SPARC
Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises

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SCOPING PAPER

INNOVATIONS FOR PASTORALISTS AND AGRO-PASTORALISTS IN FRAGILE AND CONFLICT-AFFECTED SETTINGS

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We thank all those who took the time to speak with us and share their reflections on developing and nurturing innovative approaches and technologies. The quest for innovation can detract from the day-to-day process of testing and refining approaches and technologies to meet end-user needs and price points that lead to sustained use and application of the approach or technology. Some of the businesses and products identified during the innovation mapping exercise are no longer operating or available in the marketplace. For some, the approach or technology was ahead of its time whilst others failed to raise the capital necessary to successfully refine and scale. We appreciate and admire the passion and dedication that goes into developing innovative approaches or technologies. We also thank the researchers, investors and policy advisors who shared their thoughts on fostering innovation and facilitating an environment that encourages risk and innovative solutions. Finally, we thank the reviewers for their invaluable feedback.

The interpretations and opinions expressed in the report are not necessarily those of the people we interviewed, nor of the Supporting Pastoralism and Agriculture in Recurrent and Protracted Crisis (SPARC) programme and its consortium members. The authors are solely responsible for any errors and omissions.

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ACRONYMS

ASAL	Arid and semi-arid land
FCAS	Fragile and conflicted-affected settings
IBLI	Index-based livestock insurance
ILRI	International Livestock Research Institute
NGO	Non-governmental organisation
SMS	Short message service
SPARC	Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises
USSD	Unstructured supplementary service data

EXECUTIVE SUMMARY

In the dryland areas of East and West Africa, protracted and recurrent crises undermine rural livelihoods and damage agricultural systems, leading to food insecurity and malnutrition. Conflict and environmental vulnerability affect an increasing number of people, especially those already living in poverty. Given this context, programmes and policies that build resilience are critical. This includes helping people (including women) reduce their exposure to, withstand or recover from shocks during and after protracted or recurrent crises (including climate change).

Within recurring and protracted humanitarian crises, especially in fragile and conflict-affected settings (FCAS), there remain gaps in approaches, programmes and policies that build the resilience of agricultural livelihoods and communities. Instances where promising approaches and technologies are further adapted or replicated for wider reach and impact are limited or not well documented.

Innovative solutions are necessary in such dynamic contexts. Innovation, at its core, is about doing business differently, and in the context of international development this means completely new or improved or contextually adapted approaches, technologies and techniques, as well as ways to think about an issue that create value[1] for diverse groups of people across wide geographies.

As part of its early implementation phase, the Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises (SPARC)[2] programme identified innovations for pastoralists and agro-pastoralists in arid and semi-arid lands (ASALs) and FCAS. For the purpose of this research and throughout SPARC's implementation timeframe, we consider innovation as i) the development of new solutions, ii) improvements on existing solutions or iii) advancements in product or service design, processes or business models. Additionally, there are innovations in mental models that deal with changes or adjustments to how we think about the way the world works, or challenge assumptions or how we think about things. New or adapted mental models are less common than the type of innovations listed above. As of March 2021, research on this project did not identify examples of innovations in mental models coming from or being applied to FCAS. Innovations that transform the way we think about FCAS may exist, but we did not identify them during our landscape analysis.

This scoping paper presents key findings from the SPARC review of the innovation landscape specific to FCAS contexts (referenced as the innovation landscape analysis for the remainder of the report). We identified and carried out a rapid analysis of 38 unique innovations to understand:

1. what products, process and services are being provided

2. who is innovating and where do they operate

3. what distribution channels are in use

4. what business models and partnerships are most relevant to enable these innovations.

The innovation landscape analysis sought out social innovations, as well as those in digital and non-digital products and technologies. Researchers prioritised innovations that established proof of concept and are ready to reach wider use, or that had attempted to grow but failed. Research on this project indicates that innovations that typically receive wider attention are those that are developed or led by international non-governmental organisations (NGOs) and businesses or multilateral institutions. Innovations that are engineered by communities, institutions and businesses, and social enterprises do exist but they have smaller networks to external audiences.

