. Of particular importance is access for poor farmers currently unable to meet the requirements of regional and international markets.

In principle, these requirements are not new and the majority of agri-food system interventions include elements of each, with the aim of bringing about sustainable improvements to both people and planet. However, different stakeholders have different perspectives on the specific outcomes they want to achieve and the strategies they believe are required to achieve them.

### 4.2 Key PPPA stakeholders

The term PPPA is not generally understood, let alone used by the stakeholders and key informants consulted during this study. In fact, none of the documents reviewed (see References) used the PPA or PPPA terminology. Commonly used concepts include ‘sustainable agriculture’, ‘sustainable intensification’, ‘sustainable natural resources management’, ‘agroecology’ or ‘agroecological intensification’, ‘climate-smart agriculture’, ‘green growth’ and ‘inclusion’ (of women, youths, weaker sections of society). These are the terms we used to identify planet- and people-positive practices and to engage with stakeholders.

In all four countries we identified a wide range of stakeholders in broad support of PPPA principles; these supporters are listed in Table 1.

**On the planet-positive side they include:**

- Ministries of environment and affiliated departments, including those in charge of climate change adaptation and green growth
- To a much lesser extent, the ministries of agriculture; their objectives include sustainable natural resource management — sustainable land and water management in particular
- FAO, which has a strong focus on agroecological intensification, and UNEP
- Some development partners/funders such as IKEA Foundation, and Sida
- Most INGOs (World Vision, Care International) and some national-level NGOs with a focus on sustainable agriculture and environment (see details in the country chapters), and
- Some international programmes of international agricultural research institutes (CGIAR).

**On the people-positive (inclusive livelihoods) side, the main supporters are:**

- Ministries of agriculture and their various agencies. They are mostly aligned with the AGRA approach. It focuses on productivity increase by increasing the use of external inputs and technologies, and value-chain development via private-sector involvement, including harnessing foreign direct investment.

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24 For more information, see: [https://roam.org.rw/](https://roam.org.rw/)
• Agricultural research organisations and advisory services, whose focus has been primarily on productivity-enhancing technologies using external inputs.

• Most development partners/funding agencies, including USAID, FCDO (formerly DFID), the World Bank, the Bill and Melinda Gates Foundation, which supports AGRA.

• Most private-sector actors and interest groups, including global and national agro-input companies (for example, Syngenta and Yara) but also most MSMEs whose main objective is to generate income and employment, and in some cases to do that in inclusive ways — this includes most cooperatives.

• Farmer organisations at national and regional level including the EAFF (see Box 2).

• Some INGOs emphasising economic and social objectives, and most national level NGOs/CSOs, often with a focus on food and nutrition security, employment, and income. This group also includes most farmer organisations that are representing the interests of their members in terms of access to inputs and credit, agricultural research and advisory services, infrastructure and so on.

The dimensions of ‘inclusiveness’ and ‘equity’ were less prominent amongst the ambitions of projects, programmes and policies as compared with the aim of increasing income and employment overall. The only exception is the emphasis on gender equality and inclusion of women, which is strongest in Rwanda, somewhat strong in Kenya and Uganda, and weaker in Ethiopia.

However, it is rare that actors acknowledge, let alone address the potential tensions between economic growth, commercialisation, globalisation, increasing private-sector involvement on the one hand, and social and economic inclusion, reduced inequalities and long-term environmental sustainability on the other. Addressing these tensions would require bringing together key decision makers from both sides to identify and implement ways of balancing potential trade-offs. Most policy and programme documents imply that inclusive, sustainable growth is possible but do not spell out how some of the inherent tensions will be resolved. These include tensions between:

• Short-term productivity increases and long-term sustainable land management

• Approaches relying on locally available resources (with associated limitations in terms of productivity enhancement) and approaches requiring high levels of potentially expensive/unaffordable (for poorer farmers) external inputs

• A systematic focus on food and nutrition security for all and significant growth and benefits for a few

• Conservation of crucial ecosystem functions, including biodiversity, for long-term sustainability at the cost of current growth, and less-rigorous regulations for environmental protection supporting rapid agricultural intensification at the cost of the environment.

Many synergies could be exploited, in particular via ecological intensification that is economically viable, in particular for poorer farmers unable to purchase external inputs, and is environmentally sound, by minimising pollution and supporting good land management.

We have noted that a range of networks, platforms and multistakeholder groups are in place supporting different parts of the agri-food system agenda. But often these groupings are focused on specific themes such as the Prolinnova (PROmoting Local INNOVAtion) country forums for farmer-led agricultural innovation.

A main concern is that only a small proportion of farmers are members of formal farmer groups or platforms. So it is difficult for them to have a voice on issues such as demanding appropriate agricultural services (knowledge, credit, markets) and influencing the design of projects and programmes. At the local level, informal groups and networks play an important role in terms of farmer access to information and inputs, including via traditional reciprocity arrangements. But normally, only formal groups have representation via apex bodies such as national farmer organisations, which in turn are represented regionally via the EAFF. Social media are providing farmers with access to new ways of communicating and advocating directly with each other and with the media (Kah, no date). But there have not been any systematic studies to assess the extent to which this is enabling poorer farmers to advocate effectively.

For now, most initiatives on ICTs for smallholder farmers seem to focus on technical content (such as
provision of advisory services, including some interactive platforms (Agrilinks, 2016) rather than on policy advocacy.

4.3 Entry points for a PPPA transition

In all four countries, as in most of sub-Saharan Africa, agri-food systems are constantly changing in response to many drivers. Stakeholders with different priorities, visions and mindsets influence policies, institutions and processes and try to influence each other by, for example, producing and sharing evidence about what has worked and what hasn’t. Monitoring and evaluation of projects and programmes produces however a rather incomplete picture, because there is no agreed definition of what constitutes PPPA, and what practices, approaches, technologies or processes should be categorised as such. The same applies to other visions of sustainable agri-food systems, whereby different time scales, stakeholder groups and priorities are concerned. Hence there is only evidence about components of PPPA, ie specific practices or groups of practices used in a specific way in a specific context.25 Such evaluations usually focus on a limited number of outcome parameters, for example, productivity, erosion rates, income, and so on — whereas the challenge with PPPA lies in balancing benefits for different parts of the system at different scales. There is likely to be a role for evidence in supporting an agri-food system transition, but this would require the development of agreed indicators, measures and dimension of PPPA for different contexts.

The four country reports each detail possible pathways to PPPA; all aim to redirect and build on efforts being made by the public and private sectors. In Rwanda we found that developing capacity, piloting innovative approaches, scaling out tested approaches (such as IPM, ISFM, home gardens, soil and water conservation, access to energy for MSMEs from decentralised renewable supplies), promoting evidence-based decision, and supporting civil society partners each have a role in the transition. In Ethiopia the team identified a combination of reframing current policy, capacity and knowledge building, awareness raising, direct financial support and material investment, and market support. In Uganda and Kenya, there was a strong emphasis on national government policies, plans and strategies.

To address the practicalities of implementation, and medium- to long-term sustainability when external support ends, PPPA must be integrated into ongoing public policy practices/processes and aligned with the interests of private-sector actors. PPPA activities operating in silo will not ultimately secure the support necessary to assist in the transition to PPPA. However, the opportunity cost of working within current institutions is that radical change associated with establishing new institutions, systems and processes is foregone.

The reality of working within public and private institutions in least-developed countries means the optimal entry points into policy making and private-sector activities must be identified for each issue and each country. An entry point is a point within the decision-making process where:

a) It is possible to enter and influence the process

b) It is practical to make policy or operational adjustments, and

c) There is institutional capacity and incentivised personnel to champion and assimilate change.26

Examples of such locations within the policy and operational apparatus include support for enabling policies, collaboration mechanisms, awareness and capacity building, support through beneficiary groups and elements of physical operations (FAO, no date; Jaenicke & Virchow, 2013; Petesch et al., 2017).

We identified multiple entry points that could help advance a PPPA agenda (Table 4). One of the key entry points is the ongoing or aspired mainstreaming of PPPA into current national government policies that are — at least in principle — amenable to PPPA. Our review of policies and our consultation with diverse stakeholders suggest policy frameworks in the region could only partially enable PPPA. This is because most governments focus on agrarian modernisation and commercialisation, largely through conventional agricultural practices. However, this study also found evidence of government policies, plans and strategies where PPPA objectives are explicit, most notably in climate and environmental policies that are fairly progressive in all four countries. These include the National Adaptation Plan (NAP) in Ethiopia, the

25 For example, Waddington et al. (2014) reviewed outcomes of farmer field schools, and Brueder & Gomez-MacPherson (2014) reviewed the impact of conservation agriculture on farmers’ yields.

26 Adapted from Watkiss (2015).
National Climate Change Policy in Kenya and Uganda and environmental objectives within Rwanda’s National Environment and Climate Policy (Ministry of Environment, Rwanda (MoE), 2019). Sector policies are meant to be aligned with such PPPA-friendly “crosscutting” policies, but the necessary incentives are not always there, and sectoral silos remain.

Perhaps the greatest impediment is policy implementation. Many stakeholders in the four countries repeatedly mentioned that policies are never implemented in any meaningful way. This is often due to a failure to adequately fund implementation, poor consideration of how contexts change within countries, limited technical skills within a country and little ability for intra-governmental coordination. Implementation failure was particularly true for Kenya and Uganda. In Ethiopia and Rwanda there is a more established culture and set of regulations around using policies for guidance when planning projects and programmes.

Robust and coherent regulatory frameworks are crucial for encouraging PPPA actions and outcomes. To work optimally, such frameworks often require:

- Support for poor farmers to ensure they have the capacity to comply
- Frameworks that are responsive to demands from CSOs, and
- Provision of adequate incentives for engagement, either negative or positive.

We found that all four countries have research and technical institutions that can support a PPPA agenda. These include the CGIAR centres, the Ethiopian Institute for Agricultural Research (EIAR) and the Kenya Agriculture and Livestock Research Organization (KALRO). They have good contextual knowledge and experience. However, many of these institutions have weak capacity: the resources available are short-term and they face the challenge of keeping skilled and experienced staff.

The functionality of markets for PPPA goods and services is essential for the sustainability of the transition. Current food and agricultural markets are only partially enabling the PPPA agenda. Some countries have progressed with regard to price information systems that might improve market access for small-scale farmers. Some initiatives are promoting short chains and direct linkages between farmers and informed consumers, thereby creating market opportunities for sustainably produced food. However, the barriers to smallholder entry remain considerable, especially for the poorest farmers. Barriers include insufficient access to credit and other services, lack of capacity and gender barriers that prevent women's participation. Moreover, the market opportunities that might enable PPPA goods and services are currently biased toward export markets or wealthy domestic consumers. So while they may benefit smallholders, the markets do little to improve food and nutrition security for the urban poor.

Table 4 Enabling and disabling factors for PPPA across the four countries

<table>
<thead>
<tr>
<th>Entry point</th>
<th>Enabling</th>
<th>Disabling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Policy and legal framework</strong></td>
<td>Alignment of policy with PPPA objectives (E, K, R, U)*; government plans (E, K, U) government strategies (E, K, U); responsiveness to agri-food system stakeholders (R) and PPPA issues (E); support for poorer farmers accessing market (R); openness to demands from civil society (R)</td>
<td>Misalignment of policy with PPPA objectives (E); poor incentives for local action (E); transitioning towards decentralised institutions (K); strong non-PPPA lobby groups (ALL); poor fit with context (E); little incentivised involvement of private sector (E)</td>
</tr>
<tr>
<td><strong>Institutional capacities</strong></td>
<td>Agricultural technology (R, E); national issue-focused institutions and specialist facilities (E, U); research institutions (E, U)</td>
<td>Poor resourcing of key institutions (E); limited investment in agricultural sector (K, U)</td>
</tr>
<tr>
<td><strong>Market</strong></td>
<td>Information on prices (E); market linkage schemes (E, K); incentives for private-sector engagement (E); promotion of PPPA practices and technology (U)</td>
<td>Low access to credit markets for poor farmers (E, U); systematic bias against women in value chains (U); barriers for poor to enter markets (U)</td>
</tr>
<tr>
<td><strong>Capacities of agri-food system actors</strong></td>
<td>Long-standing extension services</td>
<td>Extension coverage uneven, poorly funded</td>
</tr>
</tbody>
</table>

*Key: E=Ethiopia; K=Kenya; R=Rwanda; U=Uganda; ALL=All four countries
Finally, increasing the capabilities of the different groups of agri-food system actors is critical for enabling a 
PPPA agenda. We found a mixed picture in the four countries. All countries have extensions services, but 
their effectiveness and reach are uneven, with relatively better coverage reported in Ethiopia and Rwanda, 
particularly weak provision in Uganda, and the private-sector-support extension in Kenya. In addition to 
technical capabilities and skills, the ability of agri-food system actors to organise themselves is important. 
In the four countries there are farmers’ and other organisations, but their capacities are weak because of 
high dependence on donor (rather than member) funding, challenges with regards to governance and 
management, and poor linkages to markets.
5 Conclusions

Based on our literature review and the contributions of key informants and stakeholders, it is evident that there is already a high-level commitment to, and a range of enabling policies and conditions in place for, inclusive and sustainable agri-food systems as envisaged in the PPPA concept. The main challenges are related to gaps in the capacities, resources, knowledge and information, and voice of agri-food system actors tasked with policy implementation. A wide range of actors is already operating in this field, with substantive political and financial power and influence, and we believe it is overambitious to expect any individual actor to bring about systemic changes to the whole agri-food system of the four countries within a period of five years.

There are, however, many entry points through which to bring about incremental changes in specific areas or sub-sectors. These vary from country to country and have been elaborated in the individual country reports. They can be grouped into the following broad intervention categories (not in priority order):

1. **Developing the capacity of agri-food system actors at all levels.** These include farmers, processors, traders, extension staff, researchers, and technical and managerial staff in government and private-sector agencies. This requires bottom-up, inclusive and sustainable agri-food system interventions that co-develop locally adapted solutions. Examples include farmer field school (FFS) approaches,27 paravets supporting rural communities with basic livestock health services (Luseba & Rwambo, 2015), and initiatives to develop youth agribusiness capacity (FAO, 2018c). Lessons from these programmes show that for long-term development impact, capacity development must be supported by other enabling factors such as access to adult literacy programmes and recognition of local people’s knowledge and agency.

2. **Piloting of, and experimentation with innovative approaches.** These must address current weaknesses in implementation by providing alternative ways of doing things, with a specific focus on ways of achieving inclusion of the poorest and environmental sustainability. Examples include the Prolinnova Local Innovation Support Funds (Prolinnova, no date c) that provided small grants to grassroots innovators to further develop, trial and test their innovations, including support from formal research organisations. Another is increasing the range of agroecological innovations developed by farmers and other local innovators in Africa (AFSA, 2016). It also includes institutional innovations, such as the use of ICTs for market access (CABI, 2018) and social accountability (Tembo, 2013).

3. **Strengthening and supporting CSOs advocating for PPPA-focused agricultural policies and programmes,** including consumer organisations, farmer organisations and environmental advocacy groups. This can be effective in bringing about change from the bottom up, provided that CSOs are legitimate representatives of their stated constituents. There are many examples in the region whereby farmer organisations (Nyang et al., 2010), for example, have brought real benefits to their members and their wider communities. The governments of all four countries have signed up to ambitious climate change action. While implementation of these commitments has been uneven, they do provide CSOs with a platform to demand accountability and action.

4. **Networking, lesson sharing and platforms** to support better coordination, social learning and synergies between different agri-food system actors. These include platforms focusing on specific thematic areas such as agroecology in Ethiopia (AgriProFocus, no date) and agricultural extension services in Kenya.28 They also include value chains such as agricultural innovation platforms in Rwanda (CDAIS, no date) that bring together value-chain actors for a specific commodity. However, many of these platforms are dependent on donor funding rather than support from their constituents, meaning they may not be entirely demand-led.

5. **Addressing disconnects between food and agricultural, environmental, and overall economic policies** with regards to environmental and inclusion issues, as these disconnects are sending ambiguous signals to agri-food system actors, thus contributing to policy implementation challenges. This would require a clear commitment from governments to supporting either existing cross-sectoral

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28 AFAAS support country fora for pluralistic agricultural advisory services — for example in Kenya ([https://www.afaas-africa.org/kenya/](https://www.afaas-africa.org/kenya/)) and Ethiopia ([https://www.afaas-africa.org/ethiopia/](https://www.afaas-africa.org/ethiopia/)).
working groups or creating new mechanisms for this. But there is a concern that a focus on policy formulation alone may generate limited benefits, as challenges lie mostly at the implementation level, even where policies are coherent on paper.

6. **Developing and using relevant data and other information** to inform decision making, particularly the design and implementation of interventions. This includes lessons learned from innovative pilot initiatives (see 2. above) and information about the extent and nature of potential trade-offs between inclusion, growth and environmental sustainability (at different time frames and scale, and affecting different groups — both winners and losers). However, such actions must be accompanied by clear strategies to support evidence-based decision making, as experience (Jones et al., 2012) has shown that providing data and information alone is no guarantee of their use.

7. **Scaling out of tried and tested approaches to PPPA** via investment of financial and technical resources for implementation at scale. This conventional development approach is widely used by bilateral and international agencies and national governments to achieve impact at scale. Their success depends on a range of factors, but has often been short-lived, in particular where programmes create an artificially supportive environment that cannot be maintained post-project.

Categories 1 through 3 appear to provide the greatest scope for doing something new and different. While category 7 provides the least scope for innovation, it opens opportunities for demonstrating ‘development impact at scale’. This is an important investment justification for many bilateral development donors who may be better placed to support large-scale development programmes. A nimbler institution could opt for riskier interventions, in terms of the likelihood of their success as demonstrated by their measurable development impact. Such interventions could potentially have more impact in the longer term by improving the enabling environment for a PPPA transition.

This study provides a broad picture of PPPA context and status in Eastern Africa. The entry points listed above build on this evidence and provide general guidance on the types of interventions that have been successful or have the potential to be so. However, these findings are not conclusive. A systematic appraisal of the approaches offering the most promise of achieving PPPA, and under what conditions, is beyond the scope of this report. This paper suggests several areas of potential work that could bring PPPA into clearer focus. These include gaining a better sense of the financial and economic viability of regenerative agriculture (RA) models, and understanding innovation in capacity development for farmers, for example through horizontal models of knowledge sharing and innovation.
6 Ethiopia

6.1 The state of play for PPPA in Ethiopia

6.1.1 The agri-food system in Ethiopia

Ethiopia is a landlocked country in the horn of Africa, bordering Eritrea, Somalia, Kenya, South Sudan, Sudan and Djibouti. It has an area of 1.14 million square kilometres and is the seventh largest country in Africa by geographic size. It is the second most populated country in sub-Saharan Africa, with an estimated population of 115 million, expected to surpass 200 million by 2049 through a 2.7% annual growth rate (UN World Population prospects, 2019).

Climatic heterogeneity and proximity to the equator support a range of agricultural systems and livestock-rearing practices. Ethiopia’s agro-ecologies are shown in Figure 4. Much of Ethiopia experiences two rainy seasons per year, allowing for cultivation of two crops per year. The March/April wet season is short, followed by long rains between June and September.

Smallholders with farms averaging in size from 0.5–2 hectares account for 95% of agricultural output (Central Statistical Agency, Ethiopia, 2012). Agriculture accounted for 33.5% of GDP (World Bank Open Data), with small farms (0.5–2ha) accounting for 95% of agricultural output (Central Statistical Agency, Ethiopia, 2012).

The agricultural sector depends largely on traditional farming methods and a rainfed farming system. The major cereals grown in Ethiopia are maize, wheat, and teff (77% of total volume). The country also produces other cereals such as barley, sorghum and millet, as well as legumes including chickpeas, groundnuts and various beans. Root vegetables such as carrot, potato and cassava are also cultivated, as
well as enset (a local type of banana) and several horticultural crops (Taffesse et al., 2011). Coffee and oilseeds such as sesame and sunflower are major export crops.

Ethiopia has the highest number of livestock in Africa, including 65.35 million cattle, 39.89 million sheep, 50.5 million goats, 7.7 million camels and 48.96 million poultry (Central Statistical Agency, Ethiopia, 2020). Livestock are the main capital of pastoralists and agro-pastoralists, particularly in dryland areas. Livestock provide income, resilience in the face of drought, and secondary products such as leather.

Ethiopia’s agricultural sector is dynamic, and in recent decades it has been moving decisively from subsistence agriculture to commercialisation. The development of markets has been facilitated by improvements in infrastructure, technologies and access to information. Ethiopia is also increasingly linked to international agricultural trade: while imports of wheat, sugar, palm oil and other processed food have increased (Global Agricultural Information Network, 2017), the country has been a net exporter in value terms in the last decade (Minten et al., 2018).

Food insecurity is a reality for a large proportion of the population. In 2016, it was estimated that approximately 20.5% of households were food insecure — about 26 million people (World Food Programme and Central Statistical Agency, Ethiopia, 2019). Food insecurity is associated with large household size; low educational attainment of the household head; high age of the household head; income and asset poverty; and engagement in the informal sector, mixed agriculture and casual labour.

6.1.2 Challenges facing the food and agricultural system

Ethiopia's food and agricultural system faces several interconnected challenges stemming from the need to feed a growing population and rising pressure on natural resources, all under increasing climate variability. Based on a literature review and drawing on interviews with key stakeholders, we have identified the following five interrelated challenges for food and agricultural systems:

- Climate vulnerability
- Low productivity
- Deforestation, land degradation and biodiversity loss
- Hunger and malnutrition, and
- Post-harvest waste management.

**Climate vulnerability**

Climate-related events, especially drought and flooding, are among the most serious challenges facing Ethiopian agriculture. Drought is a major threat to agricultural production, which is primarily rain fed (Gezie, 2019). High temperatures and extended periods without rainfall result in a soil-moisture deficit that can lead to crop failure, particularly in the lowlands (Cervigni & Morris, 2016). By the middle of this century, climate change is projected to have a major impact on the agricultural sector, leading to considerable declines in the production of grains, cash crops, enset and livestock across all major agricultural regions (Yalew et al., 2018). Climate change will also increase the frequency of extreme weather events and is likely to exacerbate flooding (Gezie, 2019), already a major problem in the semi-arid northern highlands given the related loss of life and produce (IFRC, 2020). Climate-related challenges hit poor farmers the hardest: they are less able to adapt than the better-off farmers (Paul & Weinthal, 2018). Crop and livestock insurance is not readily available to smallholder farmers; where it is available, it is inaccessible due to cost or complexity (Amare et al., 2019; Takahashi et al., 2016). This further reduces the resilience of farming households to a changing climate.

**Low productivity**

Crop productivity in Ethiopia, while on average higher than in neighbouring countries, is still far below its potential (Thomas, 2020). Across a number of crops including teff, wheat, maize, sorghum and barley, yields in the field average about half that obtained on research farms (Taffesse et al., 2011). Livestock productivity is also low, particularly in milk production (Haile et al., 2011). Generalised low productivity across Ethiopia negatively affects food and nutrition security, rural incomes and livelihoods; the resulting
overuse of soils leads to their degradation. Low productivity has many different, overlapping drivers of which the most important are:

- **Lack of quality seed.** Multiplication and delivery of improved seeds is very limited, with more than 80% of seed produced and traded informally (Farm Africa et al., no date)

- **Land degradation and soil erosion** leading to soil-fertility decline, while the use of inorganic fertiliser is relatively high on average (Thomas, 2020)

- **Lack of hybrid animal breeds and disease.** Similar to seeds, the vast majority of cows are local breeds and the availability of hybrid cows and improved feed is limited (Haile et al., 2011). While this means that livestock are well suited to local conditions, opportunities for high-producing varieties and rearing methods are not adequately captured. Moreover, the lack of veterinary and related services results in frequent outbreaks of animal diseases (Seyoum and Teshhome, 2018; Tsouloufi et al., 2020).

### Deforestation, land degradation and biodiversity loss

Deforestation, land degradation and the loss of biodiversity are distinct phenomena closely linked to one another. In Ethiopia, the drive to increase arable land and pasture, to extract more food from the land and to obtain wood for fuel all put considerable pressure on natural resources, particularly forests and soil. The country’s forest cover decreased by 3.4%, more than 400,000 hectares, between 2001 and 2019 (Global Forest Watch, 2020). The loss of vegetative cover is associated with land degradation, which results in a yearly loss of nearly 3% of the country’s GDP (Tsegaye, 2019). The highlands, where soil loss can reach up to 200–300 tons/hectare/year, are the most affected (Yifery, et al., 2018). Deforestation and habitat loss are a major driver of biodiversity loss in Ethiopia; the effect of these is compounded by widespread problems with invasive species (Shiferaw et al., 2018). Agricultural expansion is likely to continue in order to meet Ethiopia’s ambition to be self-sufficient in staple crops, even if crop yields increase (Franks & Gebrehiwot, 2020).

### Hunger and malnutrition

Despite recent progress, Ethiopia continues to face persistent and widespread problems of hunger and malnutrition. According to the Global Hunger Index, the country ranks 97th out of 117 countries suffering from a ‘serious’ level of hunger (Global Hunger index, 2019a). Undernourishment affects about one fifth of the population and almost 40% of children under age five suffer from wasting. The Global Nutrition Report states that Ethiopia is “off course to meet all the global nutrition targets for which there was sufficient data”, including anaemia among women of reproductive age (Global Nutrition Report, no date).

### Post-harvest waste

It is estimated that Ethiopia loses about 282 billion birr (US$8 million) annually due to post-harvest waste (Ethiopian Monitor, 2019). For example, more than 40% of tomatoes, papayas and mangos, 15% of maize and almost one third of sorghum do not make it to the consumer (APHLIS, no date). There are multiple causes for this, from production through to consumption. Storage facilities are limited and often unaffordable; poor infrastructure leads to lengthy transportation time and transit losses; and harvesting practices at the farm level are often unsuitable. Post-harvest losses are significant in economic, social and environmental terms as they contribute to GHG emissions and loss of income, food and livelihoods, in particular for the poor.

#### Addressing challenges through PPPA practices and approaches

To address the challenges described above, Ethiopia must increase its food production and productivity while managing its natural resources sustainably, all within the context of a changing climate. Several approaches described below now fall under or overlap with CSA.

### Watershed management

Sustainable water-management practices are used across Ethiopia to address challenges including soil moisture stress, flooding, overuse of inorganic fertilisers, and agricultural productivity. Watershed

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management can also help farmers mitigate and adapt to climate change (Chisholm & Woldehanna, 2012). The Ethiopian government has supported water-conservation activities since at least the 1970s, initially through top-down programmes, which were often also donor-driven. Since the late 1990s there has been a turn towards participatory, environmentally sustainable approaches and a shift in focus from just soil conservation to broader objectives related to agricultural production (Gebregziabher et al., 2016).

Integrated watershed management (IWM) aims to protect and rehabilitate watersheds through soil and water-conservation practices, reforestation and regenerating degraded areas (Chisholm & Woldehanna, 2012). IWM can benefit ecosystems and resource users, both economically (increased agricultural productivity and incomes) and socially (improved nutritional status, reduced workloads for women). The approach brings together communities, local authorities and development practitioners in a participatory planning process (Chisholm & Woldehanna, 2012; Selassie & Amede, 2014). In 2005 the Ethiopian government published guidelines on community-based participatory watershed development, with support from USAID, WFP and other partners (Lakew et al., 2005).

Successful IWM projects piloted in the late 1990s and early 2000s have since been scaled up to the national level, including projects in Tigray funded by Irish Aid (Chisholm & Woldehanna, 2012). One reason for the success of these earlier projects was they provided farmers with financial incentives and other forms of social security; this was often crucial in balancing short-term socioeconomic trade-offs with long-term socioeconomic and environmental benefits (Chisholm & Woldehanna, 2012; Selassie & Amede, 2014). Other factors in their success included a supportive and enabling policy environment and commitment from both government and civil society.

Climate-smart agriculture

The Ethiopian government, development partners and extension services promote CSA practices and technologies (CIAT/USAID, 2017), in some cases successfully applying climate-smart approaches in the framework of IWM (Joosten & Grey, 2017). However, on-farm adoption of most practices remains low for most smallholders, largely due to pre-existing challenges around access to credit, inputs and markets, and land tenure. Also, traditional practices around free livestock grazing and land-unit fragmentation challenge CSA implementation in practices such as mulching — which require crop residues to decompose on the field rather than be consumed by livestock.

Analysis by the International Centre for Tropical Agriculture (CIAT) and USAID (CIAT/USAID, 2017) suggests that the only CSA practice widely adopted in Ethiopia is that of rotating barley with pulses. Practices with a medium adoption rate include:

- The use of improved barley varieties
- Rotating sorghum with pulses
- Precise application of fertiliser to sorghum

Landscape restoration

As part of its Climate-Resilient Green Economy (CRGE) strategy, the Ethiopian government has committed to restoring 15 million hectares of degraded land by 2025 (Reij, 2015). This builds on previous successes including the internationally recognised Productive Safety Net Programme (PSNP), which combined food security with environmental outcomes through a ‘food for work’ approach. The programme led to the restoration of over a million hectares of degraded land in Tigray in the 1990s, through tree planting, closing areas off to grazing to allow vegetation to regenerate, and building bunds and terraces to prevent soil erosion (Reij, 2015). Food-for-work programmes have tended to promote ‘new’ or ‘improved’ water-conservation practices focused on promoting conservation practices on community lands. But minimal consideration has been given to individual farms.

The government has invested over US$1 billion a year over the last ten years in land restoration but the impacts this spending has had on ecosystem services have not been adequately monitored or evaluated (CIAT, 2019). Recent evidence suggests that "conservation agriculture, soil and stone structures, and
restricting areas for grazing and agriculture have dominated restoration efforts” but there is no one-size-fits-all solution, with ecosystem and socioeconomic impacts varying from one site to another (CIAT, 2019).

NGO projects have promoted farmer-managed, natural regeneration; the most notable is the Humbo Community-based Natural Regeneration Project in the early 2000s, funded by World Vision. The project promoted agroforestry for land restoration, income generation and improved soil fertility, and sequestered 181,650 tonnes of carbon dioxide between 2006 and 2018 (World Vision, 2019).

Conservation agriculture

NGOs, the private sector and government have promoted CA in Ethiopia since the late 1990s, although practices such as reduced tillage have likely been used by farmers for much longer. Available evidence suggests that smallholder adoption of CA may be increasing; for example, around 70,000 farmers are thought to use CA technologies in the Wolaita Zone (Zerssa et al., 2021). In general, there is inadequate data on the scale and extent of CA adoption across Ethiopia, but it’s believed that only a small proportion of farmers use it overall (Jirata et al., 2016). Some obstacles include its limited integration into the government extension system, farmers’ lack of knowledge related to crop rotation and intercropping combinations, and issues related to keeping livestock (Jirata et al., 2016). Existing traditional uses for crop residues such as fuel, fodder and building materials also inhibit their use in CA, particularly given a lack of alternative, available fuel sources for many rural farmers. Reduced tillage appears to be the most successful CA practice as it reduces labour and associated costs and particularly benefits women (Jirata et al., 2016).

Traditional CA is practised in a number of areas in Ethiopia, including Derashe District, the Gambella and Benishangul-Gumuz regions, Konso Cultural Landscape and the Hararghe highlands (Jirata et al., 2016). Traditional CA practices may involve only one or two of the three that are generally thought to define CA, such as reduced tillage of some crops and crop cover, which are used in Derashe District; intercropping is not commonly practised (Jirata et al., 2016).

Integrated soil fertility management

ISFM and similar practices are being used to counteract land degradation in Ethiopia. Traditional methods of using manure can help to address problems related to acidic soils and salinity and the high cost of imported inorganic fertiliser. Scaling up local commercial production of organic fertiliser (compost) is also promoted as a viable, private-sector solution. A German-funded programme, ISFM+, piloted the use of ISFM technologies such as lime application, organic fertilisers and intercropping and supported their inclusion in the agricultural-extension system through a participatory and inclusive approach (Leta et al., 2020). The programme involved agro-dealers and a revolving fund to support the long-term sustainability of the lime supply chain. Institutionalising the technology within the extension system through partnerships and a collaborative approach was vital to the programme’s success and useful in scaling up PPPA practices and technologies (Leta et al., 2020). AGRA also recently funded a programme to promote ISFM within the national extension system.

As part of the National Biogas Programme of Ethiopia (NBPE), currently in its third phase, the Ethiopian government is promoting the use of high-value organic fertiliser to increase agricultural productivity. The project aims to scale up production and use of bio-gas stoves and the resulting bio-slurry for farm use as an alternative to imported inorganic fertilisers (SNV, no date). The NBPE II project is co-funded with the Ethiopian government. The use of bio-slurry has recently been incorporated into the government’s extension service provision.

Forest management and agroforestry

Agroforestry and sustainable forest-management practices in Ethiopia address the challenges of air and water pollution, deforestation and biodiversity loss. They also have the potential to deliver social and economic benefits. Specific practices include home garden agroforestry, intercropping and livestock production. Additional practices include alpine beekeeping, woodlot/roadside plantations, afforestation of degraded land and strengthening indigenous flora/fauna species conservation by in situ and ex situ conservation methods.
Tree planting and forestry-sector development more broadly have received a big push from the Ethiopian government in recent years. In 2016 the government joined the African Forest Landscape Restoration Initiative in assessing the potential for national forest-landscape restoration and found that 73% of the country’s land mass could benefit from tree-based landscape restoration (Mengistu & Anderson, 2018). The benefits of these programmes for both people and planet may vary according to different projects and their specific criteria. For example, historic afforestation programmes that promoted the non-native eucalyptus tree damaged soils and landscapes (Hadero, 2019).

Forestry-sector development projects in Meket district in Amhara were initially successful, growing in number from 9 to 24 between 2016 and 2018, and provided a basis for scaling up efforts to the national level (Tadese, 2018). Using plastic bags for planting seedlings has made growth more efficient, enabling growing a mix of indigenous and exotic species — some fast-growing, some slow-growing. Communities were included in many Amhara projects to secure local buy-in. They included people living in poverty and created local employment opportunities. The Ethiopian Orthodox Church has been involved in reforestation programmes through its church gardens, particularly in South Gondar in Amhara, often promoting native species that improve biodiversity.

Indigenous agroforestry and social forestry practices have been practised for centuries in Ethiopia, although they have declined in some areas including Southern Ethiopia in recent years, due to changes in land use related to cash-crop cultivation (Gebrehiwot, 2013). Planting trees on farms is widespread in Ethiopia; this often has ecosystem benefits, helps meet subsistence needs and/or provides income from fruits, timber and fodder (Iiyama et al., 2016). Farmer approaches to agroforestry appear to differ according to their environmental and socioeconomic contexts.

Finally, over the past two decades actors have piloted and started to scale up participatory forest management (PFM), particularly in the large, natural forests of the Southern Nations, Nationalities and People’s Region (SNNPR). In their projects they tend to pursue both ecological and socioeconomic goals; there are often tensions and trade-offs between the two. A review of PFM in Ethiopia found that success depends on continuous engagement with local and regional governments and the community, including elders, religious leaders and politicians (Winberg, 2011). Using and strengthening existing traditional systems and enabling exchanges between farmers on different sites also contributed to past success. The main weakness in PFM projects is that they tend to be externally funded and lack long-term financial sustainability. A self-financing mechanism is needed to ensure PFM success (Winberg, 2011).

**Pest and disease management**

IPM is promoted as part of the government’s pest management support services. Although policymakers and others in government are interested in promoting it within, relevant actors and stakeholders lack IPM-related experience and capacity. Also, the dominant view is that pesticides are more effective than IPM (Ministry of Agriculture and Natural Resources, Ethiopia, 2016).

**Seed systems**

Cooperative- or community-based seed multiplication systems can help to increase crop diversification and strengthen farmer resilience to climate change while creating employment and improving productivity. Establishing and strengthening farmer cooperatives as a means of tackling challenges around access to improved seeds has succeeded in recent years; it is being scaled up beyond regional pilot projects. For example, under the Bilateral Ethiopian-Netherlands Effort for Food, Income and Trade partnership (BENEFIT), the Integrated Seed Sector Development programme conducts participatory variety selection and provides training to seed cooperatives (Wageningen University & Research, no date). It also tries to tackle bottlenecks within seed-supply systems. Overok great! the past decade Self Help Africa has assisted farmers in establishing seed-multiplying cooperatives in SNNPR, including the Edget Farmers’ Seed Multiplication and Marketing Cooperative Union, which has since been used as a scalable model by the Agricultural Transformation Agency (ATA).

These examples show that there are a wide range of initiatives, projects and programmes supporting Ethiopia’s agri-food system. However, many are donor-funded and are of limited geographic scope and duration. Increasingly, donor-funded projects aim to influence and support an enabling environment for

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30 For more information, see: [https://benefitethiopia.org/](https://benefitethiopia.org/)
sustainable agri-food systems by, for example, strengthening the capacities of government agencies responsible for policy formulation and implementation. The next section discusses to what extent and how these policies and institutions support or hinder the transition toward an agri-food system in Ethiopia that is more planet- and people-positive.

6.1.4 PPPA enabling conditions

The environment for PPPA in Ethiopia is a mixture of enabling and disabling features. At the broadest level, the government's political ambition is to promote economic growth through modernisation. This agenda is underpinned by national infrastructure projects and incentives for foreign investment. For the agricultural sector, the vision is of modern agriculture that can deliver household, business and tax revenue. The government intends to achieve those goals sustainably and has budgeted funds to do so.

National-level policies and instruments

The main policy/strategic document at the national level is the Growth and Transformation Plan (GTP), in effect from 2010 to 2020, and its successor, the ten-year perspective plan. The main objective of these plans has been to increase GDP and turn Ethiopia into a middle-income country by 2025. Although the ten-year perspective plan has yet to be formally published, press reports suggest that, in agriculture, it will focus on promoting productivity through irrigation and mechanisation for small- and large-scale farms (for example, Zewdie, 2020).

The government's Climate Resilient Green Economy (CRGE) Strategy recognises the importance of agriculture and sets ambitious targets for increasing agricultural productivity and value (Government of the Federal Democratic Republic of Ethiopia (FDRE), 2011). The CRGE aims to reduce emissions from livestock and crop production through intensification, expansion of agriculture into degraded areas, and using low-emission agricultural techniques, such as carbon- and nitrogen-efficient crop cultivars, organic fertiliser use, consumption of lower-emitting sources of animal protein (livestock) and replacing animal power with mechanical ploughing (Ogeya et al., 2018).

In addition to these two broad strategic documents, Ethiopia has policies specific to the agricultural sector, including the agricultural sector Policy and Investment Strategy, the National Nutrition-Sensitive Agriculture Strategy and the Livestock Master Plan. These policies generally focus on improving productivity through modernisation. For example, the Livestock Master Plan promotes better genetics, feed and health services to increase livestock productivity. The first GTP promoted an agricultural commercialisation cluster approach to developing value chains (Agricultural Transformation Agency, Ethiopia, 2019). This framework appears to at least partially enable PPPA. For example, the agricultural commercialisation cluster approach mixes conventional approaches to increasing productivity and yields, with ambitions to use water and soil-friendly technologies.

A range of Ethiopia's policies and programmes related to climate change adaptation and mitigation are much more explicitly focused on the environment and many are relevant to the agri-food system. The NAP is one of the key policy documents framing the cross-government approach to adaptation. For agriculture, the NAP focuses on sustainable water use through appropriate technologies, and on reducing deforestation and land degradation (Government of the FDRE, 2019). Ethiopia has also prepared adaptation strategies and programmes for agriculture, water and health and a Sectoral Reduction Mechanism to harmonise the mitigation and adaptation activities of various sectors (National Planning Commission, Ethiopia, 2016).

Overall, national policies reveal the government’s ambition to develop the agricultural sector sustainably, but they also highlight tensions between growth and environmental sustainability. Ethiopia was an early adopter of the green-growth framework (Bass et al., 2013), so at least on paper, the institutional mindset is favourable to PPPA. But policy emphasis, particularly in the CRGE, has been on climate change mitigation. Addressing the resilience of the agricultural sector, including that of vulnerable pastoralists, appears somewhat secondary (Echeverria & Terton, 2016).

Role of private sector

The government of Ethiopia has developed an investor-friendly framework to promote foreign and domestic private investment. Private-sector investment has tended to favour large-scale, commercial agriculture, especially that which is oriented toward producing export crops such as flowers and other
horticultural products (Weissleder, 2009), as well as staples such as wheat (Deloitte, 2017). The Ethiopian government has a strategic goal of food self-sufficiency, and sees large-scale foreign investment as a means to accomplish it (Kebede, 2011). As land is state owned in Ethiopia, the government has promoted long-term leases that have raised concerns about land grabbing at smallholders’ expense (Lavers, 2012). The government has also promoted industrial parks, some of which focus on agro-processing (UNIDO, 2018). Given the strong state guidance of the private sector, it is not clear how much private entrepreneurs are driving PPPA and what opportunities there are to develop a vibrant, climate-smart MSME sector in Ethiopia. Moreover, the distortions of the land market due to state ownership are a disincentive for young people to remain — and invest — in agricultural enterprises (Kosec et al., 2017).

The private sector’s role of enabler of PPPA has risen in recent years with the formation of the ATA. In 2012, the government of Ethiopia took a dominant role in seed and fertiliser markets (World Bank, 2012), but this dominance has shrunk in recent years and the private sector has stepped in. Meanwhile, civil society advocacy groups have few if any opportunities to engage with the government in public-private partnerships.

Research and development

The formal Ethiopian Agricultural Research System comprises the EIAR, universities and some other research centres. It’s one of oldest and largest agricultural research system in Africa. Main research centres and sub-centres are located in various agroecological zones (AEZs) across Ethiopia (Daba, no date). Most CGIAR research centres have collaborative programmes with these institutions. Some of these research projects and programmes involve farmers via participatory research activities, but there are also a number of innovative, bottom-up research initiatives including the Promoting Farmer Innovation and Experimentation in Ethiopia platform (Prolinnova, no date b). This network of organisations aims to scale up farmer participatory research in Ethiopia and build capacity to identify and develop local innovation. So while Ethiopia has capacity for both high-tech agricultural research and local innovation, the two systems are largely separate, with limited interaction and collaboration.

Consumer awareness/demand

Rising incomes, especially in urban areas, are driving new food preferences, increasing the importance of features such as product differentiation, added value and consumer confidence in healthy and safe products. New consumer demand has led to new quality and safety standards, required by both public and private organisations. However, consumer awareness of these standards is low (Mengistie, 2020), and consumer willingness and ability to pay a premium for products such as organic vegetables is limited. Poor households in particular prioritise food price over nutritional value, and consumption of ultra-processed foods is increasing (Melesse et al., 2019).

Farmer organisations and farmer agency

Ethiopia currently has over 42,000 farmer cooperatives reaching over ten million farmers (Beyene, 2018). Farmers appreciate the support they get from unions and cooperatives (Derese, 2014). Unions also create market linkages for farmers by collecting products post-harvest and marketing them. Further, microfinance at the local level and incentives from government to work in the agricultural sector are enabling investment in production. This helps to build and maintain food security.

Innovative approaches bring financial institutions to farmers. Mobile banking and unions provide incentives for financial institutions to provide services in rural areas. The availability of extension services at the local level also supports the enabling environment for better food security. Though cooperatives and unions have great potential to reach rural households, they are not particularly inclusive. For example, women represent about 20% of farmer-cooperative memberships and even less of those organisation’s leadership (Woldu et al., 2013). However, Ethiopia is the only country in the region that does not have a national farmer organisation, which means that farmers are not represented in national processes via an apex advocacy organisation.

31 See https://theconversation.com/institutions/ethiopian-institute-of-agricultural-research-4972 for a brief history of the Ethiopian agricultural research system.
32 See https://www.prolinnova.net/ethiopia/about-ethiopia for more details of Prolinnova in Ethiopia.
6.1.5 PPPA-relevant stakeholders, actors and programmes

The Ministry of Agriculture (MoA) is the most influential actor in Ethiopia in relation to PPPA. However, it is also the main actor blocking PPPA efforts. The MoA’s objective is to create a modern and highly productive agricultural system in Ethiopia that uses advanced technology, with a focus on growth and poverty alleviation. However, it continues to promote high input use, particularly fertilisers, pesticides and herbicides, by smallholders and agri-businesses, and this conflicts with the planet-positive side of PPPA. With close connections to the MoA, but with far less influence, the EIAR also promotes adoption of high external inputs by small- and large-scale farmers.

The primary PPPA champion in Ethiopia is the Environment, Forest and Climate Change Commission. It is responsible for realising environmental rights, goals and basic principles enshrined in the constitution. It establishes mechanisms for the welfare of humans and the environment and is very influential in the sector. The government’s financial facility for mobilising resources to implement the CRGE Strategy is also influential.

Among the international actors who have provided support for projects with a PPPA element in recent decades are the International Fund for Agricultural Development (IFAD), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the World Bank, the European Union (EU), Sida, Swiss Development Cooperation and the UK’s Department for International Development (DFID), among others. In 2019 the European Commission announced a €170 million package to support Ethiopia, including €10 million specifically “to improve the business climate in the country”, by promoting private investment and value-chain development (European Commission, 2019).

Working with CSOs is vital in achieving PPPA in Ethiopia. International NGOs operate at the local level and their projects and programmes often leverage this grassroots experience. NGOs working on PPPA include:

- Care Ethiopia
- Farm Africa
- Christian Aid in Ethiopia
- World Vision Ethiopia
- SNV
- AgriProFocus Ethiopia
- Pesticide Action Nexus Ethiopia (PAN Ethiopia)
- World Agroforestry
- The Climate Change Forum–Ethiopia (CCF–E)
- The Agroecology Network
- The African Union’s Department of Rural Economy and Agriculture (DREA)
- The African Development Bank
- CGIAR centres including the International Food Policy Research Institute (IFPRI), International Livestock Research Institute (ILRI), Integrated Water Management Institute (IWMI) and International Potato Centre (CIP)

NGOs such as CARE, Farm Africa, SOS Sahel, SNV, World Vision and Christian Aid work directly with farmers and have great potential to impact farmers regarding PPPA. On the other hand, groups such as PAN Ethiopia, CCF-E and DREA lobby, advocate and raise awareness around PPPA and create networks and platforms for the PPPA agenda. International NGOs such as IFPRI, GGGI and ILRI have potential to shape data-driven policy. The Farmers’ Cooperative Union also plays a role in collecting and disseminating information through formal and informal networks within their structure.
The ATA is engaged in a number of projects to develop the agricultural private sector but their relevance to PPPA is limited. Two of their three main current projects in this area are focused on investment: one on linking the Ethiopian Investment Commission to agro-processing, and the other on addressing the enabling environment for the agro-processing private sector. It also aims to connect smallholders to markets. The ATA has established an agribusiness accelerator programme to help the growth of high-potential agribusinesses, initially in the honey and wax value chain. These were chosen in part due to their agroecological strengths. However, the programme’s emphasis on contract farming could compromise both the planet- and people-positive benefits.