This initial analysis also finds that:

- Innovations span value chains and thematic areas, for example: supply-chain innovations on customer acquisition and distribution channels; product innovations that drive access to markets, finance and information; digital technology and analogue solutions; or gender-intentional innovations.

- Pastoral livelihoods remain underserved and marginalised, despite their centrality to local and regional economies in drylands (70% of Africa's rural dryland population is either partially or entirely dependent on pastoral and agro-pastoral livelihood activities) (de Haan, 2016). Meaningful and scalable innovations originating from or directed towards pastoralists and agro-pastoralists in ASALs and FCAS are emerging; however, when compared to agricultural areas with higher rainfall, these are still relatively few or, more likely, under-appreciated with limited exposure outside the immediate community or context.

- Many innovations are digital technologies focused on providing extension services and information, as well as tools for better asset management. Innovations to increase access to financial tools (such as distribution models, partnerships and digital technologies) remain nascent and are mostly focused on providing insurance. Similarly, access to stable, high-value markets remains a significant challenge. Few social innovations or technologies are able to overcome chronic challenges (e.g., insecurity, poor infrastructure and low literacy levels) in ways that meaningfully build trust, reduce transaction costs or further incentivise uptake.

- For digitally enabled innovations, low-tech platforms – such as analogue radio, short message service (SMS) and unstructured supplementary service data (USSD) – remain the most effective distribution channels for ensuring scale and product adoption, given that between 80% and 90% of households in sub-Saharan Africa have easy access to radio (Hudson et al., 2017) and mobile phone penetration is estimated at 75% (Elliott, 2019).

There is a general lack of research that incorporates the heterogeneity of pastoralist and agro-pastoralist communities while identifying the factors that contribute to the success of innovations. This presents a juncture for development actors, governments and the private sector to explore the diversity of needs and opportunities that, when addressed, can sustainably promote the inclusivity and economic or social well-being of pastoralists and agro-pastoralists.

Research on this project has identified outstanding questions with which businesses and institutions continue to grapple. Cross-cutting questions include:

1. Beyond addressing immediate shocks and stresses, what innovations can promote long-term economic and other well-being outcomes for pastoral communities, and break the cycle of poverty and vulnerability to shocks?

2. What enabling environment is required to scale up impactful innovations in ASALs and FCAS?

3. What innovations currently exist for smallholder farmers that can be extended to agro-pastoralists and pastoralists in ASAL and FCAS contexts?

4. What role do pastoralist women and young people (under 25 years) play in enhancing the resilience of pastoral livelihoods? What innovations are relevant to women and youth, and to what extent are these innovations responsive and/or transformative with respect to gender and age?

SPARC aims to expand the evidence base through research on innovative approaches and technologies currently in operation in ASALs and FCAS. Lines of inquiry will include: i) understanding the attributes that make innovations successful; ii) identifying opportunities and challenges to scaling; and iii) opportunities or challenges that, if addressed earlier, would have strengthened the innovation. In partnership with innovation leads and owners, SPARC will conduct research and/or develop case studies on innovations in context that can help generate knowledge and improve innovations in the future. There is an opportunity to compare findings from across SPARC-led research on individual innovations and context analysis to draw actionable recommendations to strengthen the innovation ecosystem. Examples could include identifying common elements of success or failure, factors that precipitate a willingness to take risk or build for change, and core elements of innovations that stimulate or necessitate changes in policies or regulations.

From SPARC's innovation landscape analysis, the following factors of success have been identified:

- Innovation in fragile contexts and at the last mile[3] requires that service providers take a holistic approach and offer a suite of services.

- Patient or long-term capital[4] is important to nurture innovation. There is a dearth of private or philanthropic investors or investment mechanisms operating in the drylands.