Private-sector development features within a number of other recent and ongoing donor-funded projects. For example, the second phase of the National Biogas Programme works through public-private partnerships to scale up manufacturing of biogas appliances and accessories and build capacity and skills in biodigester construction. ILRI’s index-based livestock insurance (IBLI) programme, launched in 2010, worked closely with the private sector to develop an instrument that would be sustainable beyond the project’s duration; partners included Oromia Insurance Company. The mechanism tied pay-outs to specific climatic conditions, such as the amount of rainfall (Aronson, 2019). Projects aiming to develop seed-multiplication cooperatives and unions are also engaged in developing private-sector seed businesses, and work closely with those actors to strengthen formal and informal seed systems. Main actors now working in this space include Wageningen University, Self Help Africa USA, Farm Africa, Vita, SOS Sahel Ethiopia, EIAR, the Ethiopian Seed Enterprise (ESE), major agricultural higher-education institutions, CBOs, NGOs and faith-based organisations.

A number of recent and ongoing projects have linked agriculture and nutrition. A CSA programme funded by Irish Aid (2015–2017) was focused on CA, small-scale irrigation and ecosystem-based adaptation. The latter included constructing fishponds to increase household consumption of fish while relieving pressure on Lake Hawassa’s fish stocks. The project includes a stream of activities around creating nutrition-sensitive sources of income for women farmers, particularly related to poultry keeping (Farm Africa et al., no date). The Quality Diets for Better Health project, funded by the European Union (EU) and managed by CIP, promotes drought-tolerant cultivars of orange-fleshed sweet potatoes developed with farmers through participatory approaches. These can improve the micronutrient intake of infants and young children and reduce malnutrition, specifically Vitamin A deficiency, in SNPPR (International Potato Centre, 2019).

Below is an overview of the major projects related to PPPA that are ongoing or have recently ended.

### Table 5 Programmes and projects contributing to PPPA in Ethiopia

<table>
<thead>
<tr>
<th>Key challenge</th>
<th>Who is doing what — programmes and projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate vulnerability</td>
<td>• <strong>Flood risk management</strong>: Awash River Basin Actions (Kefayelew, 2013) increases soil fertility and reduces climate risk associated with floods.</td>
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<td></td>
<td>• The SHARE (Supporting Horn of Africa Resilience) project (with two phases between 2016–2024) aims to <strong>conserve biodiversity and ecosystems in Southern and Eastern Ethiopia</strong>, by introducing <strong>sustainable management practices</strong>. The IWMI installed automated hydrological monitoring devices in some watersheds to help farmers measure rainfall and other data on water flow, to better plan farming activities and for drought (Tadesse, 2017). Funded by the EU and implemented by Farm Africa, SOS Sahel Ethiopia, IWMI, the Frankfurt Zoological Society (FZS) and the PHE Ethiopia Consortium (Van Rooijen, no date).</td>
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<td></td>
<td>• IFAD co-funds the <strong>Participatory Small-scale Irrigation Development Programme (PASIDP II)</strong>, now in its second phase, to develop small-scale irrigation infrastructure for 46,250 farming households across 18,400 hectares in Amhara, Oromia, Tigray and SNNPR (IFAD, no date). Introduces water sources and technologies such as ponds, drip kits and low lift pumps. Develops agribusiness linkages and market access by linking smallholders to cooperatives and strengthens the capacity of cooperatives (IFAD, 2020). Fifty-two market-access alliances link farmers, input providers, financial institutions and market off-takers (IFAD, 2020).</td>
</tr>
</tbody>
</table>
Key challenge | Who is doing what — programmes and projects
---|---
**Deforestation, land degradation and biodiversity loss** | • In 2009 the Ethiopian government launched the Sustainable Land Management Programme (SLMP) with funding from GIZ, the World Bank, Canada and WFP. Consisted of two phases aiming to reduce land degradation and improve productivity, and in the long run diversify smallholder livelihoods, increase resilience to climate change and reduce emissions. Introduced sustainable land management practices in 180 watersheds across the country, treating over 860,000 hectares of degraded land (World Bank, 2020).
• IFAD-funded project in Ethiopia and Uganda (2016–2019) to restore land and improve agrobiodiversity by identifying a combination of diverse tree and -crop varieties with ecological and socioeconomic benefits for the community. Project supports national partners and smallholder farmers to integrate them into farming systems. Implemented by World Agroforestry and Bioversity, with a strong nutrition component.
• Sustainable Intensification of Maize-Legume Cropping Systems for Food Security in Eastern and Southern Africa (SIMLESA). Project run by the International Maize and Wheat Improvement Center (CIMMYT) (2014–2018) promoted CA practices and the use of improved maize and legume varieties to increase climate change resilience. Over 47,000 farmers are thought to have adopted at least some of the technologies while cooperatives, seed enterprises and private companies were involved in producing and distributing new seed varieties.

**Low productivity** | • As part of SLMP, a GIZ-managed ISFM project (ISFM+) was launched in 2015 with funding from the German ministry for development. It aimed to rehabilitate and protect soils; improve soil fertility and smallholder productivity in the highlands of Amhara, Oromia, and Tigray. Practices and technologies included use of improved seed, line seeding, lime application, fertiliser application, planting rhizobia with legumes, crop rotation and soil and moisture conservation practices.
• Advancing organic, locally produced fertiliser: the NBPE, now in its second phase. Funded by the EU and government of Ethiopia; implemented by the Ministry of Water, Irrigation and Electricity, SNV (Netherlands Development Organisation) and Hivos. Aims to scale the bio-digester sector and mainstream the use of bio-slurry in agricultural extension. Bio-slurry also used to prevent fall armyworm.
• Strengthen extension system. Government plans to open 18,000 farmer training centres and strengthen their livestock service provision. Each will be staffed by three specialists (one each for crops, livestock and natural resources). In 2019–2020, AGRA funded a programme to strengthen the agricultural extension system and promote ISFM.

### 6.2 Entry points to support the transition toward PPPA

The examples above demonstrate the wide range of projects, programmes and related skills and experiences linked to sustainable agri-food systems. A main challenge has been that many of these operate at a relatively small scale, are largely dependent on donor funding and do not lead to the long-term transition at scale that is required. The government is committed to green growth and already has many policies that could enable PPPA. To make these a reality, however, the country must balance the needs for growth, employment (especially for the youth), and increasing the resilience of its agri-food system, among others. Given the centralisation of power in the national government and the mainly top-down approach to policy formulation, a move toward PPPA will require working closely with the government and aligning with its framework. There are significant opportunities to work within the current framework to promote PPPA.
1. **Policy harmonisation.** The country’s agricultural policies can better align with its environmental- and climate-change-policy framework. Enhancing agricultural resilience receives less emphasis than does the drive for green growth, but resilience is crucial to a sustaining agriculture as the bedrock of the national economy, especially in a PPPA framework. Agricultural policies currently envisage an expansion of the area under cultivation in Ethiopia by nearly 4% per year, with at least 2.5% coming from forested land. Somehow, this must be aligned with conservation commitments made under the Convention on Biological Diversity, for example.

2. **Supporting sustainable private entrepreneurship for PPPA.** Ethiopia is an investor-friendly country, but much private investment is foreign and/or large-scale. There is much scope to harness the power of local entrepreneurs, especially in areas well suited to small-scale entrepreneurship including RA and labour-intensive value addition.

3. **Agribusiness development with youth.** Youth employment is a crucial strategic objective for the country, and the agri-food system offers employment opportunities in and beyond production. Promoting employment in value-addition and other agribusiness may also help to ease pressure on natural resources from agricultural expansion.

4. **Capacity building in PPPA.** Extension and other innovative delivery mechanisms are necessary to increase the awareness and reach of sustainable land, soil and water management techniques, particularly among smallholder farmers.

5. **Focus on nutrition.** The continued challenges of hunger and malnutrition can only be addressed if a nutrition lens is consistently applied throughout agricultural policymaking and implementation. Efforts to improve resilience to climate change, to avoid land degradation and to diminish post-harvest losses must include built-in mechanisms to understand their impacts on FNS and to mitigate any negative effects.
7 Kenya

7.1 The state of play for PPPA in Kenya

7.1.1 The food and agricultural system in Ethiopia

With a population of 47.6 million people and a land area of 56,914,000 hectares, Kenya has the lowest population density of the countries in this study (Kenya National Bureau of Statistics, 2019; Mendes & Paglietti, 2015). Around one third of Kenyans live in urban areas, and the urban population is growing rapidly. By 2050, roughly half the population is projected to live in cities (World Bank, 2016).

Figure 5 Kenya’s agroecological zones

(Dark green indicates a humid area; light green, an arid area)

Kenya has seven agroecological zones, which differ in soil fertility and rainfall patterns. This affects how agriculture is practised in these regions and the challenges faced by farmers there. One quarter of the population lives and practises agriculture in the arid and semi-arid lands (ASAL), the lighter green areas in Figure 5, which comprise around 80% of Kenya's total land mass. These areas are particularly affected by environmental degradation and biodiversity loss, and at the same time, are important for cereal and pulse production (IFAD, 2015).

There is relatively little productive or high-potential agricultural land in Kenya, constraining smallholder yields and population pressures (D'Alessandro, 2015; Birch, 2018). Around 1.2 million farming households are based in the semi-arid uplands of the northern and central ASAL (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019). Soil fertility in these areas is low and livestock pastoralism is dominant: over 60% of Kenya's cattle population is found in the northern ASAL alone (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019). Western Kenya is home to around 1.6 million farming households, followed by the Central Highlands (circa 1 million) (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019).

Agriculture is one of Kenya's main economic drivers, accounting for around one third of the country's total GDP and around 60% of total employment, including indirect employment (Kenya National Bureau of Statistics, 2020). Most of the rural population is thought to engage in agriculture to some extent, although no accurate data exist on the number of farmers in the country (Kisika, 2019). The Ministry of Agriculture estimates that farmers number around nine million, and that women do the majority of farm work (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019). Around three quarters of women are thought to work in agriculture, compared to 51% of men. However, only around half of female farmers are thought to own their farms. This has implications for their ability to access inputs, credit and support through cooperatives (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019).

Crops account for around 80% of agricultural output, followed by livestock (15%) and fisheries (2%) (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019). Staple crops grown include maize, pulses, millet, sorghum, bananas and sweet potatoes (Mendes & Paglietti, 2015). The main cash crops are tea, coffee, sugarcane, maize and sisal. The three most valuable agricultural products are tea, cattle products and cut flowers (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019).

The agricultural sector in general is responsible for around 65% of export earnings. Most exported products are unprocessed (FAO, 2019). Horticultural products, tea and coffee are the leading exports (Kenya National Bureau of Statistics, 2020). Horticultural exports, including fresh fruit, vegetables and flowers, have increased rapidly since the early 2000s (FAO, 2015). The horticulture export sector typically consists of medium- and large-scale firms. Many of these have contract farming arrangements with small-scale farmers for particular commodities, such as green beans, that must be hand-picked to maintain high quality standards. Compliance with safety, quality and sustainability standards such as GLOBALG.A.P. and Fairtrade is skewed in favour of export products; food safety and quality standards lack enforcement in domestic markets (CARE Kenya, 2016). Over one third of Kenya’s exports are destined for Africa, with over two thirds of that going to partners within the EAC. One quarter of exports, mainly horticultural products, is destined for Europe (Kenya National Bureau of Statistics, 2020).

Kenya also imports large quantities of staple food commodities, predominantly from neighbouring Eastern African countries, to meet food security needs. For example, Kenya’s import dependency ratio for vegetable products increased from 12.7% to 22.5% between 2014–2017. In other words, the country is becoming less self-sufficient over time (Kenya National Bureau of Statistics, 2019). However, in the last five years Kenya has been nearly self-sufficient in maize, a staple heavily subsidised by the government (Kenya National Bureau of Statistics, 2019; Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019). Official figures do not capture informal cross-border trade but is estimated to account for up to 60% of all intra-Africa trade (Fundira, 2018). Much of Kenya’s informal trade is in staple foods including maize, rice and beans (Gor, 2012; FEWS NET, 2020). Notably, women make up roughly 70–80% of informal cross-border traders (Tull, 2017).

Small-scale farms produce 78% of the country’s total agricultural outputs, including 60-70% of maize (D’Alessandro et al., 2015; Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019). The Ministry of Agriculture estimates that 58% of small-scale crop farmers’ land is used to cultivate maize, followed by 17% for beans (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019). Partly due to sub-division, most land parcels are small, averaging around 0.2–3 hectares. The predominant
farmers, although this has increased, likely in response to government subsidies and other mechanisms. The use of improved seeds among small-scale farmers rose to 81% in 2010, and fertiliser use on maize fields has also increased significantly (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019). However, less than 1% of all land in Kenya is thought to be under irrigation (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019).

MSMEs comprise over 80% of Kenya’s employment, most of it informal. Although reported figures vary, MSMEs may contribute up to 40% of the country’s GDP. They play a particularly important role in supplying food to low-income consumers (mainly vegetables, fruit, meat and milk). However, challenges around managerial and operational business skills, limited access to training and challenges in employee recruitment have led to historically high rates of business failure and high turnover in the sector. A major issue is access to affordable finance due to perceptions among formal financial institutions of credit unworthiness due to the enterprises’ lack of collateral and credit history. This is a particularly acute issue for women-owned MSMEs, which constitute 34% of total MSMEs in Kenya but make up 54.9% of failed businesses. Women are less than men to access formal finance and tend to receive smaller loans with higher interest (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019).

Medium- and large-scale farms (above three hectares) are associated with commercial crops such as horticulture, tea and coffee, and are more likely to invest in technologies or marketing, and take-out loans (World Bank/CIAT, 2015). Large-scale farms produce 30% of Kenya’s marketed agricultural products mainly in the form of cash crops (tea, coffee, maize, sugarcane, wheat) (D’Alessandro et al., 2015).

Finally, the agricultural sector plays a crucial role in food and nutrition security. Vegetable products, including cereals and pulses, comprise 86–88% of average daily calories per capita; within this, cereals contribute around 50%, compared to around 14% for pulses (Kenya National Bureau of Statistics, 2019). Maize accounts for over half of cereals consumed, followed by wheat (28%) and rice (13%). Beans account for about half of pulse consumption. However, the contribution of different foods to the diet varies year on year depending on factors such as crop yields and fluctuations in market prices.

Kenya faces a triple burden of malnutrition — undernutrition, overnutrition and micronutrient deficiencies. Around 26% of children under the age of five experience stunting, while 4% are wasted (Kenya National Bureau of Statistics, 2014). Undernutrition is associated with 35,000 deaths per year among children under five (Gudu et al., 2020). At the same time, just under one third of Kenyans aged 18–69 years are either overweight or obese (Ministry of Health, Kenya, 2015). The Kenya Cost of Hunger Study (Government of the Republic of Kenya, 2019) estimates that 41.4% (12.9 million) of the Kenyan working-age population in 2014 was stunted in childhood. This has considerable impact on productivity levels and wellbeing. It is thought the country has lost roughly US$4.2 billion (KSh 373.9 billion) due to the health, education and productivity effects of childhood undernutrition, equivalent to 6.9% of GDP that year. Kenya has performed better than the EAC average in its food deficit and in the prevalence of childhood stunting, but price volatility and dietary diversity are below the EAC average (Ministry of Agriculture, Livestock, Fisheries and Irrigation, Kenya, 2019).

7.1.2 Challenges facing the food and agricultural system

The agri-food system in Kenya is hampered by a number of longstanding and interrelated challenges. In this section we provide a brief overview of the main challenges, highlighted by key informants and stakeholders, that are most relevant to PPPA. These largely mirror the dominant challenges identified in the literature. Most of these challenges, such as issues around low soil fertility and low productivity, are not new and many interventions have been tried to tackle these problems in the past few decades. In the

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33 Children who are thin for their height because of acute food shortages or disease. Also known as ‘acute malnutrition’, wasting is characterised by a rapid deterioration in nutritional status over a short period of time in children under five years of age. Wasted children are at higher risk of dying. (Global Nutrition Report, 2020)
following section, we will discuss the planet- and people-positive approaches used to address these challenges, and consider which have been more or less successful and why.

**Climate change**

All those interviewed for this study mentioned climate change as a key challenge. Less than 10% of arable land in Kenya is under irrigation, so agriculture in many areas of the country is highly vulnerable to increasingly frequent and intense droughts (World Bank, 2019a). Pastoralists in the northern rangelands are especially at risk, with livestock losses from drought estimated at over US$1.08 billion in the last decade (D’Alessandro et al., 2015). In addition, climate change has been linked to more frequent and severe flooding, which renders roads impassable, reducing market access; it also contributes to post-harvest losses and impacts household food availability.

**Soil quality**

Soil fertility is already low in many parts of Kenya and has been declining. This is partly due to agricultural practices such as over-grazing of livestock, continuous cropping and fertiliser misuse, including both over-use and under-use (Birch, 2018; D’Alessandro et al., 2015). Over-use of chemical inputs is more common among larger farmers growing high-value crops, while under-use or ineffective use, such as using inputs unsuited to the soil are more common among small-scale farmers. Land degradation is linked to climate change and degraded soils in the ASAL leave the region more vulnerable to flash floods (D’Alessandro et al., 2015). Soil degradation and declining soil fertility are in turn linked to low agricultural yields (Birch, 2018).

**Low productivity related to agricultural practices**

Low agricultural productivity has been the main target of national agricultural policies for at least the past few decades. It is explained by a number of interrelated challenges, which vary depending on the agricultural sub-sector. In general, low yields are attributed to the low fertility and declining quality of soils in many parts of the country. In turn, this is linked to the absence or misuse of external inputs. This is often explained by a lack of information, including a lack of knowledge about soil types and inputs best suited to those soils. and the prohibitive cost of inputs for most smallholders. Small-scale farmers also face challenges in accessing credit to purchase inputs at the right time.

The fact that most farmers cultivate very small plots of land also contributes to low productivity. The increasing sub-division of land is recognised as an important challenge by the national government. It may also be a barrier to small-scale producers adopting PPPA practices; farm plots are not of a sufficient size to host experiments on only part of the land, and such farmers may be reluctant to risk trying a new approach on the whole plot (World Agroforestry, 2020).

Given that much of what most farmers produce is for subsistence, low productivity contributes to challenges around food and nutrition security.

**Food and nutrition insecurity**

Food and nutrition security remains a challenge; the amount of food consumed by 12% of the population is inadequate (WFP, 2018b). One in ten rural households have low dietary diversity, with the prevalence rising among some pastoralist communities (WFP, 2016). The country is self-sufficient or close to it in producing maize, beans, potatoes, cassava, tomatoes and bananas, which make significant contributions to daily energy intake (Kenya National Bureau of Statistics, 2019). However, reliance on rainfed maize production to meet food security needs has left the country vulnerable to the impacts of climate change, including increasingly erratic rainfall that has meant lower yields in some recent years. For example, in the year July 2019 to June 2020, FEWS NET (2020) estimated an aggregate import gap for the structurally maize-deficit-producing countries Kenya, South Sudan, Rwanda, Burundi and Somalia of 757,019 tonnes due to poor rainfall performance. This reduced the area under production and yields, especially in Kenya and Somalia. Kenya is also dependent on imports of rice and wheat (mostly consumed by more affluent, urban households) as well as sorghum. However, it is important to note that food and nutrition security are also affected by other factors such as trade, food prices, access to health services, environmental factors, food utilisation and childcare practices.
Limited knowledge and information

Conversations with stakeholders pointed to limited knowledge of specific agricultural practices as an obstacle to a PPPA transition in Kenya. The country’s agricultural landscape is heterogeneous, creating a need for localised information about soil quality and the suitability of different technologies. The costs of generating such knowledge have typically been prohibitive for small-scale farmers, although innovations are helping to increase access (see Box 3).

Box 3 Private-sector case study: Crop Nutrition Services

Crop Nutrition Services (Cropnuts) is based in Kenya but works across Africa. Their focus is on soil management and they use soil testing to help farmers regenerate their land. They see soil tests as the starting point for supporting farmers to improve soil health.

The business was started 22 years ago when government soil testing was still slow and inaccessible to most farmers. Having scaled up to provide services for large farms, they are now building their business to support small-scale farmers. Small farms tend to lack information about the quality of their soils, which can lead to the misuse of chemical inputs, for example if particular inputs are unsuited to their soils. The vast majority of small farmers will never have done soil testing, and the practice remains out of reach for many, in part due to the high cost.

Small-scale farmers can be difficult to reach and expensive to engage with individually, so Cropnuts work through cooperatives, out-grower schemes and processors, who often sell the company’s services to their members. Cropnuts has an ISO-accredited central lab near Nairobi, and a mobile testing lab, which is more affordable and better suited to work with small-scale farmers. Although tests from the mobile lab are less comprehensive, they are adequate in telling farmers what inputs to use and how productive the soils could be. A mobile test costs around US$10, which is affordable for a farmer looking to invest around US$200–300 in inputs. Over the past two years, Cropnuts has done 120,000 mobile tests across Africa as a whole. Their aim is to reach five million farmers in the next five years.

The company is developing partnerships with leading digitised financial institutions, to link soil testing with agronomic advice and de-risk financial lending in the agricultural sector. They have established a small number of decentralised agronomy hubs or clinics that provide testing and training services, crop trials and other agronomic advice. Through app-based technology, they are developing mobile extension and advisory services that could help farmers interpret test reports and decide what inputs to buy, how much, and so on. They are also working on a soil map of Kenya, to understand soils and soil needs in different areas. Finally, Cropnuts is exploring the possibility of linking soil testing to crop insurance.

Cropnuts lacks the resources needed to scale up their services and activities, particularly for upfront costs related to technology and data for the smallholder farmers service model. This is something they hope to develop in partnership with private-sector input suppliers and the finance sector. They face high upfront costs, for example to develop new software and mobile technologies. Getting the training needed for staff is also expensive, as are the marketing costs associated with raising awareness about soil health and reaching new customers.

Source: Blackmore, E., Interview with Cropnuts, 16 December 2020.

There is a gap between agricultural research and extension services: publicly funded agricultural research tends not to reflect farmers’ needs and priorities, and research also rarely trickles down to extension service providers and farmers so that it can be used. The proportion of farmers accessing extension services is low and tends to favour wealthy farmers (Birch, 2018). Extension services are increasingly provided by private-sector actors such as input suppliers; however, they tend to emphasise high-value commodities, may often provide low-quality advice and operate in areas with better resources and infrastructure, thereby excluding poor and marginal farmers (Biovision Foundation, 2020, Muyanga & Jayne, 2008, D’Alessandro et al., 2015). Agribusiness actors also tend to have few incentives to protect public goods such as soil and water and may be unlikely to promote PPPA practices or enable their uptake by farmers.

Small-scale farmers learn about PPPA approaches through a range of formal and informal sources at different levels, such as via other farmers, local leaders, media or NGOs. However, local networks and
peers are likely to be most important in terms of adoption (Gunter et al., 2016). In light of this, the farmer-led, participatory farmer field school approach has been trialled across Kenya, often to promote IPM.

**Limited funding and investment**

Limited public expenditure on agriculture remains a challenge for the agricultural sector in general, and for the transition to planet-positive agriculture. Kenya is currently failing to meet the African Union target of spending 10% of its national budget on agricultural and rural development. Between 2013–2018, spending averaged 3.8% of the total (Government of the Republic of Kenya, 2018). County governments, which are responsible for implementing agricultural development programmes, allocated on average 6.3% of their budget to agriculture in 2018/19 (as low as 1.6% in Nairobi and up to 14.6% in Kitui) (Africa Check, 2019a; Africa Check, 2019b). However, actual spending is often much lower. This is owing to political, bureaucratic, legal and technical challenges and delays in fund disbursement from the national to county governments and in county governments’ ability to absorb and spend funds (Africa Check, 2019a; International Budget Partnership, 2019).

In terms of private finance and investment, Kenya has a vibrant and enabling market for financial technology, but the more traditional banking sector needed to service commercial agriculture is lacking. This is particularly true for access to credit for MSMEs, although the government has introduced new MSME credit facilities in recent years (see Section 2.3). Only 4% of commercial bank lending is for agribusiness, even though a majority of Kenyans are employed in agriculture or agribusiness (Wankuru et al., 2020). To promote investment, the government has recently reduced the number of licences needed to set up a business from 300 to 11 (International Trade Centre, no date). But taxation remains onerous for agribusinesses, particularly in the horticulture sector.

**7.1.3 Addressing challenges through PPPA practices and approaches**

As noted above, a range of different practices and technologies have been trialled over the past decades to tackle the longstanding challenges facing Kenya’s agri-food system. This section provides an overview of the main PPPA approaches and practices currently promoted in Kenya. Information gleaned from key informant interviews (KIs) and document reviews provides a good indication of the approaches and practices that have been promoted in the country, are familiar to a range of agri-food system stakeholders and are thought to have potential.

The main PPPA umbrella approaches that have been adopted and promoted in Kenya are CSA and CA. This is reflected in a review of major ongoing agricultural projects in Kenya, summarised in Table 6 below.

**Table 6 Main current projects/programmes promoting PPPA practices in Kenya**

<table>
<thead>
<tr>
<th>Programme and funder</th>
<th>Key PPPA practices and approaches promoted</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya Cereal Enhancement Programme — Climate Resilient Agricultural Livelihoods (IFAD, GoK, EU)</td>
<td>CA services; push-pull technology trials; training and demos on CA and good agricultural practices; climate information services</td>
<td>Western, Central and Southern Kenya (14 counties)</td>
</tr>
<tr>
<td>Kenya Climate Smart Agriculture Project (World Bank)</td>
<td>Community-driven rangeland management; context-specific CSA technology-innovation management practices; sustainable seed systems; nutrition-sensitive agricultural interventions; agro-weather forecasting and marketing information systems and tools</td>
<td>ASAL (24 counties)</td>
</tr>
<tr>
<td>Small-Scale Irrigation and Value Addition Project (ADB, FAO)</td>
<td>Irrigation schemes; training in integrated crop management, clean seed production and irrigation agronomy</td>
<td>ASAL (counties with low rainfall)</td>
</tr>
<tr>
<td>RA through the development of the pulses value chain (AGRA)</td>
<td>Village-based advisers model; CSA; regenerative agriculture</td>
<td>Embu and Makueni Counties</td>
</tr>
</tbody>
</table>
### Programme and funder | Key PPPA practices and approaches promoted | Region
--- | --- | ---
National Agriculture and Rural Inclusive Growth project (World Bank) | Sustainable land management/CSA practices (adapted to local contexts); building capacity of producer organisations through community-driven development | 10 counties across Kenya
Feed the Future — Accelerated Value Chain Development (USAID) | Drought-tolerant seeds; training in post-harvest handling; improved range management practices | Makueni county and eastern Kenya
Conservation agriculture for food security (AGRA) | CA training for smallholders; linking smallholders with suppliers of CA equipment; | Machakos and Laikipia

#### Climate-smart agriculture

CSA is promoted by a number of high-level stakeholders in Kenya including the national government, NGOs and international donors, including IFAD, the World Bank and the AGRA. The Ministry of Agriculture launched the Kenya Climate Smart Agriculture Strategy (KCSAS) for the period 2017–2026 and is currently running a large-scale project with the World Bank on CSA across 24 counties in the ASALs. Within the KCSAS, CSA encompasses a wide range of practices, often including other approaches such as CA. The KCSAS aims to both increase the adaptive capacity and resilience of agricultural actors to climate change, and minimise the sector’s impact on climate change. The strategy mentions the following practices:

- Use of climate/weather information
- Early warning and response systems
- Livelihood diversification
- Index-based agricultural insurance
- Use of drought-tolerant varieties, species and breeds that are resistant to pests and diseases
- Sustainable resource management
- CA
- Water and soil conservation, water harvesting and storage
- Agroforestry
- Use of low emission breeds and improved feeds, and
- Use of energy-efficient technologies in transportation and processing.

While a large number of CSA practices have been trialled in Kenya, few have been adopted at scale. However, a scoping study by Osumba & Rioux (2014) found that the initiatives often incorporated elements related to CSA without labelling or framing them as such. World Bank analysis suggests the highest adoption rates, albeit with regional variations, are in intercropping (primarily of maize and beans in Western and Eastern Kenya) and mulching (primarily in tea production, in Kericho and Central Kenya) (World Bank/CIAT, 2015). Practices with a medium adoption rate include crop rotation (various crops across the country) and mixed cropping of grass and legumes in intensive dairy farming (in Central and Western Kenya).

Large-scale farms focusing on commercial crops may be more likely to adopt CSA-related land management technologies such as terracing and zai pits (World Bank/CIAT, 2015). Adoption of CSA practices and technologies may also be higher within more commercialised sub-sectors, as with the use of biodigesters to produce biogas among intensive dairy production systems (World Bank/CIAT, 2015).
Conservation agriculture

Experts consulted as part of the research identified CA as one of the PPPA approaches with the most potential for scaling up in Kenya, given that many of the practices it promotes, such as the use of cover crops, are already widely accepted. FAO has promoted CA in Kenya since the early 2000s, particularly in the drylands. CA generally refers to integrated soil management, minimum tillage, the use of soil cover or cover crops and diversified crop rotation (FAO, 2008). CA practices must be adapted to local agroecological conditions and require experimentation to understand which combinations of crops or cover crops work best in different conditions.

CA is promoted by the government, NGOs and international actors as a means of increasing resilience to climate change, improving soil fertility and, as a result, increasing yields and food security. In 2018, the deputy president, William Ruto, pushed for CA to be scaled up across the country, at the Second National Conservation Agriculture Conference (xinhuanet.com, 2018). CA is mentioned in about 14 out of 47 2018–2022 County Integrated Development Plans (CIDP). It is also promoted by a number of donor-funded programmes, as seen in Table 6 above.

Actors promoting CA and/or helping to implement it on the ground include AGRA, the Kenya Agricultural & Livestock Research Organization (KALRO), IFAD, the African Conservation Tillage network (ACT) and national NGOs such as Participatory Approaches for Integrated Development (PAFID). Some donor-funded programmes that have included CA training in recent years are CA4FS (funded by AGRA), CA-SARD, implemented by FAO and ACT, COMESA-SADC-EAC, and the IFAD and EU-funded KCEP-CRAL project.

Estimating the number of farmers who are using CA methods is challenging because some studies and programme evaluations only count farmers who are applying multiple methods (usually no tillage, intercropping or crop rotation, and soil cover). There is relatively little data available on what worked and for whom. Most existing data come from donors and NGOs, often working in partnership with government.

Evidence suggests that some or all of the practices associated with CA may already be widespread in some parts of Kenya (Kaumbutho & Kienzle, 2007; Gunter et al., 2016). However, evidence from recent programmes suggests variation in the extent to which farmers are adopting CA in the long term and the impact this is having on the environment and livelihoods. FAO estimates that 26,000 farmers are applying CA in Kenya (likely a small proportion of Kenya’s farmers) and is aiming to expand its use to 10% of the country’s farmers (FAO, 2018b). Other sources suggest that CA is only being applied on less than one million hectares across all of Africa (FAO, 2016). Therefore, adoption thus far appears to be limited.

Recent projects have attempted to tie conservation practices to more obvious social and economic benefits for farmers, perceiving this as a reason for historic failures in agricultural land conservation efforts (COMESA, SADC & EAC, 2011).

The CA practice that appears to have been the least-frequently adopted, particularly among smallholders, is minimum tillage, possibly due to the need for specific equipment. The use of crop residues as soil cover also conflicts with livestock farmers’ use of them as animal feed, and sometimes the sale of crop residues as a source of cash; this was seen as a barrier to wide-scale adoption of CA in the CA-SARD project.

Regenerative agriculture

RA overlaps with CA in terms of key agricultural practices: minimum tillage, intercropping, crop rotation, use of cover crops, IPM, rotational grazing, permaculture, agroforestry and silvopasture (Lunn-Rockliffe et al., 2020).

Developing and disseminating context-specific knowledge is vital to the success of RA approaches. As part of a project on RA in the pulses value chain, AGRA will train 200 village-based advisors in the approach and they will disseminate knowledge about techniques and technologies to a wide network of farmers. The project will promote intercropping maize with a nitrogen-fixing bean variety and agroforestry crops; local aggregators will be trained to develop local value chains for the crops (Farm Africa, 2020).

Lunn-Rockliffe et al. (2020) have noted the contribution of farmer experimentation and refinement to scaling this approach in an African context. For example, a push-pull system for managing pests and weeds co-developed with small-scale farmers in Western Kenya, which was shown to increase maize yields from 1 ton/hectare to 3.5 t/ha, has since been adopted by 130,000 farmers in Eastern Africa.
Given the knowledge-intensive nature of many RA practices, this project’s success was explained by a focus on supporting farmers to understand the ecological processes behind the push-pull system (Lunn-Rockliffe et al., 2020). A series of projects funded by the Global Challenges Research Fund (GCRF), led by the Institute for Global Prosperity (IGP) and PROCOL Kenya, aim to pilot this farmer-led regenerative design approach by developing solutions with farmers and through multistakeholder partnerships. They plan to work with policy makers in Narok and Elgeyo-Marakwet counties, including on biocircular economies, waste management strategies and payment for ecosystem services (Lunn-Rockliffe et al., 2020).

**Agroecology**

Agroecology shares many of the same principles and practices with the approaches discussed above around water and soil conservation and regeneration. In addition, it promotes the diversification of species and varieties and the enhancement of agrobiodiversity, including through mixed cropping, intercropping, agroforestry and livestock integration (AFSA, 2016). This is often linked with benefits to food and nutrition security, given the potential of some of these practices for increased dietary diversity. Proponents of agroecology in Kenya also tend to emphasise the co-creation of knowledge with farmers and food producers.

AFSA and FAO have promoted agroecology across Africa, including in Kenya. Numerous community-based organisations (CBOs) are also promoting agroecological practices on the ground. For example, in Busia county, the Sustainable Income Generating Investment Group (SINGI) promotes diversification and trains farmers in ISFM; it currently works with around 1,000 farmers. In Meru and Tharaka-Nithi, the Institute for Culture and Ecology (ICE) has provided training on indigenous varieties, agroforestry and water and soil conservation techniques; at least 800 farmers have adopted the practices as a result (Leippert et al., 2020).

Agroecology may not be well understood by some Kenyan policymakers; there is an assumption that agroecology can only be applied at a small scale and therefore has limited potential to tackle food insecurity (Leippert et al., 2020; Biovision Foundation, 2020). The KCSAS includes some agroecological practices aimed at increasing productivity, resilience and diversity but does not mention principles around culture, tradition or the circular economy (Leippert et al., 2020). Concepts and approaches that emphasise circular practices and circular agribusiness have generally received little attention in national policy documents. Although agroecology has been a bigger focus of recent projects, the emphasis tends to be on biological and ecological circularity and benefits for the planet, rather than on socioeconomic concerns such as social inclusivity.

**Overall adoption of practices with potential to result in planet- and people-positive outcomes in Kenya**

Conversations with experts and analysis of the literature point to CSA and CA as the planet- and people-positive umbrella approaches with most potential for scaling up in Kenya with regards to agricultural production. In large part this is because they have already benefited from significant donor backing in the past two decades and are currently supported by a wide range of stakeholders. This has raised their profile and allowed for larger-scale programmes and pilots to take place. As will be outlined in Section 2.3 below, financial-donor-backing of CSA and CA has led to their inclusion in national and local policy, in turn strengthening further institutional and financial support for them. Another result of this is that more data has been collected on CSA and CA adoption compared with other approaches, such as agroecology. Capitalising on existing support and testing of these approaches may therefore be the most effective and efficient use of resources.

In addition to donor support, other factors indicate that of all PPPA approaches, CSA and CA have the most potential for scaling. There is evidence to suggest many farmers in Kenya, both small- and large-scale, already apply a wide range of PPPA practices, including those associated with CSA and CA, but may not refer to them as such or consistently adopt all of the practices associated with a particular approach (Leippert et al., 2020; Kaumbutho & Kienzle, 2007; World Agroforestry, 2020).

CA and CSA adoption may have also been facilitated by the fact that some practices, such as intercropping, are already culturally accepted in parts of Kenya. However, other practices such as no tilling involve a shift in how things are done and require new equipment or information; these may inhibit more
widespread uptake by smallholders (Kaumbutho & Kienzle, 2007). Existing uses of crop residues for purposes other than soil cover has also been identified as a possible barrier for livestock owners (BMVEL/FAO Bilateral Fund, 2005).

Programme evaluations provide insights into why adoption of PPPA practices through donor-backed projects has been limited so far. A review of the World Bank-funded KAPSLM project suggests that a lack of access to land, appropriate tools and labour may explain why only 50% of farmers trained in CA practices later adopted them. It also suggests the technologies promoted were not suited to farmers, their contexts and constraints (IEG Review Team, 2017). This also appears to have contributed to low adoption of integrated soil and water conversation practices in the Drylands Development programme. Most farmers were already applying many of the practices, albeit not in an integrated way; however, adoption of the integrated approach, which combined multiple practices, was limited. The review suggests this is because integrating additional practices was more labour and capital intensive; farmers who did adopt the approach only did so on small portions of their land, which was likely to minimise the risks associated with new techniques (World Agroforestry, 2020).

The promotion of PPPA practices without support for farmers in overcoming economic and other barriers to trying it, or providing financial incentives to take risks, may therefore explain the relatively slow uptake of practices so far. In addition, the PPPA practices promoted by donors, including the way in which they are promoted, often appears to be ill-suited to the reality of small-scale farming in Kenya. Maina et al. (2013) note that farming is dynamic, but many of the technical solutions proposed by donors are static, creating a disconnect between what is being promoted and the reality on the ground. This suggests farmers themselves are not currently playing a lead role in shaping the transition to PPPA in Kenya.

7.1.4 PPPA enabling conditions

This section provides an overview of the political and economic environment in relation to PPPA, including analysis of the main players driving PPPA in Kenya.

A number of national policies are broadly supportive of PPPA and demonstrate a commitment to sustainable, resilient food and agricultural systems, in particular KCSAS and the Agricultural Sector Transformation and Growth Strategy (ASTGS). A small number of county governments have also incorporated actions that are enabling a transition to PPPA within their policy implementation plans. Some aspects of PPPA have become mainstreamed within policy, while others are completely absent. For example, CSA and CA have received significant support from a wide range of stakeholders, and have emerged as the dominant solution to the intersecting challenges of poverty, food insecurity, climate change and environmental degradation. These are often coupled with inclusive value-chain approaches. However, the focus on modernisation and commercialisation may have led to a misplaced focus on technical fixes. This has been criticised for failing to tackle the underlying reasons for challenges such as environmental degradation and small farmers’ vulnerability to climate change (Maina et al., 2013). Some of the more regenerative and holistic PPPA approaches, such as agroforestry, have received limited support. Others are completely absent from policy, such as agroecology and circular economy concepts; this is aside from individual agroecological principles and practices that overlap with CA, such as IPM and crop rotation.

The policy process is complicated and often highly politicised, involving numerous ministries, international donors, foreign governments, private-sector actors and domestic players. Likely all of them have competing interests. Moreover, policy implementation has been hampered by political, bureaucratic and technical challenges relating to budget allocation and disbursement. That said, international donors and NGOs shape the policy context in Kenya through technical support and funding, and were influential in driving the inclusion of PPPA principles in the KCSA Strategy and the ASTGS. National NGOs may play a bigger role in shaping and implementing policies at the local level, but may be more likely to promote less-conventional PPPA practices and approaches.

Finally, despite expectations that the private sector will play an important role in driving agricultural transformation, the current economic environment is not enabling a transition to PPPA, with few mechanisms to support green business or incentives for businesses to invest in PPPA technologies.
Policy and governance

Kenya’s agri-food system policies are geared toward transforming the agricultural sector to one that is modernised, commercialised, sustainable and resilient. Increased agricultural productivity, food and nutrition security, and economic growth are the national government’s priorities, but there is widespread recognition that these goals must be achieved in an environmentally sustainable way. The Kenyan government has demonstrated a strong commitment to tackling climate change and agriculture features prominently in national plans to adapt to climate change, as well as mitigate it.

Given the existing agenda for sustainable transformation, there is considerable scope to promote PPPA within the current policy landscape in Kenya. A number of PPPA-relevant approaches, particularly CSA, are already included in key policy and strategy documents (summarised in Table 7), suggesting an enabling environment for promoting PPPA practices as a means to achieve policy priorities. However, given the political, technical and bureaucratic obstacles to realising the government’s existing vision for agricultural transformation, it will likely be challenging to scale PPPA effectively through policy channels.

By law, strategic ministerial plans must be aligned with Vision 2030, Kenya’s blueprint for development. In addition, ministries formulate numerous sectoral policies such as the National Horticulture Policy and National Dairy Development Policy. In theory, county governments should also identify gaps in national policy and participate in the national policy process; in practice, this does not always take place. Finally, each county government develops detailed implementation plans. Due to time and space constraints, only the high-level policies have been reviewed in this study. However, analysis by Faling (2020) suggests that when it comes to framing CSA policy, there are discrepancies between strategic plans and sectoral policies. This suggests a continued lack of alignment both within and between government bodies and levels.

Table 7 Overview of main national strategies relevant to PPPA in Kenya

<table>
<thead>
<tr>
<th>Policy</th>
<th>Overview and relevance to PPPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya Vision 2030</td>
<td>The blueprint for the country’s development launched by the national government in 2008, it sees agriculture as one of six key sectors that will contribute to achieving 10% GDP growth per annum. Vision 2030 sets out national priorities reflected in sector-specific strategies and plans. Its focus is on boosting productivity, expanding crop irrigation and land under cultivation and improving institutions such as regulatory and research bodies. It also aims to significantly scale up the blue economy for sustainable use of ocean resources.</td>
</tr>
<tr>
<td>Agricultural Sector Transformation and Growth Strategy (ASGTS) (2019–2029)</td>
<td>Aims to increase producer incomes, agricultural output, food security and household resilience. The strategy promotes “a sustainable and resilient transformation” of the sector through natural resource management and disaster preparedness. It sees the private sector as critical for co-financing and delivering on achievement of many objectives around agro-processing and service delivery to small-scale farmers. UNEP, through the SWITCH Africa Green programme co-funded by the EU, worked with ministers to green the ASTGS, leading to inclusion of a principle on sustainability and specific environmental indicators. In line with Vision 2030, it aims to expand the area under crop production by creating new large-scale commercial farms in the ASAL, made possible by linking to existing irrigation projects such as dam rehabilitation, although it notes these projects have progressed slowly.</td>
</tr>
<tr>
<td>Kenya Climate Smart Agriculture Strategy (KCSAS) (2017–2026)</td>
<td>Aims to enhance agricultural-sector resilience to climate change and improve food and nutrition security and producer livelihoods, while minimising GHG emissions from agricultural production. Emphasises environmental protection and mitigating the impact of agriculture on climate change. Promotes a number of PPPA practices and technologies including CA, agroforestry and integrated soil-fertility management.</td>
</tr>
<tr>
<td>National Climate Change Action Plan (2018–2022)</td>
<td>Lays out mechanisms for achieving low-carbon development while increasing resilience to climate change. Prioritises adaptation and the achievement of food security over the mitigation of GHG emissions, although it includes aims to achieve low-carbon agricultural growth.</td>
</tr>
</tbody>
</table>
Policy | Overview and relevance to PPPA
--- | ---
Green Economy Strategy | Includes objectives around promoting drought-tolerant food crops; strengthening risk management and warning systems related to climate change; growing fast-maturing, high-value trees; payments for ecosystem services; increased tree cover and community participation in sustainable resource management.

National Agricultural Soil Management Policy (2020) | Aims to facilitate soil restoration and conservation in line with ASTGS objectives, in the absence of a coherent national strategy for soils and the existence of multiple, often conflicting policies, acts and laws related to soil management. Drafted with financial support from GIZ (German Corporation for International Cooperation GmbH).

Vision 2030 projects a renewed role for the private sector. Private investors are important in meeting targets around the provision of agricultural inputs and in implementing large-scale irrigation projects. Vision 2030 also aims to scale up agribusinesses and expand the agro-processing MSME sector by creating an enabling fiscal and regulatory environment for business, including through the National Credit Guarantee Scheme. However, the Third Medium-Term Plan (MTP) (2018–2022) for Vision 2030 acknowledges that progress on public sector reforms needed to create this enabling environment has been slow so far.

In line with Vision 2030, the ASTGS sees a significant role for agribusiness as the engine of agricultural transformation; it aims to accelerate 1,000 MSMEs that will act as local change agents for smallholder farmers, primarily as extension providers, agro-dealers and traders. The strategy is innovative in its inclusion of informal actors, who make up the majority of all MSMEs in Kenya. The ASTGS also envisages a shift from subsidising only maize and crop farmers to an e-voucher system that will give farmers greater control over input decisions. It includes measures to help farmers improve soil quality, for example through requiring lime use by farmers who register in parts of the country known to have acidic soils. This is encouraging from a PPPA point of view, as it suggests a move toward an enabling environment for greater diversification and more effective use of fertilisers and pesticides. On the other hand, the strategy is not clear about the balance between organic and inorganic fertilisers, with the e-voucher scheme apparently focusing on the distribution of inorganic inputs. The government’s focus on increasing chemical input use may conflict with some PPPA principles. For example, the Food Crops Regulation launched in 2018 was criticised for proposing a ban on the use of raw manure as an organic fertiliser, purportedly on food safety grounds, with some suggesting that commercial interests in inorganic fertiliser were behind the idea (Muyesu, 2019; Sasi, 2019).

The inclusion of approaches such as CSA and CA within a number of existing national and county level agricultural strategies does broadly indicate an enabling policy environment for PPPA. The Third MTP for Vision 2030 includes CSA as one of the 21 agriculture and livestock programmes (though not a flagship one) to be implemented in 2018–2022. The NCCAP and KCSAS specifically mention CA and agroforestry as strategies for increasing resilience to climate change through sustainable natural resource management. A number of county-level implementation plans also refer to CSA and CA and include specific budgets for training farmers in CA or sourcing CA equipment.