- Development actors play a significant role as innovation partners, particularly in de-risking innovation for products and services that target underserved populations, such as poor and low-income pastoralists and agro-pastoralists, as well as women.

- Partnerships with the private-sector, community-based organisations, research institutions and government are key to ensure innovations reach scale and are sustainable.

- Market intelligence, convening for review and discussion, and information dissemination can shape the ecosystem and concentrate activity and resources that support innovation.

SECTION 1

INTRODUCTION

Innovation, at its core, is about doing business differently. In the context(s) of international development and humanitarian relief, this means new innovations that create value – at scale – where the value created is primarily social impact, but it could also be economic. Innovation might include products, services, processes, business models and technologies. Yet not all innovations work, and not all of those that do, do so at scale. In particular, we do not fully understand which innovations are appropriate in ASALs and FCAS; their feasibility to be replicated at scale in dynamic development contexts; or indeed the effectiveness of innovations geared towards supporting the resilience of pastoralists and agricultural and transitional livelihoods.

The SPARC Innovation Research Facility sets out to co-create, curate and broker evidence on which innovations are most relevant, impactful and scalable (when, where and how); and on which types of policies or operating environments enable the success of these innovations in an ASAL/FCAS context. The value of the Innovation Research Facility goes beyond the collection of evidence for individual, innovative interventions. While individual innovations tend to be based on rapid feedback and learning cycles (i.e., lean start-up models), many promising innovations have been unsuccessful in achieving scale or lasting change. This can be traced back to the lack of a strong business case to drive investment, and limited awareness among donors, governments and other decision-makers regarding which innovations hold the most promise for solving priority problems in agro-pastoral contexts.

Therefore, SPARC aims to fill important knowledge gaps in how to design more effective and innovative programmes that can be replicated across a wider area or reach larger populations; and to inform policies that increase agro-pastoralist and pastoralist resilience to recurring shocks and protracted crises and conflict. We believe proof-of-concept innovations and those that have recently expanded their reach can speak to these knowledge gaps. Prior to launching deeper research and learning around specific innovations, two steps were needed:

1. Examine the innovation ecosystem relative to FCAS, including creating a portfolio of innovations that show high potential to contribute to better policies and programmes.

2. Index innovations based on evidence on what works, why, under what circumstances and at what scale so that such evidence is understood and informs the decisions of donors, host governments, private-sector actors, investors and other scaling agents.

SCOPE OF THIS PAPER

From September 2020 through to February 2021, as part of its early implementation phase, the SPARC programme mapped innovations for pastoralists and agro-pastoralists in ASALs and FCAS. Known as the innovation landscape analysis, the exercise was conducted to assess the current state of innovation in the drylands and to capture lessons and ideas to apply to future research. This scoping paper outlines the major findings of that exercise.

The main objective of the innovation landscape analysis was to survey the innovation landscape and larger ecosystem through: i) curating innovations for pastoralists and agro-pastoralists in the Horn of Africa and the Sahel, and the needs they address; ii) identifying and building relevant partnerships; and iii) mapping business models, where data was available, against a common framework. In doing this, we uncovered innovations ranging from financial products and services to innovative business and service delivery models, as well as new process approaches.

In this paper, we share emerging insights on the enabling factors for successful pastoral innovations, as well as opportunities for further research and intervention. It is our intention to set the scene for discussions with and amongst investors, as well as innovators, in the drylands in order to stimulate greater knowledge exchange, and to increase understanding of the current state of the innovation environment. We expect that this research will help identify relevant innovations that are the most appropriate for building the resilience of agro-pastoralists and pastoralists in ASALs and FCAS.

STUDY METHODOLOGY

The innovation landscape analysis was conducted primarily through desk research and interviews with experts from the private and public sector, and research institutions. Annex 1 highlights institutions and programmes that i) focus on innovation in African agriculture, ii) operate in FCAS, and/or iii) were interviewed for the analysis.