Agricultural policies acknowledge the role of smallholders within the sector and increasing smallholder productivity is a key objective, specifically through increased access to affordable agricultural inputs and mechanisation services. The vision for agricultural transformation put forward in the ASTGS includes principles on inclusivity and sustainability. It targets low-income farming households and includes quotas for women and youth in some of its programmes, suggesting an enabling environment for the people-positive aspects of PPPA. Nonetheless, large-scale farms are expected to play a role in agricultural transformation, with the ASTGS outlining plans for 50 new large-scale private farms.

Kenya’s relatively recent shift to a decentralised approach to agriculture may help explain why sectoral change has been slow and why adoption of PPPA practices has been relatively limited so far despite apparently widespread buy-in from different stakeholders. In 2010 Kenya enacted a new constitution, leading to the devolution of a number of agricultural sector functions to the 47 county governments. Under this two-tier system, central government is mostly responsible for policy making, while county governments lead on delivering services at the local level (FAO, 2014). However, the transition to a devolved system was lengthy, and delays in funding transfers from central to county governments were an early obstacle to the implementation of new policies on the ground (FAO, 2014). Challenges related to the absorption of
development partner funds, slow approval processes for public-private partnerships and a lack of monitoring and evaluation mechanisms continue to hamper progress in the vision’s objectives for agricultural transformation. Although actors such as FAO, AGRA, the EU and UNEP are providing high-level support to policy design and implementation, the political, legal and governance landscape remains complex and likely creates an inhibiting environment for agricultural transformation.

There is broad recognition within national and local policies of the need to sustainably manage natural resources. But overall, high-level policy making is dominated by a Green Revolution approach focused on increasing the productivity of smallholder agriculture through modernisation and the increased use of inputs. The influence of this narrative is clear in the policy focus on the private sector and agribusiness as key drivers of agricultural transformation; the ASTGS received strong support from AGRA in both its development and plans for implementation. The power of the Green Revolution narrative may be acting as a barrier to the more regenerative principles of PPPA (Lunn-Rockcliffe et al., 2020). Analysis by the Biovision Foundation (2020) suggests that commitment to this narrative is putting efficiency and markets ahead of environmental sustainability and wellbeing. Indeed, Vision 2030 is explicit about putting economic growth first and there are signs this may detract from its inclusivity. For example, its MSME accelerator programme will focus on areas with high agroecological potential, which already have good infrastructure and access to urban markets, and therefore have the greatest potential for success; its drive towards formalisation of MSMEs is also part a strategy to expand the country’s tax base.

7.1.5 PPPA-relevant stakeholders, actors and programmes

At the national government level, the ministries of agriculture and environment appear to be the strongest advocates for PPPA, as set out in their strategic plans on CSA and the green economy. They have a strong role in national policy formulation, although this is shaped and to some extent constrained by the objectives for agriculture set out by the president in Vision 2030. However, there does appear to be some support for PPPA from high-level politicians. For example, Vice President William Ruto has publicly endorsed CA. But sectoral ministries appear to have weak influence over the budget allocation process and play a smaller role in policy implementation, due to devolution. In theory county governments should contribute to national policy formulation but this appears limited in practice.

Few county plans refer to PPPA approaches, and governance, bureaucratic and capacity challenges continue to hamper budget allocation and timely disbursement to counties; this is an obstacle to agricultural development programmes on the ground. However, there are clearly advocates for PPPA within some county institutions. For example, Kiambu has adopted a law on agroecology and Kitui has a county CA programme aiming to get 25,000 households to adopt CA by 2022. The devolution of agricultural policy implementation to county governments may present an opportunity to integrate more regenerative, inclusive and circular PPPA practices at the local level (Leippert et al., 2020).

International donors and NGOs play a large role in shaping national policy, including framing PPPA policy, which centres on CSA. Donors, international research centres and NGOs have sturdy research capacity and provide significant technical support to government and ministries in policy formulation and implementation. AGRA (with support from the Bill and Melinda Gates Foundation), FAO and CGIAR bodies are among the most influential international organisations promoting PPPA in Kenya. However, AGRA’s focus on the Green Revolution narrative, including mechanisation and economic growth, may be at odds with some PPPA approaches, such as those minimising the use of external inputs. FAO has long promoted CA and CSA and other approaches, including agroecology, in Kenya. FAO supports the government on policy formulation and implementation and supports farmers on the ground through its field offices. FAO is a proponent of Farmer Field Schools, which have long been used to promote IPM, including by the Kenyan Tea Development Agency. The EU is another major international stakeholder driving PPPA; it has provided significant technical support to policy formulation and programme funding.

National NGOs and CBOs engage in policy advocacy and lobbying but they appear to have less influence over national policy than international organisations and donors. They likely play a stronger role in influencing county governments and shaping the adoption of PPPA on the ground, but can also oppose PPPA if they consider practices to be unsuitable or detrimental for farmers. For example, national farmer organisations may object to PPPA practices that increase labour requirements. Analysis by Leippert et al. (2020) suggests that CBOs such as SINGI and ICE have been influential in creating an enabling environment for PPPA at the county level in Busia, Meru and Tharaka-Nithi.
Kenya’s agricultural private sector consists of large- and medium-scale agribusinesses, overwhelmingly in the horticultural sector, and a vibrant and diverse MSME sector in horticulture, dairy, livestock and other food-related commodities. Through interviews with private-sector actors, it is clear that a wide range of agribusinesses is driving the adoption of PPPA practices on the ground. Agribusinesses may adopt PPPA practices themselves or support other actors to adopt them by providing funding or access to services, inputs and markets. As noted in the previous section, the private sector is increasingly called upon to implement PPPA-relevant policies through multistakeholder partnerships, particularly public-private partnerships. For example, the CA4FS programme links producers with agribusinesses supplying CA inputs and equipment. Through conversations with key informants we found examples of private-sector actors contributing to the transition to PPPA. This could be via adopting and scaling planet-positive practice, such as the use of terraces, cover crops and crop rotation to manage pests and diseases at Goshen Farm Produce. It could also be by providing technologies and services that enable smallholders to transition to PPPA methods, as with the development of affordable soil tests by Crop Nutrition Services.

Different areas of the agricultural private sector likely shape the transition to PPPA in different ways. For example, within the horticulture sector, large-scale producers have long used IPM techniques and many hold GlobalG.A.P. and Fair Trade certification. However, compliance is skewed in favour of export markets due to greater consumer willingness to pay premiums in these markets. The sector has historically benefited from low government regulation, thanks to strong political ties, although this has changed in recent years (Tyce, 2020). Likewise, the dairy processing industry is dominated by two players, Brookside and New Kenya Co-Operatives Creameries (NKCC), which benefit from strong ties to the government. The Kenya National Farmers’ Federation (KENAFF) represents producer organisations, farmer cooperatives and some large farms; it has promoted PPPA practices and technologies such as biogas, CA and water harvesting for irrigation (Osumba and Rioux, 2014). In general, farmer organisations have weak policy influence. But they likely have a great ability to shape the adoption ofPPP A practices on the ground, given the role they often play in delivering training and providing farmers with access to inputs, technologies and markets. On the other hand, they have often pushed for subsidies for inputs and technologies that tend not to align with PPPA principles.

The Kenya Agriculture and Livestock Research Organization (KALRO) is the main public agricultural research body and contributes to policy and programme implementation. It tends to be guided by national government objectives and priorities and focuses mainly on improving agricultural efficiency. But it also receives donor funding and its research focus is likely shaped by funders. Around one third of its projects include agroecological elements, for example diversity, resilience and reduced use of chemical inputs (Biovision Foundation, 2020).

Civil society is represented in the policy process through different organisations including national and international NGOs, which often take part in multistakeholder consultations. They may come together on specific issues, such as the Kenya Climate Change Working Group, a network of CSOs formed in 2009 which helped shape government action and policy on climate change (Maina et al., 2013).

CBOs, which encompass farmer groups and cooperatives, are a source of information and support for farmers, including around PPPA. Donors increasingly seek to work with and bolster these organisations, often promoting community-based approaches to natural-resource management (Atela et al., 2018). This is a promising development in terms of improving farmers’ participation and agency in the transition to PPPA. But the representation of small-scale farmers within these groups is limited and smallholders have little leverage over the food and agricultural system overall (Atela et al., 2018).

**Finance, investment and public expenditure**

Kenya’s financial and business environment is not currently enabling a transition to PPPA and there are no specific policies or fiscal incentives supporting private-sector actors to invest in or adopt green agricultural practices and technologies (UN Environment Programme, no date; Koenig, 2018). In interviews, key informants from agribusinesses operating in this space discussed challenges around the high upfront costs of some technologies, lack of MSME access to finance, lack of access to equipment and poor existing infrastructure related to PPPA.

Kenya operates a market-driven economy with limited state interference in business and continues to improve in its World Bank Ease of Doing Business ranking, at 56 out of 190 in 2020 (Matui et al., 2016; Trading Economics, 2019). In general, the relative stability of the country’s judicial and political systems
makes it attractive for private-sector investment. Kenya does not have many special incentives for foreign investors (African Private Equity and Venture Capital Association, 2020; Bowmans Law, 2020). The limited incentives available are through export-led schemes. Regulatory changes in 2019 have helped to create a more favourable environment for foreign investment. However, foreign investors are not currently supported in investing in things such as CSA, while some policies may even act as disincentives to investment (for example, value-added taxes on some CSA-related technologies) (Feed the Future, 2018a). Financial incentives targeted at specific agricultural sub-sectors, such as cotton and dairy, tend not to be attached to sustainability or social inclusion (Feed the Future, 2018b). And even where there are incentives for planet-positive technologies, such as renewable energy, many are tied to export processing zones and special economic zones, inhibiting their potential to be mainstreamed (Feed the Future, 2018a).

Amendments to the Banking Act 2015 (enacted through the Banking (Amendment) Act 2016) capped the rate of interest chargeable by banks, and significantly tightened credit and liquidity in the country (particularly for the MSME sector). This cap was removed in October 2019. In addition, the national government has introduced a new MSME policy, which aims to improve access to affordable finance (loans without collateral ranging between Sh30,000 (US$297) and Sh250,000 (US$2500)) without collateral via the mobile phone app ‘Stawi’ (Afrikan Heroes 2019). These loans are backed by government. This may produce some increases in credit availability, as may the lifting of the cap on interest rates, but there is no PPPA-related conditionality attached to lending criteria.

The Green Economy Strategy and Implementation Plan (GESIP) (2018–2022) lays out the rationale and pathways to achieving green growth, including a number of objectives relevant to PPPA, such as “develop and enhance agricultural infrastructure”; “promote livelihood diversification for vulnerable communities”; and “expand opportunities in marine and aquatic resources”. However, it acknowledges a number of challenges, including “weak and ineffective” enforcement of environmental regulations, and barriers to accessing finance, which especially stifle innovation in green technology, often perceived as uncertain and risky. UNEP provided support to the formulation of the GESIP, and is now contributing to its implementation through SWITCH Africa Green (co-funded by the EU). By addressing both the policy and regulatory environment, as well as the capacity of individual MSMEs, SWITCH Africa aims to improve the enabling environment for ‘green’ business. It has awarded grants to a number of Kenya-based projects with a green business focus, in particular MSMEs in agricultural processing and manufacturing in the horticulture, coffee and dairy sectors.

Public expenditure on agriculture has been declining over the past two decades, as noted in Section 2.1, although the budget allocated to the sector in FY 2020/2021 was 21% higher than in previous years (Atellah, 2020). Around 72 million US$ (KSh 8 billion) has been allocated to projects supported by international donors, many of which contain PPPA elements. The Presidency and the National Treasury are the main players in budget allocation, as well as County Assemblies, and non-governmental actors such as the Kenya Institute for Public Policy Research and Analysis (KIPPRA) (UNICEF, 2018). Analysis by the Biovision Foundation and IPES-Food found Kenya to be second only to Ethiopia in terms of the sums of agricultural aid it receives — around US$153 million per year; Kenya’s main development aid donors are the US, BMGF, the EU, Germany, the World Bank and Japan (Biovision Foundation, 2020). China is also a major donor. The Kenyan government ranks third in Africa in terms of its investments in public agricultural research, at around US$274 million a year (Biovision Foundation, 2020). However, much of this research does not appear to currently support a transition to PPPA, with the majority of funding focused on industrial agriculture and increasing efficiency (Biovision Foundation, 2020).

A review of ongoing and recently completed donor-funded agricultural programmes in Kenya suggests that donor spending broadly supports the government’s vision for agricultural transformation, and is geared towards achieving its strategic and policy objectives. Environmental benefits are rarely the sole focus of these programmes, with productivity and profitability usually taking priority. The PPPA focus of most projects tends to be on sustainable agricultural and land-management practices — generally delivered through farmer training — and on developing rural infrastructure and increasing access to credit, inputs and markets, with the aim of improving farmer livelihoods. A few smaller projects have taken different approaches, for example piloting Payments for Ecosystem Services in Navaisha, or developing MSME capacity in sustainable agri-processing. Better-funded projects tend to take a more sector-wide approach,

34 Through the enactment of the Finance Act and the Data Protection Act, amendments to the Companies Act and the proposed Employment Bill.
building technical, research and policy capacity in addition to working with farmers at the county or community level. The World Bank is currently funding the two largest projects, one on CSA and another on agricultural and rural inclusive growth — both with budgets of over US$200 million. Spending is greatest in ASAL counties, which is positive given their vulnerability to climate change and environmental degradation, and also understandable given their relative size and importance for poverty alleviation.

7.2 Towards a transition to planet-positive agriculture

A number of practices and technologies that fall under the PPPA umbrella have been trialled across Kenya in the past few decades. However, there is widespread acknowledgement that most interventions aimed at shifting production practices towards PPPA have had limited long-term success among small-scale farmers. There are a number of reasons for this, but one important, overarching factor limiting the success of these initiatives appears to be limited consultation with small producers and therefore an inadequate understanding of their situation, needs and constraints. Many donor-driven programmes promote externally developed technical fixes, often attempting to implement them in static, top-down ways, which may poorly reflect the dynamic nature of small-scale farming (Maina et al., 2013).

Increasing the reach of PPPA approaches will not be achieved without buy-in from small farmers, but programme design and evaluations rarely include these crucial stakeholders in meaningful ways. Nor do farmers have much agency in shaping the PPPA technologies, practices and solutions that are promoted (Atela et al., 2018). To ensure PPPA solutions to agri-food system challenges are successful in the long term, they should be co-designed with local stakeholders, including farmers.

- **Entry point: fund and pilot bottom-up approaches to developing PPPA practices and approaches with farmers, focusing on their agency, knowledge and needs.** Support pilot interventions focused on farmer experimentation and learning and have scientists and farmers co-design solutions, bringing indigenous knowledge and experience together with expert-generated data. A number of county- and national-level NGOs and CBOs already promote farmer-led design of PPPA technologies and solutions; these include Prolinnova-Kenya, PROCOL Kenya, AFSA. Providing technical and financial support to these organisations could also help mainstream their participatory approaches, build their networks and partnerships and amplify farmer voices within local planning.

It is likely that many farmers already apply some PPPA practices even if they don’t label them as such, or may use only some practices, or only on some parts of their land. The researchers found few, if any attempts to measure the extent of these practices on the ground. This is an obstacle to scaling PPPA in itself.

Gathering evidence of how PPPA is already being practised in local contexts could inform future investments by international donors, private-sector actors and governments aiming to build on what’s already working. It could also provide inspiration for alternative interventions, which could inform efforts to scale PPPA in other contexts.

- **Entry point: map local success stories at the level of individual farmers and communities, to understand what’s already working for people and planet in specific contexts and why.** Identify cases of farmers using locally developed or adapted practices and technologies that are providing benefits to both the community and the environment. These could be indigenous practices, techniques that have been externally introduced and adapted by local farmers or approaches that have been co-designed by scientists and farmers to suit local contexts. Evidence of how PPPA is already being practised on the ground, beyond externally funded projects, is severely lacking; however, the gathering of this evidence should be grounded and participatory.

Building the capacity of community stakeholders such as farmers and local CBOs to generate their own evidence around PPPA could help them advocate for their priorities and connect local experiences to policy and planning processes. The devolution of agriculture has brought services and policy implementation planning closer to communities and promised greater transparency, equity and accountability in policymaking. However, policy formulation is led largely by high-level actors at the national and international level. Many policies have involved broad, multistakeholder consultations, including with civil society. But international donors are well funded and have strong technical capacity; as a result, they exercise significant influence over national policy and agendas.
Entry point: build capacity of local and national actors who represent voices traditionally excluded from policy, and who may provide a more effective link between farmers, civil society and decision makers. This might include farmer organisations and cooperatives, CBOs, civil society movements and coalitions.

While the policy landscape is broadly supportive of the principles of PPPA, it emphasises some aspects more than others. A number of high-level stakeholders have embraced CSA and CA, likely because they promise triple wins: economic growth, agricultural productivity and environmental sustainability. In addition, CA, or at least the way it has been presented so far, tends to promote continued use of external inputs, including inorganic inputs and machinery, which in current policy frameworks and donor programmes are being provided by the private sector. Given the likely considerable influence of agribusiness interests in shaping agricultural policy, CA may be more appealing for donors, investors and the private sector on whom the government currently relies and works closely with to transform its agricultural sector.

The considerable influence of international donors and governments over agriculture and environment policy in Kenya has led to the dominance of Green Revolution narratives within the current sustainable agriculture landscape. This may be a barrier to the more regenerative and inclusive elements of PPPA. Currently, little is being done to support the emergence of circular agricultural systems, and principles related to agroecology and circular economics are virtually absent from policies and programmes.

Entry point: raise the profile of RA and agroecology, and advocate for their inclusion within existing policies and programmes. Identify influential local individuals who are promoting PPPA, such as farmers, community leaders or local planners. Influential donors and NGOs should also try to mainstream the inclusion of truly regenerative and inclusive principles within the wider global discourse on PPPA.

Nonetheless, some county government plans and partnerships suggest that there is appetite for trying more ‘radical’ approaches at the local level. Some innovative private-sector actors are also developing solutions that would enable smaller farmers to transition to planet-positive agricultural production. Although there is considerable donor funding and government interest in inclusive value chains, with a focus on building MSME capacity in the agro-inputs and processing sectors, most initiatives formalise MSMEs. Little is currently being done to enhance and support the significant existing contribution of the entrepreneurial informal economy to food security and agricultural development. These actors provide crucial links to farmers and strongly shape the PPPA enabling environment but may operate outside of the policy sphere, and at a much faster pace.

Entry point: partner with and support county governments, local CBOs and entrepreneurs already implementing or enabling more progressive and regenerative PPPA policies and practices. Support county governments and authorities to develop county-level laws, regulations and policies which enable a transition to PPPA at the local and regional level. Partner with and support the activities of innovative private-sector actors contributing to the enabling environment for PPPA through the provision of technologies and agricultural services.
8 Rwanda

8.1 The state of play for PPPA in Rwanda

8.1.1 The food and agricultural system in Rwanda

Rwanda is a small country with a large, fast-growing population. This results in challenges to the food and agricultural system, which must produce affordable, quality food for citizens, generate revenue to buy imported food that Rwanda cannot produce and provide income, employment and livelihood opportunities for a large part of the country’s population. Fifty-two per cent of Rwanda’s land area of 2.63 million hectares is classified as arable land. The population was estimated at 12.627 million in 2019, with an annual population growth of 2.6% (UN Department of Economic and Social Affairs, 2019).

The country is subdivided into 14 AEZs with a variety of land-use systems. These range from forests in the Southwest to seasonal and perennial cropping in the Central Plateau and in the North Western Highlands, to savannah used largely for livestock production in the Northeast. Figure 6 shows the land-use system.

![Figure 6 Agroecological zones of Rwanda](source.png)


The main food crops grown in Rwanda are maize, plantain, cassava, sweet potatoes, Irish potatoes and beans (Ministry of Agriculture and Animal Resources, Rwanda, 2019). Yields remained fairly stable between 2011 and 2017, except for those of cassava, which have increased dramatically thanks to improved disease control (Alun, 2020). The main export crops are coffee and tea (for the global market) and food crops (potatoes, vegetables) sold to neighbouring countries.

Livestock plays an important role in Rwandan farming systems, including cattle, goats, sheep, pigs and poultry. Animal production has increased significantly over the past ten years, in particular production of...
milk as a result of a range of programmes to promote small-scale dairy production (Ministry of Agriculture and Animal Resources, Rwanda, 2019).

There are three main types of agricultural value chains in Rwanda.

The first is for domestic food crops, with a large proportion of rural households producing their own food while buying and selling some food crops in the market. The government’s objective, according to the Strategic Plan for Agriculture Transformation, phase 4, 2018–24 (PSTA4), (Ministry of Agriculture and Animal Resources, Rwanda, 2018b), is to ensure low and stable prices for domestic rural and urban consumers so they can meet their dietary requirements and reduce malnutrition. Some food crops have commercial potential through agro-processing, but aggregation and value addition are not well developed.


The third value chain is that of traditional export commodities — tea, coffee and pyrethrum — where the private sector is already heavily engaged in production, aggregation, value addition and trade. PSTA4 aims to harmonise agricultural and trade policies, encouraging farmers to focus on higher-value crops. This would enable them to buy food crops for which Rwanda does not have a comparative advantage, in particular maize. There is still significant growth potential in focusing on high-value niche markets, as Rwanda is not able to compete on price, for example, with coffee producers such as Ethiopia.

PSTA4 identifies several high-impact commodities for which Rwanda has a long-term comparative advantage. These are largely labour-intensive products with a high value per unit area and/or a substantial contribution to food and nutrition security (FNS). They include animal resources (dairy, poultry, fish) and horticulture (fruit and vegetables), both for domestic consumption and export.

Rwanda’s agro-processing sector consists largely of processing locally available raw materials for products such as wine, beer, soft drinks, flour, rice, cheese, honey and cooking oil. The sector is characterised by a very small number of large enterprises and many micro-enterprises, including in the informal sector, and a ‘missing middle’. Micro- and small enterprises (traders, transporters and agro-dealers) comprise approximately 98% of all businesses in Rwanda and account for 41% of all private-sector employment (Ministry of Agriculture and Animal Resources, Rwanda, 2018b).

There has been some diversification into new products such as essential oils, which have increased the agro-processing export base. As of October 2020, a total of 48 MSMEs and agro-industries were producing for local consumption and export (Rwanda Development Board, 2020a).

Despite significant progress in combatting poverty and malnutrition, Rwanda’s 2018 Comprehensive Food Security & Vulnerability Analysis (CFSVA) (WFP, 2018a) reported that 18.7% of Rwandan households were still food insecure. The stunting rate dropped nationwide from 37% to 35% between 2015 and 2018, but in 11 districts it was still above the WHO critical threshold (>40%). Similar to the 2015 CFSVA, food-insecure households were among the poorest, with few active members, and were frequently headed by a person with a low level of education, a single person or a disabled person. Such households depend mainly on daily labour, as they are landless or cultivate plots smaller than 0.5ha, cultivate few crops (two to three) and are less likely to have a vegetable garden. Female-headed households are more prone to food insecurity (23%) than male-headed households (17%), spend a larger part of their budget on food, and are more engaged in livelihood coping strategies. An effective PPPA transition must address the challenge of meeting the needs of these groups of people via affordable (and possibly subsidised) food, while also incentivising farmers to produce in a more sustainable, planet-positive way.
8.1.2 Challenges facing the food and agricultural system

Rwanda has made huge progress in developing its food and agricultural sector and has been leading the Malabo Declaration league table for some time, scoring an impressive 7.24/10 in 2019, the highest score in all of Africa (African Union, no date). This reflects, in particular, high scores for efforts in the policy/enabling and conducive environment, including:

- Multisectoral and multistakeholder coordination
- Inclusive institutionalised mechanisms for mutual accountability and peer review
- Evidence-based policies and supportive institutions, and
- Capacity to generate and use agricultural data and information.

However, many interrelated challenges remain, in particular the persistently high rates of malnutrition and stunting amongst parts of the population in parts of the country. FNS is closely linked to a range of drivers at different scales, including climate change, agricultural productivity, crop diversity, water and sanitation, and education. Figure 7 maps out the links between the main drivers and related challenges that affect the agri-food system in Rwanda, based on literature reviews and KIIS. It shows that most challenges are interconnected, sometimes reinforcing each other, as is to be expected in complex systems.

Figure 7 Drivers, challenges and impacts in Rwanda’s agri-food system

Source: authors’ own, based on document review and KIIs; not exhaustive.
The challenges faced by Rwanda’s agri-food system shown above can be grouped into six main categories, which affect both people and planet.

Table 8  Agri-food system challenges and their PPPA dimensions in Rwanda

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Specific PPPA dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Food- and nutrition-security-related challenges</td>
<td>• High incidence of stunting</td>
</tr>
<tr>
<td></td>
<td>• Low level of food security (quality/quantity) for some households</td>
</tr>
<tr>
<td>(2) Agricultural-production-related challenges</td>
<td>• Low productivity (crops and livestock)</td>
</tr>
<tr>
<td></td>
<td>• Limited access to quality farm inputs</td>
</tr>
<tr>
<td></td>
<td>• Scarcity and low quality of livestock feed</td>
</tr>
<tr>
<td></td>
<td>• Low genetic potential of indigenous livestock breeds</td>
</tr>
<tr>
<td></td>
<td>• High incident of livestock diseases</td>
</tr>
<tr>
<td></td>
<td>• Use of hazardous agrochemicals to control weeds, pests and diseases</td>
</tr>
<tr>
<td>(3) Natural-resource-management-related challenges</td>
<td>• Droughts and floods (increasing under climate change)</td>
</tr>
<tr>
<td></td>
<td>• Limited farmland resulting in small plot size</td>
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<tr>
<td></td>
<td>• Limited land under irrigation</td>
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<tr>
<td></td>
<td>• Use of unsustainable farming practices</td>
</tr>
<tr>
<td></td>
<td>• Land degradation and soil erosion</td>
</tr>
<tr>
<td>(4) Value-chain- and market-related challenges</td>
<td>• Poor access to markets for smallholder farmers</td>
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<tr>
<td></td>
<td>• Limited cross-border trade</td>
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<tr>
<td></td>
<td>• Imperfect agricultural commodity markets and value chains</td>
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<tr>
<td></td>
<td>• Inadequate agricultural waste management</td>
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<tr>
<td></td>
<td>• High post-harvest losses</td>
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<tr>
<td></td>
<td>• Lack of critical mass of production to make processing viable</td>
</tr>
<tr>
<td></td>
<td>• Low access to finance for MSMEs</td>
</tr>
<tr>
<td></td>
<td>• Limited role of MSMEs in agro-processing</td>
</tr>
<tr>
<td>(5) Challenges related to agricultural knowledge and information systems</td>
<td>• Skill gaps in agriculture, limiting productivity</td>
</tr>
<tr>
<td></td>
<td>• Inadequate research and extension services</td>
</tr>
<tr>
<td></td>
<td>• Inadequate veterinary services</td>
</tr>
<tr>
<td>(6) Social and institutional challenges related to agri-food systems</td>
<td>• Low household incomes</td>
</tr>
<tr>
<td></td>
<td>• Some households resort to unsustainable coping strategies</td>
</tr>
<tr>
<td></td>
<td>• Low levels of farmer participation in agricultural programme development</td>
</tr>
<tr>
<td></td>
<td>• Women and youth are not fully participating in agri-food systems</td>
</tr>
<tr>
<td></td>
<td>• Women-headed households are disadvantaged</td>
</tr>
</tbody>
</table>
Addressing these challenges requires both technical and institutional solutions that work in tandem. For example, addressing the use of hazardous agrochemicals to control weeds, pests and diseases would require plant-protection practices that are environmentally sound. These include push-pull; IPM; use of natural enemies and biopesticides; and appropriate technical support, for example via agricultural advisory services and market incentives (value-chain development) to promote widespread adaptation and adoption of these practices.

Rwanda has, over the past decade, consistently tried to balance environmental, social and economic objectives, putting in place some environmental policies and safeguards (see also Section 8.1.4). However, human development indicators (in particular FNS and income) remain very low. With a rapidly growing population, the economic performance of the agricultural sector in the near future is increasingly the main focus of government policies and development-partner programmes, and this is reflected in the various agri-food system policy documents and strategies. Note that environmental objectives do not feature prominently in documents such as the PSTA4 (Ministry of Agriculture and Animal Resources, Rwanda, 2018b). While land degradation is recognised as a main challenge that must be addressed in order to safeguard future agricultural potential, productivity-enhancing measures can have negative long-term effects on both people and planet, where environmental safeguards are not effectively enforced. For example, the negative impacts of fertiliser leaching into wetlands were noted (Green World Consult Ltd, 2014) and concerns raised about the misuse and overuse of pesticides (Wipfler & ter Horest, 2018). Similarly, land consolidation programmes aimed at increasing agricultural productivity and efficiency can exclude the poorest farmers and thus increase inequalities and reduce social sustainability (Nilsson, 2019). So balancing trade-offs between sometimes-competing social, environmental and economic objectives is a challenge in itself.

All countries in the Eastern Africa region are facing the overall challenge of balancing economic, social and environmental objectives within different timeframes. But Rwanda is in a particularly difficult situation due to its high population density and its dependence on very limited agricultural land, with little or no scope for further expansion without encroaching on land already earmarked for nature conservation. Such land is a valuable asset, with tourism, largely wildlife tourism, accounting for nearly 15% of GDP in 2018. According to IFPRI, Rwanda’s agricultural growth rate of around 5% between 2015 and 2018 was made up of land expansion (2%), productivity growth (1.7%) and increased labour productivity (1.3%). Farmland expansion was achieved by developing inland swamps, but options for further expansion are very limited (World Bank, 2018a).

8.1.3 Addressing challenges through PPPA practices and approaches

In Rwanda, a wide range of practices have potential to contribute to a positive PPPA transformation of the agri-food system in line with the ambition spelled out in Table 1. These have been developed, adapted, tested, piloted and promoted to address the challenges outlined above. The extent to which these practices meet the different PPPA criteria varies and is often highly dependent on context. A practice may have PPPA potential, but only if used appropriately and supported by enabling conditions. Normally, practices cannot maximise benefits to both the planet and to people in the long term, because maximising production and profit may erode the natural resource base and/or increase inequalities. So the challenge is to:

- Optimise benefits in a transparent and fair manner
- While acknowledging differences in stakeholder perceptions and priorities, and
- While developing and promoting synergistic practices that can contribute to a range of outcomes along the three sustainability dimensions.

A detailed catalogue of PPPA practices and the assessment of them against multiple criteria exceeds the scope of this study. We therefore focused on the main groups of practices that have already shown potential in the Rwandan context, or could be beneficial if adapted appropriately. This section will focus on practices in the sense of technologies; institutional innovations are covered in Section 8.1.4.
Table 9  Main PPPA practices identified in Rwanda

<table>
<thead>
<tr>
<th>Practice</th>
<th>Challenges addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Soil and water conservation</strong></td>
<td></td>
</tr>
<tr>
<td>Terraces/radical terraces</td>
<td>Soil erosion/ land degradation</td>
</tr>
<tr>
<td>Field bunds and ridges</td>
<td>Soil erosion/ land degradation</td>
</tr>
<tr>
<td>Agroforestry</td>
<td>Soil erosion, soil fertility decline, livestock fodder shortage</td>
</tr>
<tr>
<td>Use of lime</td>
<td>Soil acidity and soil fertility decline</td>
</tr>
<tr>
<td>Use of organic manure and compost</td>
<td>Soil fertility decline</td>
</tr>
<tr>
<td>CA/zero or minimum tillage</td>
<td>Soil erosion/land degradation and soil fertility decline</td>
</tr>
<tr>
<td><strong>Crop production</strong></td>
<td></td>
</tr>
<tr>
<td>Use of inorganic fertiliser and improved seed</td>
<td>Low productivity</td>
</tr>
<tr>
<td>Crop rotation, fertiliser micro-dosage, weed control using cover crops and mulching</td>
<td>Low productivity</td>
</tr>
<tr>
<td>IPM</td>
<td>Low agricultural productivity, environmental impacts of pesticides</td>
</tr>
<tr>
<td><strong>Animal production</strong></td>
<td></td>
</tr>
<tr>
<td>Crossbreeding (using artificial insemination)</td>
<td>Low genetic potential/productivity of local breeds</td>
</tr>
<tr>
<td>Animal vaccination, spray drugs</td>
<td>Animal disease such as tick-borne diseases and other parasites (tsetse fly, helminths), mastitis and brucellosis</td>
</tr>
<tr>
<td>Distributing forage grass and legume seeds</td>
<td>Livestock feeding challenges</td>
</tr>
<tr>
<td>Establishing fishponds/aquaculture</td>
<td>FNS (stunting/low protein intake)</td>
</tr>
<tr>
<td><strong>Environmental protection</strong></td>
<td></td>
</tr>
<tr>
<td>Waste recycling and use of renewable energies</td>
<td>High energy costs, low access to electricity</td>
</tr>
<tr>
<td>Converting household waste to biomass fuel briquettes; using compost as organic fertiliser</td>
<td>Soil fertility decline, pollution from urban waste</td>
</tr>
<tr>
<td><strong>Building resilience to climate change and other shocks</strong></td>
<td></td>
</tr>
<tr>
<td>Early warning system for severe weather events/weather forecast</td>
<td>Flood prevention, low level of resilience</td>
</tr>
<tr>
<td>Improved storage methods, eg bubble drying</td>
<td>Post-harvest losses, low FNS</td>
</tr>
<tr>
<td>Growing crops with high nutritional value</td>
<td>Low FNS/stunting</td>
</tr>
<tr>
<td>Maize varieties, cassava, and orange sweet potatoes development</td>
<td>Low level of resilience, low FNS</td>
</tr>
<tr>
<td>Increase acreage under irrigation</td>
<td>Low productivity</td>
</tr>
<tr>
<td>Valley tank and farm ponds</td>
<td>Vulnerability to drought</td>
</tr>
</tbody>
</table>

These practices could provide both environmental and livelihood benefits, depending on design-specific factors that include:

- The extent to which practices are adapted to the specific context.
- Long-term economic and financial viability and social acceptability for different types of farmers in different contexts. This is particularly important for initiatives relying on high levels of initial financial or technical support to farmers, which may hide challenges related to adoption in the longer term once support is withdrawn.
- Extent of external support required for the adaptation, adoption and use of practices in terms of capacity development and investments.
Most of the factors above relate to the degree of involvement by different categories of farmers, including women and youth, in identifying, designing, testing and piloting these practices. Whether and how farmer-led innovations and adaptations are considered and included in the mix of options is also important, as it has implications for ownership and acceptability.

National government, donors and investors in Rwanda are currently promoting a number of approaches with potential PPPA outcome. These include:

- **Conservation agriculture**, strongly supported with funding from the Howard G Buffet Foundation, including via RICA, which won the Award of Excellence from the American Society of Landscape Architecture Fund in 2020 for its ecology campus (American Society of Landscape Architects Fund, 2020).

- **Climate-smart agriculture**, often overlapping with CA practices, supported by the World Bank, USAID and UKAID (including via CGIAR’s Climate Change, Agriculture and Food Security programme (CGIAR, no date), with a focus on soil and water conservation, farmer capacity development, the use of climate and weather information and expanded irrigation.

- **Organic agriculture** (with certification) for high-value export crops (coffee, tea and essential oils) and domestically consumed fruit and vegetables for the higher end of the urban market. The Rwanda Organic Agriculture Movement (ROAM) acts as a national umbrella organisation for producers, farmers, processors, exporters and importers involved in organic agriculture and related value chains.

Value-chain and market development can increase employment in the off-farm rural and urban economy and create incentives for farmers to invest in their land and produce for the market. Combining these with the approaches listed above can contribute to more sustainable agri-food systems. To what extent these initiatives achieve their objectives remains to be seen. Currently there are no initial reviews or evaluations publicly available.

However, a recent World Bank/Government of Rwanda report (2020) claims that “extending these programs to more farms would likely continue to promote a rate of growth of 5% and improve the welfare of large numbers of smallholders for perhaps a few years, as farms yet to be reached adopt more modern practices. However, the impact of such improvements will decline over time as the ‘low-hanging fruit’ are picked and more difficult cases are taken on. Most important, this approach would not generate the agricultural growth necessary to achieve the rapid increases in output envisioned under the government’s strategy.”

So the question is not just what sort of practices and approaches Rwanda should use for a PPPA transition. Instead, it is perhaps more important to ask what types of farm enterprises and value chains would be best suited to meet national development objectives: food and nutrition security, poverty reduction and employment via sustainable and equitable economic growth. In that national development context, the terms ‘transition’ or ‘transformation’ are used to describe the ambition to increase the productivity, profitability and competitiveness of the agricultural sector. Within that, environmental and social objectives are considered, but perhaps with a lower level of priority. The following section will consider how current agricultural policies and strategies support or hinder a PPPA transition.

### 8.1.4 PPPA enabling conditions

Rwanda has made very good progress in developing the enabling conditions for the agricultural sector. This is reflected in its policies, strategies and frameworks and in the scores achieved in independent reviews/evaluations carried out as part of regional and global processes.

Rwanda’s Vision 2050 and the associated National Strategy for Transformation (NST1, Ministry of Finance and Economic Planning (MINECOFIN), Rwanda, 2018) set out the country’s long-term ambitions; this includes attaining upper middle-income country status by 2035). The NST1 includes specific targets for the...
period until 2024 with a focus on poverty reduction, FNS and shared prosperity. Specific policies and programmes related to agricultural transformation include the National Agriculture Policy (Ministry of Agriculture and Animal Resources, Rwanda, 2018a) and the associated PSTA4 (Ministry of Agriculture and Animal Resources, Rwanda, 2018b). These focus on four broad pillars:

1. Enabling environment and responsive institutions
2. Technological upgrading and skills development
3. Productivity and sustainability, and
4. Inclusive markets and off-farm opportunities.

The current degradation of biodiversity and soil-fertility decline have driven the government to reshape its agriculture policies and strategic plans toward RA and inclusive agribusiness development. For instance, the PSTA4 highlights integration of agroforestry into crop production systems to improve soil health and nitrogen fixation (Ministry of Agriculture and Animal Resources, Rwanda, 2018b). The Livestock Master Plan gives priority to climate change mitigation by introducing low GHG-emitting livestock species for meat (chicken and pork) (Shapiro et al., 2017). Under the PSTA4, agricultural research is meant to focus on areas such as soil health and fertility; pests and diseases including IPM; development of resistant varieties and animal genetic improvement; integrated farming systems, including CSA and crop/livestock integration; and on previously under-exploited areas, specifically fisheries and aquaculture to promote regenerative agriculture.

Similarly, the National Environment and Climate Change Policy (Ministry of Environment, Rwanda, 2019) includes objectives and strategies relevant to the agri-food system, particularly in relation to climate change adaptation, pollution prevention, ensuring biosafety, and explicit commitments to developing a circular economy and green technologies. Rwanda has developed its Intended Nationally Determined Contributions (INDCs) for agriculture (Rwanda Environmental Management Authority, 2015), its commitment to the 2015 Paris Climate Change Declaration and the National Adaptation Programmes of Action (NAPA) implemented by the National Climate and Environment Fund.

However, the type of transformation envisaged by these policies and programmes is not entirely in line with PPPA principles. Instead, the emphasis is on growth via modernising and commercialising the agriculture and food sector, including increasing the use of external inputs and professionalising the work force through training. PSTA4 does support increasing organic-fertiliser production and use as part of ISFM and training farmers in IPM, but the main focus is on increased use of improved crop varieties and inorganic fertiliser. But the National Environment and Climate Change Policy (Ministry of Environment, Rwanda, 2019) highlights concerns about the environmental impacts of an agricultural growth and modernisation strategy largely reliant on a high external-input model. This approach results in pollution from agro-inputs, including ammonia, nitrate, phosphate; and pesticide residues through leaching and erosion, which is affecting groundwater and the ability of ecosystems to filter toxins naturally. It also raises concerns about inorganic fertilisers used to compensate for nutrient losses resulting from inadequate erosion control. “Inadequate resilient soil conservation practices, the use of chemical fertilisers and associated agriculture low yields are resulting into over-cultivation and subsequent soil degradation and pollution. The impact has been a vicious cycle of erosion and reduced soil fertility and productive capacity.”

There is clearly a need to harmonise these policies and ensure the environmental concerns about a high external-input strategy are addressed and alternatives are piloted, adapted and promoted with the same effort as inorganic solutions. The latter have the backing of AGRA and the agro-industry lobby. AGRA is currently investing heavily in programmes in Rwanda to increase the use of inorganic fertilisers and other “improved technological management practices” through the development of input markets, access to finance and so on (AGRA, 2019). The key country indicators for and targets of AGRA’s operations in Rwanda include important human-development indicators (poverty reduction, dietary diversity and food security, women empowerment, youth engagement), but the only indicator with a potential environmental dimension refers to the adoption of climate-smart agriculture.39 Because AGRA’s interventions are closely aligned with Rwanda’s Vision for Agriculture Development, scope for influencing ongoing AGRA investments is limited.

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39 Percent yield difference of farming households using climate-smart technologies in times of shocks/stresses.
CSOs could possibly play a stronger role in bridging the gap between productivity and environmental objectives by working with innovative farmers and their organisations. They could also engage with formal research bodies, to develop, pilot, adapt and promote environmentally sustainable, inclusive agricultural that is affordable and suitable for poorer farmers, and agribusiness practices. However, there are capacity gaps in CSOs in Rwanda, with many of their senior staff moving to government or the private sector due to poor CSO working conditions (low pay, long hours) and a shortage of career progression opportunities. There are also some limitations to CSO registration and operation in Rwanda: they might advocate for policy changes, the interests of specific groups or on environmental issues. The Rwanda Governance Board, which monitors service delivery in public and private institutions, has a high level of discretion about registration, which must be renewed every five years (Kelly, 2019).

While many aspects of the government’s vision of agricultural transformation are compatible with PPPA, a few differences remain, as outlined in Table 10. Importantly, there is no explicit recognition of potential or actual trade-offs between economic objectives (growth), social objectives (inclusion) and environmental objectives (sustainability). Productivity increase appears to be the overarching objective, with some safeguards to protect the more vulnerable sections of society.

### Table 10  PPPA principles and Rwanda’s vision of agricultural transformation

<table>
<thead>
<tr>
<th>PPPA principles and components</th>
<th>Extent addressed</th>
<th>Rwanda’s vision of agricultural transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and nutrition security for all (SDG2, 3)</td>
<td>High</td>
<td>Key policy objective included in the vision and one of four policy objectives, to be achieved via crop diversification, productivity increase, poverty reduction, etc.</td>
</tr>
<tr>
<td>Gender equality (SDG5)</td>
<td>High</td>
<td>Very strong commitment with ambitious targets and a range of interventions (access to land, finance, extension services, literacy etc), including women in governance. National Gender Policy (2010), Constitution of the Republic of Rwanda (2015).</td>
</tr>
<tr>
<td>Consumer involvement and rights (SDG16, 12)</td>
<td>High</td>
<td>Food safety and affordable food prices are key concerns; food systems perspective is being adopted to ensure links between production and consumption are realised, commitment to dialogue with CSOs representing consumers.</td>
</tr>
<tr>
<td>Farmer agency and empowerment, farmer participation (SDG5, 16)</td>
<td>Medium</td>
<td>Emphasis on women’s economic empowerment and youth agribusiness development but no mechanisms for farmer participation in policy and programme design and evaluation, no farmer-led innovation components. Limitations to associational and organisational rights.</td>
</tr>
<tr>
<td>Inclusive value chains (SDG8)</td>
<td>Medium</td>
<td>Emphasis is on professionalising and formalising value chains, with risk of pushing out micro- and small enterprises; aim is to build a professional ‘middle’ sub-sector (medium-sized enterprises).</td>
</tr>
<tr>
<td>Inclusive access to agricultural services (extension, finance, etc) (SDG5, 8)</td>
<td>Medium</td>
<td>A weak part of CAADP SDG/Vision 2063 reviews in the past; there is commitment to increase inclusion, in particular for women and youth.</td>
</tr>
<tr>
<td>Climate change adaptation and building resilience to climate shocks (SDG13)</td>
<td>High</td>
<td>Recognising limitations within the agricultural sector, national adaptation programme of action prioritises non-agricultural income-generating activities to reduce vulnerability to climate risks.</td>
</tr>
<tr>
<td>Climate change mitigation/GHG emission reduction (SDG12,13)</td>
<td>Medium</td>
<td>Aims to promote production and consumption of chickens and pigs (rather than other ruminants) and regulate higher GHG emitters. However, external input-reliant productivity enhancements (in particular fertiliser) will increase emissions; environmental policy recognises the need for harmonisation with agricultural policies.</td>
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### PPPA principles and components

<table>
<thead>
<tr>
<th><strong>PPPA principles and components</strong></th>
<th><strong>Extent addressed</strong></th>
<th><strong>Rwanda’s vision of agricultural transformation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing use of renewable energy (SDG7, 13)</td>
<td>Medium</td>
<td>PSTA includes investment in solar-powered pumps for small-scale irrigation but no other renewable energy component.</td>
</tr>
<tr>
<td>Agroecological and regenerative agricultural production systems (SDG12, 14, 15)</td>
<td>Medium</td>
<td>Not explicitly mentioned in any policy documents, except in the context of organic certification for some niche products.</td>
</tr>
<tr>
<td>Nutrient recycling and use of organic soil amendments, ISFM (SDG12, 14, 15)</td>
<td>High</td>
<td>Research into and promotion of organic fertilisers included in both policy and strategic plan; nutrient recycling and ISFM mentioned.</td>
</tr>
<tr>
<td>Integrated pest and disease management (SDG12, 14, 15)</td>
<td>Medium</td>
<td>Included (both research and extension, farmer field school approach) but with very modest targets, and main emphasis on synthetic pesticides.</td>
</tr>
<tr>
<td>Agrobiodiversity protection (SDG12, 14, 15)</td>
<td>Low</td>
<td>Strong emphasis on use of improved crop varieties (largely imported), no specific measures to protect local crop varieties in situ.</td>
</tr>
<tr>
<td>Protection of biodiversity hotspots/controlling agricultural expansion (SDG15)</td>
<td>High</td>
<td>Conservation via land sparing (land consolidation, land-use planning) with strict enforcement/good governance.</td>
</tr>
</tbody>
</table>

Agricultural transformation is part of African continental policies and programmes. Two processes are tracking performance against agreed targets (see also section 0). They are the Agenda 2063 (AUC, 2015) and the Malabo Declaration on Accelerated Agricultural Growth and Transformation (AUC, 2014), associated with the Comprehensive Africa Agriculture Development Programme (CAADP).