The objective of the research was to understand:

1. what innovations exist in ASALs and FCAS, what problems they solve, and who is providing these products and services or making innovative partnerships

2. what distribution channels are most relevant and effective for providing these products and services

3. what business models and partnerships are necessary for the adoption and scale of such innovations

4. what knowledge and information gaps exist that development practitioners need to be aware of in order to better understand innovations in ASALs and FCAS.

As part of the innovation landscape analysis, SPARC carried out a review of existing literature to capture what is known about the innovation landscape specific to dryland agricultural systems and factors attributed to the successful scaling of innovations. Working through existing networks to identify key informants, we consulted with 15 experts (service providers, researchers and development practitioners) and reviewed industry reports and relevant websites to shortlist 38 innovations. We then spoke with innovation leads and reviewed the websites or relevant documentation of shortlisted innovations to gather the insights presented in this scoping paper. We recognise the following limitations of this study:

- As this study was conducted primarily via desk research and through expert interviews, the information obtained is likely skewed towards innovations that are available on the internet and/or that have reached significant scale. Subsequently, the innovation landscape analysis should be considered a living document to be updated and informed through expanded networks and direct contribution by stakeholders throughout SPARC's lifecycle.

- Due to limited access (as a result of geographic distance, language barriers and/or lack of digital footprint), the study identified fewer innovations in the Sahel. Over the course of the programme, SPARC expects to engage more researchers based in the Sahel in order to gather insights into innovations from that region.

In June 2021 we sought additional feedback on our initial findings and solicited greater insights (integrated in later sections of this report) through the 'Innovative Solutions to Strengthen Resilience in the Drylands' session at the 'Global Landscapes Forum Africa Digital Conference'.[5]

SECTION 2

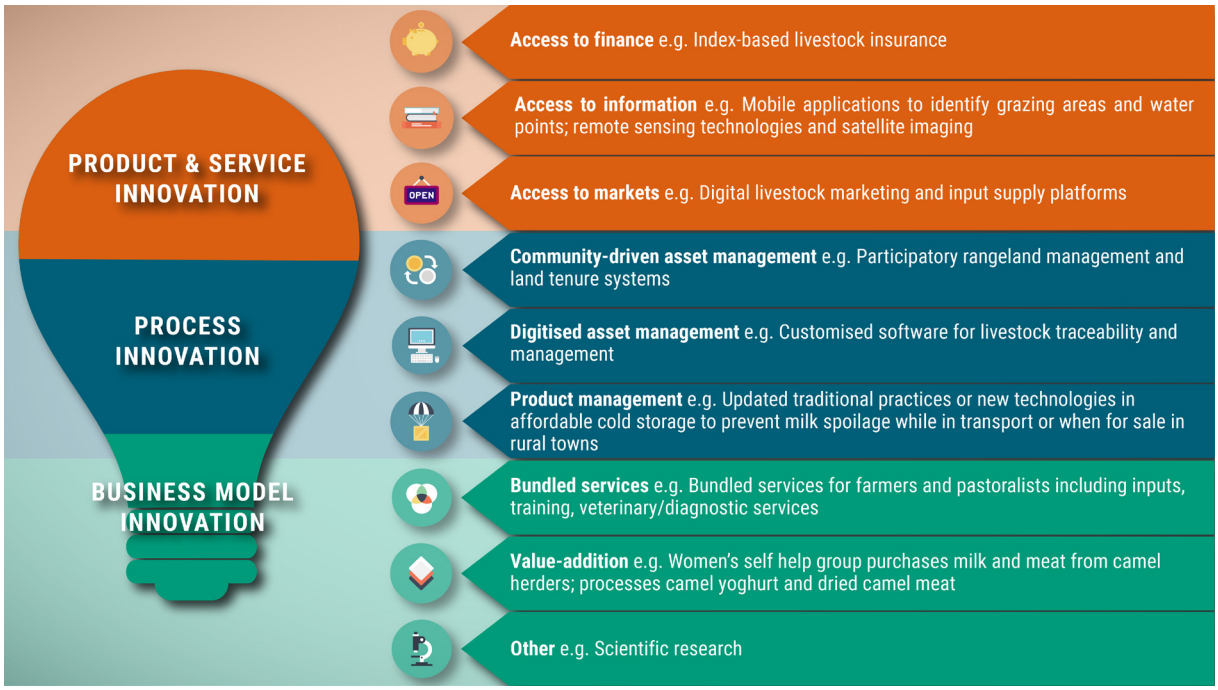
INNOVATIONS FOR PASTORALISTS AND AGRO-PASTORALISTS IN FRAGILE AND CONFLICT-AFFECTED DRYLANDS