Rwanda has achieved 6.1/10 in 2017 and 7.24/10 in 2019 for both CAADP biennial reviews — the highest scores in Africa. In 2019, Rwanda scored particularly high on a range of process and institutional indicators, but low on reduction of poverty and stunting among children, value of intra-Africa trade, food safety and health, and farmers’ access to financial services (AUC, 2020). Rwanda achieved 100% of the Agenda 2063 goal “Environmentally sustainable climate resilient economies and communities” in 2019, but made slow progress in terms of “Percentage of agricultural land placed under sustainable land management practice” (AUDANEPAD & AUC, 2020). This demonstrates that it takes time for policies and institutional reforms to tackle challenges on the ground. Despite the remarkable progress Rwanda has made in many spheres, malnutrition and land degradation are still huge challenges.

Key government interventions in the agri-food system are addressing some challenges outlined in Section 8.1.2. They include irrigation development, consolidation and registration of agricultural lands, cooperative development, input subsidies for seed, fertiliser and electricity, promotion of fertiliser and improved seed, and livestock-sector development (in particular dairy production). Specific actions aimed at the required enabling conditions are as follows:

1) **Agricultural knowledge and technology.** The agricultural innovation system of Rwanda is composed of research, education, extension, civil society and public and private-sector institutions engaged in agriculture. In 2016, Rwanda had four agencies for agricultural research and education with nearly 150 full-time researchers (Flaherty et al., 2018). The National Information and Communication Technology for Research in Agriculture (ICT4RAG) Strategy (Ministry of Agriculture and Animal Resources, Rwanda, 2016) emphasises the use of ICTs to support agricultural transformation. However, the sub-sector is still dominated by public institutions, which are understaffed and underfunded. Extension services are insufficient to support both quantity and quality, and linkages between research and extension are weak (World Bank, 2018b). There are currently no projects or programmes focusing on farmer-led agricultural innovation and integration of traditional knowledge.
2) **Farmer and value-chain-actor participation via inclusive organisations.** Memberships in agricultural, livestock and fishing cooperatives has steadily increased, reaching nearly one million in early 2020 (Rwanda Institute for Conservation Agriculture, 2020). A recent study (Meador & O’Brien, 2019) concludes that Rwandan cooperative policy, most notably the mandatory inclusion of high numbers of women in cooperative decision making, is helping to promote strong agricultural institutions and sustainable economic development. However, Bizoza et al. (2018) highlighted low farmer participation in agricultural planning and budgeting via the performance contracts known in Kinyarwanda as *imihigo*, which are meant to be developed in a participatory way. According to the World Bank and Government of Rwanda (2020), more than 70% of farmers with more than ten hectares (large by Rwandan standards) were members of cooperatives, contrasted with a very small proportion of those with less than one acre. The Government of Rwanda has policies that encourage women’s inclusion in agricultural, trying to address constraints such as their access to land and farm inputs, implements, training, financial services and markets. This has resulted in increased access to finances and participation of women in cooperatives (Senders et al., 2020).

3) **Agricultural and agro-industrial inputs.** In line with its vision of transformation, access to improved crop varieties and inorganic fertiliser has been a priority for the Rwandan government. A wide range of agriculture intensification programmes have supported adoption of package technologies (seed, fertiliser, agrochemicals) to smallholder farmers. Rwanda has been called ‘AGRA’s poster child’, with AGRA investing US$9 million in the agricultural sector since 2006. Most of these investments have been in developing the seed and fertiliser sector. However, a recent report (Wise, 2020) calls Rwanda ‘AGRA’s hungry poster child’, as the four-fold increase in maize production and doubling of rice production in the AGRA years has come at the expense of more nutritious and diverse small-scale agriculture. There are currently no ongoing programmes supporting farmer-participatory plant breeding or variety selection to incorporate traditional crops and varieties in the research process, and agrobiodiversity loss is ongoing due to the introduction of improved crop varieties, without adequate protection of traditional varieties (Ndayambaje, 2016).

4) **Energy.** Currently only about 51% of the population has access to electricity (37% on-grid, largely in urban areas, and 14% off-grid). Cooking fuel is still 80% from biomass (wood energy), with plans to reduce this to 42% by 2024 (Rwanda Development Board, 2020b). To achieve 100% electricity access by 2024, the government aims to attract private-sector investment in both grid and off-grid supply. The relatively high electricity tariff (in comparison with neighbouring countries) and limited access to power for micro-enterprises hinders their expansion.

5) **Financial resources for investments along the value chain.** Overall investments in agriculture were 7.26% of GDP in 2019, still lagging behind the Malabo Declaration target of 10% of GDP. Access to agricultural credit has improved over the past decade, but still lags behind credit access for other purposes. According to the Agricultural Finance Year Book (Institute of Policy Analysis and Research-Rwanda 2018), loans to the agricultural sector accounted for an average of 6.15% of total loans in Rwanda between 2014 and 2018. They identified seven challenges:

   a) Limited credit to the agriculture sector due to both perceived and actual risks in undertaking agricultural activities
   b) Weak linkages and organisation among value-chain actors
   c) Inadequate post-harvest financing
   d) Value-chain financing
   e) Agricultural finance supply
   f) Sector-wide impacts
   g) Agricultural finance demand.

   There is currently no finance available for individual farmers’ investments in soil and water conservation measures.

6) **Markets and value chains.** The development of markets and value chains has been a high priority for the government, which has invested in rural infrastructure, particularly roads and storage facilities, and cooperative development to support aggregation. This is one of the four PSTA priority areas, with a specific focus on inclusion of women and youth. Rwanda plans to increase cross-border trade with
neighbouring countries in commodities where it has a comparable advantage, in order to generate the foreign exchange to purchase staples, in particular maize, rice and wheat.

Currently there is no specific policy to ensure that agricultural value chains maximise recycling of raw materials and minimise wastage. However, the National Sanitation Policy Implementation Strategy includes a commitment to properly dispose of 60% of domestic waste by 2019/2020 and 80% by 2029/2030. Additionally, the government is targeting a recycling rate for non-organic solid waste of 30% by 2019/2020 and 40% by 2029/30 (Rajashekar et al., 2019). Pollution aspects related to agribusiness development are included in the National Environment Policy, but it is not clear to what extent this policy is being implemented.

8.1.5 PPPA relevant stakeholders, actors and programmes

The main stakeholder categories are: government ministries and agencies, farmer organisations, other CSOs (such as national and international NGOs, consumer organisations and environmental organisations), the private sector (from MSMEs to multinational companies, including companies in agro-input supply, production, processing and marketing), and international agencies and funders.

The Ministry of Agriculture and Animal Resources (MINAGRI) and its agencies are the main government agencies in charge of the agri-food system. They have the power to design policies, strategies and programmes and oversee their implementations. The government's budget allocation for the agriculture sector decreased from 5% (FY2018/19) to 4% (FY2019/20), but was still higher than that for environment and natural resources, which was 2% in both years. Both of these are dwarfed by expenditure for public finance management (30%), education (11%), justice/law and order (9%), transport (9%) and health (8%) (PWC, 2019).

Agricultural policies mention the need for sustainable natural resource management and the development of environment management plans for agricultural interventions and investments. But overall, agricultural policy objectives are about productivity enhancement and employment generation, which receive more attention than environmental factors (Ministry of Agriculture and Animal Resources, Rwanda, 2018a, Ministry of Agriculture and Animal Resources, Rwanda, 2018b). Agro-processing and trade fall under the Ministry of Trade and Industries, which has a high level of influence politically and a strong interest in creating employment and growth. So any endeavour that supports a regenerative, circular food system would need to demonstrate clearly that it can deliver on these key outcomes — a challenge that in practice would imply the need for some level of compromise with regard to environmental objectives.

The two major national farmer organisations, URUGAGA IMBARAGA and INGABO, have limited influence and are keen to improve farmers’ livelihoods, food security and incomes, but have less interest in environmental sustainability. IMBARAGA has just under 100,000 members and membership is skewed toward farm households that already have some market linkages. From the consumption side, the only consumer association in Rwanda is ADECOR, whose representative participated in the virtual country workshop for this study. ADECOR is mainly concerned with food safety and its main focus has been working with urban consumers and formal value chains.

There are a number of environmental NGOs and networks doing some very relevant and interesting work on environmental awareness, RA and sustainable livelihoods (Arcos, REAO, RECOR, OSEPCCA, APEFA), but their scope of operation is limited and they have very limited influence on national agricultural policies and priorities.

Donors and international development agencies (IFAD, EU41, World Bank, FAO42, WFP43, USAID, DFID, Howard G. Buffet Foundation, AGRA) have a high influence on policy implementation, as they support or fund programmes aligned with national policies. Currently only FAO has a very strong commitment to agroecological intensification, with most other funders supporting the country’s modernisation and commercialisation pathway. NGOs such as CARE International,44

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41 For more information, see: European Union, Where we work, Rwanda [https://ec.europa.eu/international-partnerships/where-we-work/rwanda_en](https://ec.europa.eu/international-partnerships/where-we-work/rwanda_en)
43 For more information, see: World Food Programme (WFP) in Rwanda. [https://www.wfp.org/countries/rwanda](https://www.wfp.org/countries/rwanda)
Concern Worldwide, International Alert, Women for Women International and others have relatively low influence, but are eager to support inclusive green development. The various agro-industrial companies generally have low interest in environmental issues, and high interest in generating profit. Their power and political influence vary. Some are local firms with limited capital and turnover, while others are multinational companies such as Yara Limited Rwanda that have significant lobbying power vis-à-vis the Rwandan government and/or international organisations.

A range of research organisations operate in the agri-food system in Rwanda, including CGIAR centres such as the International Institute for Tropical Agriculture (IITA), which has a low influence on policy but high interest in solutions that are both planet- and people-positive. Academic institutions such the University of Technology and Arts of Byumba (UTAB) have low political influence but high interest in PPPA through teaching and research.

There are currently a number of major agri-food system-related development initiatives underway, supporting national policy implementation. The majority of these are focused on productivity enhancement and value-chain development, often with a component focusing on organisational development and capacity building for farmers and their organisations. For example, the Feed the Future programme 'Hinga Weze' promotes soil conservation, integrated soil-fertility management and crop diversification; it also works with agro-input dealers to promote the judicious use of inorganic fertiliser and pesticides and new crop varieties.

8.2 Entry points for a transition to planet-positive agriculture in Rwanda

Rwanda's agricultural and environmental policies make a clear commitment to FNS for all, inclusive growth and sustainable natural resource management. However, challenges remain in terms of policy coherence across sectors, in particular between the agriculture and environment sectors, and with policy implementation. This has prompted a demand by key informants for updates to some policies. Because of Rwanda’s track record of political will with regards to pursuing sustainable national development objectives and good governance, a range of supporting programmes and projects exist that strongly align with government policies. But the emphasis remains on economic outcomes. The scope for radical transformation appears very limited in the current political context, with the government having set out a clear vision for the future and expecting development partners to align with and support that vision. Hence entry points for supporting PPPA consist of incremental steps that do not contradict the existing policy framework but contribute to its implementation in a PPPA-focused way via the following, perhaps in combination:

a) **Pilot innovative approaches** that support bottom-up identification, development and adaptation of context-specific solutions via experiential learning that involves farmers, other value-chain actors, researchers and regulators. Such a process could address current weaknesses in implementing technology-transfer approaches, providing lessons showing alternative ways of doing things; this would include a specific focus on inclusion of the poorest, and environmental sustainability.

b) **Develop the capacity of agri-food system actors** at all levels (farmers, processors, traders, extension staff, researchers, technical and managerial staff in government and private-sector agencies, and so on) to support and manage such bottom-up approaches of co-learning.

c) **Strengthen and support CSOs** (including consumer organisations, farmer organisations and environmental advocacy groups) advocating for PPPA-focused agricultural policies and programmes and to play their role in supporting the development of context-specific solutions under a).

d) **Policy harmonisation** to improve the alignment of agricultural and environmental policies to address inherent trade-offs between high external-input strategies and environmental sustainability.

e) Developing and using **relevant data and information** to inform decision making (design and implementation of interventions). Several recommendations emerging from the KIIs and workshop in

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45 For more information, see: World Concern Rwanda. https://www.concern.net/where-we-work/rwanda
47 For more information, see: Yara Rwanda Ltd: Agricultural input supplier (seed- feed- fertilizer- Agro-equipment) Kigali, Rwanda. https://agriprofocus.com/organisation/yara-rwanda- ltd
Rwanda focused on this, but lack a clearly articulated strategy for ensuring that databases are used for decision making\(^\text{48}\). Based on an analysis of the challenges, enabling practices and factors to address these, and existing actors and programmes, the points above all appear to offer entry points for the IKEA Foundation and similar medium-sized donors. They have a strong commitment to environmental sustainability and inclusion, and these actions are about strengthening the capacity to try out, adapt, learn and innovate beyond the business-as-usual paradigm currently promoted by many larger development actors and parts of the private sector. In all those actions, the emphasis would need to be on:

1. The poorest farmers and value-chain actors to ensure they benefit from development interventions and are not left behind. Considering that these farmers often have very limited parcels of land at their disposal, this may well involve supporting a transition to non-farm livelihoods.

2. A meaningful integration of environmental considerations in the design and implementation of agricultural projects and programmes, to ensure these are in line with Rwanda’s ambitious environmental policy. This should include a focus on making agroecological and circular farming practices economically viable.

3. Moving away from the technology-transfer mindset toward one of empowering and incentivising farmers and others in the value chain to make choices that enhance environmental sustainability in the longer term, rather than only emphasising the rolling out of particular technologies.

There seem to be specific opportunities in developing bottom-up mechanisms for farmer participatory research and extension, building on lessons from other parts of sub-Saharan Africa. One example is the Prolinnova network, which has country platforms in Ethiopia, Kenya and Uganda but none currently in Rwanda (Prolinnova, no date a). Bottom-up mechanisms would help address the disconnects between environmental-protection objectives on the one hand, and agricultural productivity and growth objectives on the other because at the farm and community level, sectoral silos don’t exist. This initiative would involve working with the following in order to build on successes in IPM and inclusive value-chain developments adapted to local contexts and informed by local knowledge:

- National farmer organisations
- Other national CSOs
- The Rwanda Agriculture and Animal Resources Development Board (RAB) as the main government agency for agricultural research, and
- Those parts of the private sector committed to PPPA outcomes.

Current agricultural strategies focus quite rightly on professionalising the agri-food system, with a narrow interpretation what ‘professional’ looks like in the context of poor small-scale farmers, processors and traders. Sector transformation can only be inclusive when those at the bottom of the pyramid — poor farmers, consumers and value-chain actors — make their voices heard in the development of solutions for the future.

\(^{48}\) There is a wide body of literature on evidence-based decision making, showing that the availability of data and information does not automatically lead to more informed choices/decisions, because of a wide range of factors that influence decision-making processes. See eg Jones et al. (2013).
9 Uganda

9.1 The state of play for PPPA in Uganda

9.1.1 The food and agricultural system in Uganda

Uganda has one of the youngest and fastest-growing populations in the world, with a median age of 15. Uganda’s population was about 40 million people by mid-2019 and is expected to grow at an average of 3% per annum (Uganda Bureau of Statistics, 2019). Uganda’s literacy level was 70% for people aged ten years and above, (Uganda Bureau of Statistics, 2019) which has a big influence on the country’s agri-food system. Uganda is a youthful country, with those aged under 30 accounting for almost 80% of the population. Youth unemployment, currently at 13%, is an ongoing challenge (National Planning Authority, Uganda, 2020).

Uganda is a tropical country with varied geography, covering 14 AEZs. These have been further divided into ten main AEZs (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2018; see also Figure 8). The characterisation of the different farming zones is determined by soil types, climate, landforms, topography, socioeconomic and cultural factors. Land degradation has reportedly increased in all AEZs due to poor agricultural land management, increased extreme weather events and population pressure. As a result, the AEZs are now experiencing varying levels of vulnerability to climate-related hazards such as drought, floods, storms, pests and diseases (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2018).

Figure 8 Agroecological zones of Uganda

Agriculture remains a significant contributor to Uganda’s economic growth and is predominantly driven by smallholder subsistence farmers, who account for nearly 70% of all farmers (National Planning Authority, Uganda, 2020). The sector’s contribution to GDP in fiscal year 2018/19 was 22% — second after the services sector (Civil Society Budget Advocacy Group, 2020). Agriculture employs about 72% of the total labour force, including disguised labour; 77% of these are women and 63% are youth, and most reside in rural areas. Its contribution to total goods export earnings in 2012–13 was 40% (National Planning Authority, Uganda, 2015).

Uganda has been considered the breadbasket of central Eastern Africa. The country is self-sufficient across a number of staples such as tubers and plantains, and exports maize and other cereals to nearby countries. According to the NPA (2015), the agriculture sector is dominated by food crops, forestry and livestock production, which account for 51.6%, 18.2% and 17.8% respectively. Furthermore, the country produces coffee, tea, cotton, cereals, bananas, livestock and fish products. There are enormous opportunities for agro-processing, which the country has not fully harnessed; most exports are in raw form (National Planning Authority, Uganda, 2015). Of total manufacturing, agro-processing contributes 39.3% (National Planning Authority, Uganda, 2020).

Uganda’s Third National Development Plan (National Planning Authority, Uganda, 2020) prioritised ten commodities due to their contribution to export earnings and their impact on nutrition and food security, namely coffee, tea, fisheries, cotton, vegetable oil, beef by-products, maize, dairy and cassava.

Agriculture in Uganda is mainly rain fed, which makes the sector highly vulnerable to weather variability, climate hazards (particularly droughts) and climate change. Frequent incidences of drought or extreme rainfall may result in reduced crop and animal productivity, biodiversity loss, and reduced farm yields which lead to food shortages, thus impacting human nutrition (Kimani et al., 2020). Food is largely available in most regions of Uganda except in Karamoja, East Central and West Nile where the key challenge is food access and utilisation. This has been attributed to low level of incomes, storage, inadequate nutritional awareness, cultural food preferences, poor sanitary and food preparation practices, and wastage of food during harvest periods due to festivities. (FAO, 2020).

Uganda lost over 60% of its forest cover in a period of 25 years from 4.93 million hectares in 1990 to 1.95 million hectares in 2015 (Uganda Bureau of Statistics, 2015). This has been attributed to over-reliance on biomass energy and population pressure; there is reported severe reduction in forest cover as well as wetland degradation and encroachment (National Planning Authority, Uganda, 2020).

9.1.2 Challenges facing the food and agricultural system

Uganda faces a number of challenges related to the agri-food system. In the researchers’ review of the literature and conversations with diverse stakeholders, they identified six crucial challenges, described below:

- Low productivity
- Climate change
- Deforestation and land-use change
- Food and nutrition insecurity
- High post-harvest losses and poor waste management, and
- Financial constraints.

**Low productivity**

The main challenge facing Ugandan agriculture is low productivity and low yields, which mainly result from low use of the right inputs and technologies (CIAT, BSF/USAID, 2017; Walker et al., 2018). According to the NPA (2020), only 4% of Uganda farmers use production-enhancing technologies such as improved seeds, fertilisers and other supportive services. For example, the rate of fertiliser application in Uganda is one kilogram/hectare/year compared to five kilograms/hectare/year in Tanzania. Because nutrients and organic matter are not replenished naturally at a fast enough rate, continued agriculture results in the degradation of soils (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2016a; Ministry of
Agriculture, Animal Industry and Fisheries, Uganda, 2015; Ministry of Water and Environment, Uganda, 2015). While the National Agricultural Research System (NARS) has generated a significant number of technologies, the majority of smallholder farmers have not accessed or adopted them (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2016a). This is reflected in wide gaps between the yield at research centres and that on farms (National Planning Authority, Uganda, 2020).

Low technology-adoption rates have been attributed to the fact that farmers are unaware of the technologies and their benefits, that technologies are not available when needed, and that they are not profitable (Odame et al., 2013). The problem of low input usage is compounded by the presence of poor-quality agricultural inputs for crop and animal production. For example, according to one of our interviewees, in the livestock sector, acaricides do not kill ticks, which are reportedly resistant to options available in the market. Fake seeds are another widespread problem leading to low yields: an estimated 30–40% of seeds on the Ugandan market are fake, and up to 65% are low-quality or non-certified seeds (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2015). Fake seeds exist in Uganda because of the weak seed regulatory system (Odame et al., 2013). The National Seed Certification Service (NSCS), mandated to police counterfeits, lacks the means to do so (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2015). Networks of seed dealers are weak, leading to high distribution costs and poor access for farmers, all of which means low uptake of certified seed. Low productivity is also attributed to reliance on rainfed agriculture, which renders farmers vulnerable to climate-change shocks such as prolonged droughts. The low agricultural productivity in turn affects food availability and nutrition outcomes for Uganda’s population (National Planning Authority, Uganda, 2015).

**Ongoing serious food and nutrition insecurity**

With high population growth, Uganda faces the challenge of feeding its people. Uganda scores 30.6 in the Global Hunger Index 2019 (Global Hunger Index, 2019b), which characterises the situation as “serious”, implying that many people suffer serious hunger and suggests Uganda is not yet self-sufficient in food production. Over the last 15 years, child stunting has been substantially reduced, with national prevalence dropping from 45% in 2000 to 29% in 2016. Despite this progress, much more effort is required to reduce the absolute numbers of stunted children in order to meet the World Health Assembly (WHA) targets by 2025. About 3.6% of children under five years of age are wasted, and more than half the children are anaemic, well above the WHO cut-off level for defining anaemia as a serious public health problem (≥40%). Furthermore, 32% of women of reproductive age are anaemic (Uganda Bureau of Statistics and ICF, 2018). Consequently, Uganda spends on average US$500 million on treating preventable diseases (Budget Speech, 2019). The Cost of Hunger Study in Uganda (World Food Programme (WFP) & AUC, 2013) estimated that about eight million adults of working age suffered from growth restriction before reaching the age of five (this represents 54% of that population). In 2009, undernutrition is estimated to have cost Uganda US$899 million (UGX1.86 trillion) (WFP & AUC, 2013). These losses were equivalent to 5.6% of GDP of that year.

**Climate change as a threat to agriculture**

Despite having among the lowest GHG emissions per capita in the world (CIAT, BSF/USAID, 2017), Uganda faces critical challenges as a result of climate change. Climate change is expected to lengthen dry spells and exacerbate drought (Intergovernmental Authority on Development — IGAD Secretariat 2019), affecting primarily small-scale farmers who do not have the means to respond adequately. For example, the climate trends for Uganda have manifested as increased temperature (an increase of 0.20°C per decade), reduced rainfall (8% lower between 1920 and 1969) and extreme weather events (Ministry of Agriculture, Animal Industry and Fisheries, Uganda 2018). Although this is a national issue, the effects vary in different areas. For example, extreme weather events already experienced include landslides in Bududa district in Eastern Uganda; more frequent and longer droughts than seen historically have been experienced in Western, Northern and North-Eastern regions (Ministry of Agriculture, Animal Industry and Fisheries, Uganda 2018); and flooding in Northern, Eastern and Central regions of Uganda, including Kasese district. Climate change is negatively affecting agriculture by increasing soil erosion, reducing yields and increasing crop losses (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2018).
Deforestation and land-use change

Despite the efforts to preserve natural forests as ecosystem and biodiversity centres, the country relies heavily on biomass energy. This has led to high rates of deforestation, reported at 2.3% per annum (Ministry of Water and Environment, Uganda, 2015). Deforestation destroys the carbon sink and at the same time emits carbon, implying that over time GHG emissions in Uganda will increase, exacerbating climate change (Ministry of Water and Environment, Uganda, 2015). The degradation of biodiversity hotspots including forests, lakes and parks is making food systems increasingly vulnerable to climate change.

High post-harvest losses and poor waste management

Food wastage and post-harvest losses due to limited value addition, poor post-harvest handling techniques and inadequate bulking and storage facilities (National Planning Authority, Uganda, 2020) accounts for 30–40% losses in grains and other staples, and 30–80% for fruits and vegetables. An important driver of this is the lack of standard storage facilities for smallholders; this leads to low-quality produce and unnecessary waste (National Planning Authority, Uganda, 2020). Agricultural waste, which includes crop residues and animal waste produced as by-products of agricultural activities (Sabiti, 2011), is an important renewable resource, which is usually underutilised. For example, Kampala accumulated 1,000 tons of organic waste, of which only 30% was collected and sent to a landfill (Sabiti, 2011). In interviews, key informants specifically pointed to poor waste management in abattoirs, which causes environmental pollution. Waste is not handled properly in urban areas by municipal authorities. For example, in Mukono District unrestrained dumping and poor waste management led to environmental pollution, spread of diseases and land degradation (Yusuf et al., 2019).

Financial constraints

The Agriculture Sector Strategic Plan 2015–2020 prioritised farmers’ access to agricultural finance (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2016a), yet the reality is different on the ground. Lack of capital prevents most farmers from acquiring appropriate sustainable-farming technologies. According to one interviewee, lack of funds also affect adoption of PPPA practices because the return on investment in sustainable-farming technologies is long term, yet financial institutions offer mainly short-term finance. Agriculture is deemed risky and most financial institutions are not keen on backing this sector. According to Benni et al. (2020), the Government of Uganda tried to support the agriculture sector by using tax exemptions and subsidies as incentives to increase lending to the sector. For example, it exempted them from tax on income earned by lending to agriculture and agro-processing investments. It also reduced the VAT on most agricultural inputs and services to zero. However, according to Benni et al. (2020) these tax incentives did not benefit farmers in the form of either reduced input prices, or increase access to finance. Instead they mostly benefited the banks and importers while denying the government revenue.

9.1.3 Addressing challenges through PPPA practices and approaches

The previous section illustrated the range of interconnected challenges faced by Uganda’s agri-food system. Uganda is still largely an agricultural country; with its growing population, it must improve productivity in a way that does not further deplete the natural resource base, while also withstanding the climate change crisis. PPPA could play a crucial role in addressing Uganda’s challenges sustainably.

In Uganda several PPPA practices and approaches are currently being implemented at different scales and with varying degrees of success. Our review of the literature and interviews with key stakeholders did not allow us to evaluate which of these PPPA practices have had success at scale, or have the potential to do so. This is due to several reasons. First, there is limited systematic data about the performance of different practices discussed below; the data, for now, is anecdotal or incomplete. Second, PPPA terminology is not widely used, and many of the terms used to describe these practices, for example CA, cover several existing practices that may not be labelled as PPPA. Finally, the absence of evidence about clear frontrunner practices or those with the biggest potential is itself indicative of a movement that is in its early stages. Different stakeholders are testing and promoting multiple practices, sometimes overlapping with each other. This review suggests there are no clear winners — yet.
Some key PPPA approaches and practices currently being implemented in Uganda are listed below, with explanations as to how they address the different challenges described in section 9.1.3. At the end of this section is a partial, and subjective, assessment of the conditions that seem to enhance the potential for their use and scalability, according to follow-up interviews with key stakeholders.

1) Seeds and inputs

To improve access to higher-quality seeds, local NGOs and international organisations have promoted the development of local seed businesses. The approach is to foster the exchange of locally open-pollinated seeds that can be regrown, and/or carefully selected indigenous seeds that are better suited to local climate variability. It is estimated that improved seeds accessed through the formal sector take up 15% of Uganda’s total cultivated land area while the informal sector takes up the remaining 85% (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2015). Crops grown from improved seeds under the formal sector include maize, sunflower, sorghum, rice, beans and soybean. The informal sector, on the other hand, provides farm-saved seed from previous season’s crops and community-based seed multiplication and dissemination (Kansiime & Mastenbroek, 2016). The informal sector consists of mainly self-pollinated crops such as rice, millet, legumes like cowpeas, groundnuts and green grams “for which it is easy to maintain genetic purity through successive generations” and propagated vegetative crops such as Irish potato, sweet potatoes, cassava, bananas and various tropical fruit trees (Kansiime & Mastenbroek, 2016). The government highly recommends the use of improved, nutrient-dense and diversified seeds, breeds and stocking materials that can tolerate drought, are resistant to pests and disease and/or have higher yielding capacity (Ministry of Agriculture, Animal Industry and Fisheries, Uganda, 2015). These would also contribute to meeting the nutritional needs of the population.

2) Land and soil management

Currently several approaches are being used in Uganda to improve land and soil management with a view to enhancing productivity with low inputs. Conservation agriculture, known for its ability to improve soil fertility and yields (Kaweesa et al., 2018), is a practice that encompasses the principles of minimum soil disturbance, maintaining a soil cover through mulching with crop residues or planting cover crops and practising crop rotation, early planting and terracing (Kaweesa et. al., 2018). A study in Southwestern Uganda (Fungo et al., 2011) found that nearly half of farmers surveyed used soil conservation practices. The most common practices include crop rotation, used by over 85% of those surveyed, intercropping (72%), cover crops (70%), manure application (64%) and terraces (62%). According to interviewees, these practices are implemented to varying degrees in Uganda, depending on demographic factors such as affordability and labour requirements, topography and crops grown, but are not currently used by more than about 10% of farmers. For example, crop rotation is thought to be widespread, as it is a traditional practice used with beans and millet, but interviewees perceived mulching and intercropping as less common.

Spaces in urban centres are small so to produce crops with high output, people have turned to mandala gardens, sack gardens and staircase gardens. Adapted and diversified crop varieties have been adopted in urban farming techniques as they are easy to manage even in prolonged droughts (UNFCCC, no date). Urban gardening is currently sporadic, but the interviewees believe it is picking up speed in large urban centres, noting for example the appearance of rooftop gardens in Kampala.

To a smaller extent, pests and diseases are managed using IPM.

3) Water management

The focus of water management is on increasing access to water for production through small-scale irrigation and water harvesting schemes and setting up permanent planting basins. In addition, planting of adapted crop varieties is promoted (UNFCCC, no date). Agroforestry systems are among the most common climate-smart practices promoted in the country to improve productivity, diversification of production, food and nutrition security and resilience to climate hazards (CIAT, BSF/USAID, 2017). According to a study in South-Western Uganda (Fungo et al., 2011), about 40% of surveyed farmers use rainwater harvesting.
4) Reducing deforestation

Tree planting, silvopastoral systems and agroforestry are means used to counteract rampant tree cutting and effects of climate change (World Bank, 2019b). A recent report from World Agroforestry (ICRAF) suggests that up to 90% of smallholder farmers in Uganda plant or maintain trees in their plots, but there is no systematic data on how these trees are used or the contributions they make (Kiyingi et al., 2020). A number of organisations have promoted cooking methods that do not depend on charcoal — one of the country’s main drivers of deforestation. There is no systematic information on the adoption of different cooking technologies, but according to key informants, energy-saving stoves are common in urban centres. A recent study of such stoves in rural Uganda (Hoigt, 2019) found that people are generally attracted to the concept, but that building the stoves is still seen as too expensive or complex for many.

5) Reducing post-harvest losses

To reduce post-harvest losses, maintain nutritional value and improve product shelf life, a number of SMEs are participating in value addition and agro-processing. It is at this stage that foods are fortified to include micronutrients (Government of the Republic of Uganda, 2011). Participants in the validation workshop and some key informants (KI) recommend the establishment of bulking and value-addition centres in communities to promote farmer participation and inclusion in value chains. The dairy sector has a number of milk collection centres spread through the cattle corridor; this has greatly reduced milk losses and eased farmers’ access to markets (National Planning Authority, Uganda 2020). Stakeholders in the validation workshop suggested that farms and agribusinesses should apply circular agribusiness principles such as reduce, reuse, recycle to reduce total waste in production systems.

6) Farm household self-sufficiency

Local and international organisations in particular have promoted kitchen gardens as a way to improve household food security, increase dietary diversity and improve nutrition. There are no systematic accounts about the scale of kitchen garden use around the country, but some evidence suggests they are relatively common. For example, a study of farms in Mpigi District in central Uganda found that about one third of households use kitchen gardens (Tumwesigye et al., 2017). An assessment of farmer field schools in Kiboga District found that up to 70% of participating households established a kitchen garden (Mfitumukiza et al., 2017). These numbers do not show the whole picture, but point towards a relatively easy and low-cost way to improve household food and nutrition security.

7) Livestock production

Sustainably managed livestock production can play an important role in a PPA framework. Practices such as silvopastoral systems, adoption of improved breeds, improved feeding regimes, grazing land management, and integration of biogas and other livestock present good opportunities to improve livelihoods and reduce agricultural emissions in the country — especially considering that livestock production is one of the highest contributors of agricultural GHG emissions in Uganda. Silvopastoral systems (where trees and shrubs are interspersed among fodder crops), rotational grazing and fodder conservation are all examples of practices used to regenerate degraded land. We lack systematic data about nationwide adoption of these practices, but according to interviewees these have generally not been widely adopted. Livestock dung has been used to produce household biogas, particularly in intensive zero-grazing systems as a climate change measure (CIAT, BSF/USAID, 2017). The need to promote indigenous livestock breeds that have adapted to the climate of arid and semi-arid regions should be emphasised.

8) Trade and finance

In Uganda, an inclusive market-systems approach targeting and engaging women and youth has been successfully used in the coffee value chain and is being piloted in the piggery value chain by the International Livestock Research Institute. Value-chain development can be an important way of linking smallholder farmers to higher value markets, as well as providing better skills, knowledge and access to financial and other services (Grant 2015).
9.1.4 PPPA enabling conditions

At least on paper, Uganda has a partially supportive environment for PPPA. While national policies tend to prioritise productivity gains through conventional agriculture, there are several other instruments promoting sustainable approaches. However, the gap between policy and implementation is one with several obstacles.

National-level policies and instruments

The agri-food system policy framework in Uganda includes the plans, policies and strategies listed in Table 11. If implemented, these policies could support PPPA. However, the driving agenda for the national strategic documents is to increase agriculture productivity and incomes through increased access to conventional inputs and mechanisation. While PPPA practices are mentioned in sections of the policy documents, a transition towards PPPA is not their primary objective so it is not mainstreamed in all policies and plans.

The Uganda Vision 2040 and the Agricultural Sector Strategic Plan lay out the most important, and at the same time most conventional, guidelines for the sector. The overarching ambition is to move away from subsistence, low-input and low-productivity farming towards modern, commercial agriculture. Other policies, especially those related to climate change adaptation, more explicitly cover issues related to sustainable agriculture, diversification and conservation and are thus potentially more likely to enable PPPA.

Many stakeholders during the webinar noted that, while the policies were good, they were poorly implemented or enforced. For example, while the national land policy aims to protect marginal land and fragile ecosystems such as riverbanks, swamps, shorelines and hilly areas, farmers continue to practise farming in these areas due to population pressure and the need to meet food demand (Ministry of Lands, Housing and Urban Development, Uganda, 2006). There is also inconsistency between policy and national implementation plans and strategies. For example, agriculture zoning was developed in 2016 but Uganda is not functioning according to agriculture zones. Moreover, most policies are not gender nor climate change mainstreamed.

Table 11 Key strategic policy documents relevant to PPPA in Uganda

<table>
<thead>
<tr>
<th>Name</th>
<th>Relevance for PPPA</th>
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<tbody>
<tr>
<td>Vision 2040 Main national policy-planning document (2013)</td>
<td>Envisions transformation of smallholders from subsistence to commercial production in 30 years</td>
</tr>
<tr>
<td>Agriculture Sector Strategic Plan (2015/2016–2019/2020)</td>
<td>Prioritises increased production and productivity; improved access to mechanisation and inputs; improved market access; and increased value addition</td>
</tr>
<tr>
<td>National Agricultural Policy (2013)</td>
<td>Stresses access to seeds, agrochemical inputs, water and mechanisation</td>
</tr>
<tr>
<td>The National Climate Change Policy (2015)</td>
<td>Promotes resilient and sustainable agricultural systems for climate adaptation</td>
</tr>
<tr>
<td>National Seed Policy (2018)</td>
<td>Regulates and promotes availability and access to high-quality seed</td>
</tr>
<tr>
<td>National Agricultural Extension Strategy (2016)</td>
<td>Promotes knowledge transfer for increasing productivity</td>
</tr>
<tr>
<td>Food and Nutrition Policy (2003) and Nutrition Action Plan (2011)</td>
<td>Aims to ensure food and nutrition security; promotes dietary diversity and consumption of indigenous foods</td>
</tr>
<tr>
<td>National Adaptation Plan for the Agricultural Sector (2018)</td>
<td>Promotes climate-resilient and diversified agriculture and livestock; promotes value addition and storage</td>
</tr>
<tr>
<td>National Biodiversity Strategy and Action Plan (2016)</td>
<td>Aims to reduce biodiversity depletion due to agriculture, and promotes agrobiodiversity</td>
</tr>
</tbody>
</table>
Stakeholders mentioned budgeting, prioritisation and lack of coordination between agencies as some of the reasons for poor implementation. KIIs confirm that plan implementation is weak, largely due to lack of a coordination mechanism and a monitoring and evaluation structure, plus a low level of dissemination, and underfunding. The success of these plans and policies promoting PPPA needs concerted effort by all stakeholders such as the government, development partners, NGOs, farmers and the private sector. The government is supposed to play a central role in encouraging and coordinating the drivers of agricultural transformation, namely agricultural advisory services, farmer-based organisations and farmer agency, access to credit and markets, budget allocations for food and agriculture, access to PPPA technology and inputs, enhancement of value addition and food and nutrition activities at community level.

Role of the private sector in PPPA promotion

The private sector plays a key role in developing PPPA products and practices. There are a number of private-sector companies that have developed and are selling solar and energy-saving technologies and producing biofertilisers and eco-friendly alternatives to pest and disease control (see Box 4). In addition to multinationals and local companies that invest in good agricultural practices, some more traditional actors like maize traders are also investing in more sustainable sourcing. Rather than being driven by high-end consumer demand, these traders expect better quality and handling, which leads to less spoilage. Some NGOs have promoted PPPA practices while others have supported the private sector in promoting PPPA practices, but these efforts are lacking in terms of spread and adoption. There is still a need to invest in the promotion of PPPA practices at scale.

Research and development in PPPA promotion

Uganda has several universities and research organisations, including NARO, the National Agricultural Research Organisation, which work on research and development in the agricultural sector. We identified two main challenges for the PPPA agenda. First, research, especially that driven by NARO, focuses on fairly conventional agricultural practices for yield improvements through external inputs. Second, while some technologies have been successfully tested, uptake at the farm level remains low. This is attributed to poor dissemination and a weak extension system. Wide gaps exist between yield output at the research stations and that actually produced on the farms.

Educational context in PPPA promotion

While agricultural advisory services are prioritised in the various sector policies and plans, evidence shows that this is one of the existing gaps in PPPA promotion, due to limited extension staff and funding. While Uganda’s Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) is meant to provide advisory services through the National Agricultural Advisory Services, this is not happening. Most smallholder farmers do not have access to advisory services and cannot afford those of the private sector. Knowledge is limited regarding PPPA benefits, leading to negative mindsets towards those practices.

PPPA investment and finance

The Government of Uganda, NGOs and the private sector provide funding to the agriculture sector through, for example, the Agriculture Credit Facility, the Uganda Development Bank and the Private sector Foundation Uganda. These address skills and credit needs of targeted agricultural sectors. As much as these kinds of financing are useful, most are deemed inaccessible to the majority of the farming community because of the stringent measures required to qualify for them. Only a few big farms and firms are able to access them. In addition, credit from the financial institutions come with unfavourable terms, for example high interest rates and collateral such as titled land. These exclude much of the farming

Box 4  Business case: Rural Community in Development (RUCID)

Rural Community in Development (RUCID) is a social enterprise located in Mityana, Uganda. It specialises in producing biofertilisers, aiming to improve agricultural productivity using locally available resources. “Our crops are performing very well, farmers are adopting because they are able to see the results,” says Mr. Nyanzi, the founder. Some biofertiliser benefits include long-term improvement of soil fertility; easy replication by farmers once they trained for a fee; a business opportunity for young people since biofertiliser demand exceeds supply; an opportunity to use waste; and support for circular systems and reduced use of chemicals.
community, especially women who do not own land. The agriculture sector is deemed high risk and is not targeted by financial institutions.

**Farmer organisations** are channels through which farmers can access services such as training in PPPA approaches and practices, markets, finance and food and nutrition promotion. Farmers in the coffee and dairy sector are organised in cooperatives but such organisation is lacking for other sectors. The existing cooperatives are farmer owned and farmer driven but have capacity gaps in terms of being successful organisations. NUCAFE, the national coffee growers’ union, offers some positive experiences (Box 5).

### Box 5 National Union of Coffee Agribusinesses and Farmer Enterprises (NUCAFE)

NUCAFE is the national umbrella organisation of coffee farmers in Uganda. It is formed by coffee-farmer cooperatives and associations and includes some 200,000 households organised in 123 groups and associations. NUCAFE uses the farmer-ownership business model, which promotes value addition to coffee before it leaves the farmers’ hands. NUCAFE works on the principle that farmers should own the coffee through the various value-chain stages to improve quality and value. FOM includes smallholder farmers who add value to, and maintain ownership of, their coffee through stages such as drying, milling and processing and sell at a profit at different value-chain levels. The model also promotes sustainable production and gender inclusiveness. (NUCAFE, no date)

### 9.1.5 PPPA-relevant stakeholders, actors, and programmes

Multiple agri-food system stakeholders have relevance — current and potential — to advance the PPPA agenda. Government institutions can be influenced on policy formulation and implementation and to some extent on raising financing and implementing PPPA practices. But the government is not a monolith: it’s a collection of often-competing institutions with varying degrees of power. In Uganda, national government institutions have a lot of power to advance a PPPA agenda, but their interest and commitment in doing so varies. Our assessment is that Parliament and the Ministry of Agriculture have less interest in PPPA relative to the Ministry of Water and Environment. Low interest is partly a function of other priorities, expressed as a lack of funding or poor intersectoral coordination.

Our analysis suggests that smallholder farmers and MSMEs have little power to influence the PPPA agenda due to lack of resources, organisation and coordination, and in general they have little interest in doing so. A number of private organisations and large-scale farmers are seen to have a lot of interest — for example, they have invested in projects and programmes that promote PPPA practices and approaches — but have little influence. Some large farms and food corporations have a lot of influence due to the level of taxes they pay and the number of jobs they create, but PPPA is not their primary objective and their interest in it is low. There is a need to engage and interest this category of actors.

The following is a list of agriculture-related networks, alliances and platforms that have the potential to convene and coordinate a number of agri-food system actors to facilitate learning, information dissemination and influence policies.

- **PELUM.** Supports improving livelihoods of smallholder farmers and promotes sustainable farming, works with NGOs that work with farmers. Consists of 59 member organisations, both local and international. Current coordinator of a platform on ecological agriculture in Uganda and has a Google group for this.
- **AgriProFocus.** Aims to “create a space for networking and to facilitate learning amongst agriculture stakeholders, building sustainable partnerships, sustainable food systems, stimulating long-term collaboration and improving the business environment”.
- **Prolinnova Uganda.** An NGO-led initiative to develop a national learning network to promote local innovation in ecologically oriented agriculture and natural resource management.
9.2 Towards a transition to planet-positive agriculture in Uganda

Uganda faces a significant agricultural productivity gap, the ramifications of which affect people’s livelihoods, food and nutrition security, land use and economic output. It is therefore not surprising that increasing productivity is a top priority for the government, donors and the international community. Achieving this important goal in an environmentally and socially sustainable way is the crux of PPPA in Uganda.

Closing the productivity gap in a planet- and people-positive way will involve a range of approaches, including enhanced soil and water management, crop diversification, reliance on drought-resistant varieties and breeds, improved seeds, and the conservation of biological diversity. The current environment is only partially conducive to this type of sustainable transformation. Below is an outline of the key entry points for improving the enabling conditions for PPPA.

Entry point: build on existing initiatives and activities

Some building blocks for closing Uganda’s productivity gap sustainably are already there. Techniques such as proper soil management, avoiding slash and burn, composting, mulching and the use of manure fertiliser are already part of the traditional farming repertoire. Agroforestry is also used traditionally, as it meets multiple needs such as fuel, construction material and for controlling soil erosion. Concepts such as CA put new labels on some of these existing practices, so it is important to understand what is already happening and what is already working. However, it is also clear that current approaches have shortcomings because they are not being used consistently or at large-enough scale. There is scope for improving all these practices, as the farming context changes over time, for example due to climate change.

Entry point: existing solutions are accessible, affordable and culturally appropriate

An additional benefit of the existing knowledge described above is that it is already socially acceptable behaviour. According to many interviewees, this is an important feature of successful approaches. Practices are more widely used when materials are easily available and technologies affordable (as in the use of biogas), or when the entry costs are low, as with value adding/processing. Uganda’s natural wealth offers an opportunity to use abundant local materials. Traditional seed banks and exchanges are other successful low-cost examples. It is important to note that not all socially accepted behaviours are positive. For example, traditional patriarchal structures lead to stark gender inequality. Likewise, resources such as land are likely to become increasingly scarce as the population grows, so some practices may become less, rather than more, accessible.

Entry point: develop capacities, especially for farmers

While many promising approaches to addressing the productivity gap in a sustainable way already exist and could be scaled up, the lack of training and capacity on the part of the poorest farmers remains a critical bottleneck. The funding of conventional extension services is an obvious entry point for enhancing the knowledge and skills of farmers. But lasting change can’t depend on government-backed extension. Supporting innovation in skill sharing and farmer-to-farmer learning exchanges is a vital step in increasing the reach of many of the approaches described above.

Entry point: support the private sector without waiting for the government to act

Uganda has a dynamic entrepreneurial sector. Much innovation in food and agricultural systems is being driven by private actors, from investors in value chains to traditional cereal traders and home processors. While not all innovation aligns with PPPA, many entrepreneurs are finding and exploiting business opportunities that are based on sustainable agricultural practices. As described above, the government’s policies are largely supportive of conventional agriculture, and change in effectiveness and implementation is slow and difficult to achieve. Much of the innovation documented in this report in terms of sourcing, skill transfer and finance has happened despite, rather than thanks to government policy. Donors and international organisations have a role in leveraging and supporting some of these high-risk activities.
Entry point: leverage climate change policy

National policies prioritise conventional agricultural practices including inputs and mechanisation, but some more recent policies — especially those related to climate change adaptation — open windows of opportunity for PPPA approaches. The Ugandan government has made international commitments to progressive climate mitigation and adaptation policies. For example, the national climate-change adaptation strategy offers a framework for increasing resilience in agriculture and an opportunity to promote PPPA practices and approaches. While these are far from being properly implemented and financed, they provide civil society and international organisations with leverage for demanding accountability and improvement. Lobbying that seeks to take the government at its word on climate policy offers opportunities for better implementation, budgeting, monitoring and evaluation.
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