DEFINING INNOVATION IN THE PASTORALIST AND AGRO-PASTORALIST CONTEXT(S)[6]

For the purposes of this research and throughout SPARC's implementation, we consider innovation as: i) the development of new solutions; ii) improvements on existing solutions or iii) advancements in product and service design, processes or business models. Innovations can be engineered by NGOs, businesses and social enterprises, academic and research institutions, or local populations and civil society organisations. We looked at innovations in technology as well as social innovations.

Innovations may transect entire value chains and therefore traverse themes. Examples include supply-chain innovations on customer acquisition and distribution channels; product innovations that drive access to markets, finance and information; digital technology and analogue solutions; or innovations with a gender lens. Figure 1 shows an initial typology for innovations in the pastoralist and agro-pastoralist context(s).

FIGURE 1. TYPOLOGY OF INNOVATIONS IN THE PASTORALIST AND AGRO-PASTORALIST CONTEXT(S)



Source: SPARC

KEY FINDINGS FROM THE INNOVATION LANDSCAPE MAPPING

Through a review of secondary information and chain-referral sampling, 38 innovations were identified as serving pastoralists and agro-pastoralists. Of these, 13 were identified as either being digital technology or using it. We assessed all innovations to understand: i) what products, processes and services are being provided; ii) who is innovating and where do they operate; iii) what distribution channels are in use; and iv) what business models and partnerships enable these innovations.

What products, processes and services are being provided?

After identification and initial vetting, innovations were separated by typology (Figure 1) and further classified by the specific nature of the innovation. Identified innovations range from entire products that increase access to markets through to new business models and processes. See Annex 2 for a list of the innovations. Figure 2 summarises the number of innovations per typology identified through the landscape analysis.

The innovations reviewed as part of this research were developed to take advantage of emerging opportunities, to address a chronic problem or to address the need to sustain in a challenging operating environment. Common themes surfaced after broad comparison across the innovations and during interviews with industry experts and innovation leads.

Overall, most of the innovations focus on providing bundled services or access to information through a network of field officers, radio or mobile phones. These innovative services have undergone several iterations and have wide use. Financial services are included within many of the bundled services, especially when the service uses mobile phone technology. Only a few innovations provide access to finance (e.g., development bonds, loans) without some other products or services. The success of these financial products has been limited, however, and the reasons for poor adoption or use is not apparent. Several tools (innovations) are attempting to improve or modernise asset management (e.g., livestock and land), but these either remain poorly adopted or failed to reach wide use.

There are tools for land management (such as LandPKS) and agro-ecology practices (through partners like the Savory Global Network[7] and Acacia for All[8]) but, similar to tools for asset management, adoption of these has been limited.

Innovations providing direct access to stable, high-value markets by individual producers remain a significant challenge, with limited scaled or sustained innovations. Digitally enabled trading platforms (e.g. myAnga and mifugo.trade) have been set up to provide market linkages for pastoralists, but these have either been slow to scale or have been considered deadpooled.[9] Although NGOs seek to facilitate more direct market linkages, which would enable producers to capture a larger share of the overall value, incentives for sustained cooperation remain limited.

FIGURE 2. NUMBER OF INNOVATIONS PER TYPOLOGY IN THE PASTORALIST AND AGRO-PASTORALIST CONTEXT(S)

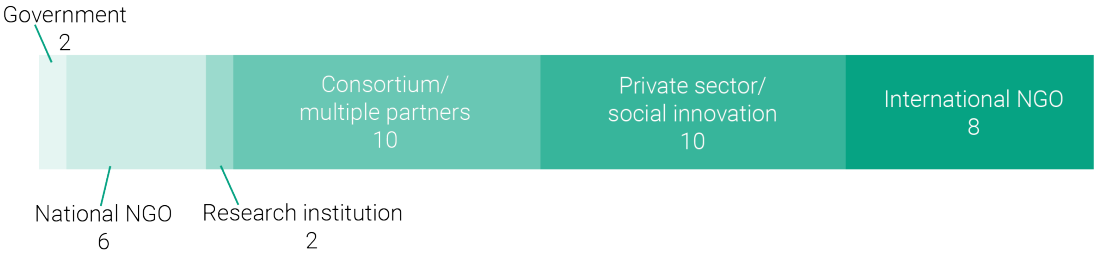
	Product & service innovation	Process innovation	Business model innovation
Access to finance	2		
Access to markets			4
Access to information	4		3
Asset management	2	2	
Product management	1	1	
Governance	3		
Value-addition			2
Bundled services	5		3
Knowledge management	1	2	
Partnership model		3	1

Source: SPARC

Who is innovating and where do they operate?

Nearly half of the innovations identified in this study (18 out of 38) have been designed and launched by international NGOs or consortia of international and national institutions in partnership with the private sector (both corporate and social enterprises). There are very few published innovations managed by community-based organisations in FCAS. We recognise that the first round of innovation sampling may be biased to under-report innovations emerging from community-based and civil society organisations that have smaller networks or a smaller presence online. Future innovation identification efforts will attempt to compensate for any bias. Figure 3 provides a breakdown of the innovation developers reviewed as part of the study.

FIGURE 3. BREAKDOWN OF INNOVATION DEVELOPERS



Source: SPARC

Examples of innovations from the categories above include:

Consortium/multiple partners:

- The Climate Livestock and Markets (CLIMARK) project deployed a blended agri-weather information system for local pastoralist communities in northern Kenya and southern Ethiopia. Consortia partners include multilateral research institutions (International Livestock Research Institute (ILRI), Technical Center for Agriculture and Rural Cooperation CTA) and private-sector organisations (AmfraTech,[10] aWhere, Crescent Takaful Sacco[11]) (CTA, n.d.).

Private sector/social innovation:

- Pula partners with governments, insurance companies and global reinsurance firms, and increasingly crop and livestock input suppliers, to insure farmers and livestock owners against a wide range of climatic risks, including drought, excessive rainfall, pests and diseases (Pula, 2020).
- Laitière de Mauritanie (now known as Tiviski) in Mauritania was Africa's first camel milk dairy. It sources raw camel, cow and goat milk from smallholder, livestock-owning households to produce fresh processed and ultra-heat treatment (UHT) milk, yoghurt and cheeses (Tiviski, n.d.).

International NGOs:

- Project Concern International (PCI)[12] developed the AfriScout mobile application through its Satellite Assisted Pastoral Resource Management (SAPARM) programme. The app disseminates maps generated by satellite data and crowd-sourced verification to pastoralists in Ethiopia and Tanzania to help them find grazing land (PCI, 2021).
- SNV launched the mobile application Garbal through its Sustainable Technology Adaptation for Mali's Pastoralists (STAMP) and STAMP+ projects. Garbal uses satellite data to disseminate rangeland and market information to pastoralists in Mali (Hoefsloot, 2018).

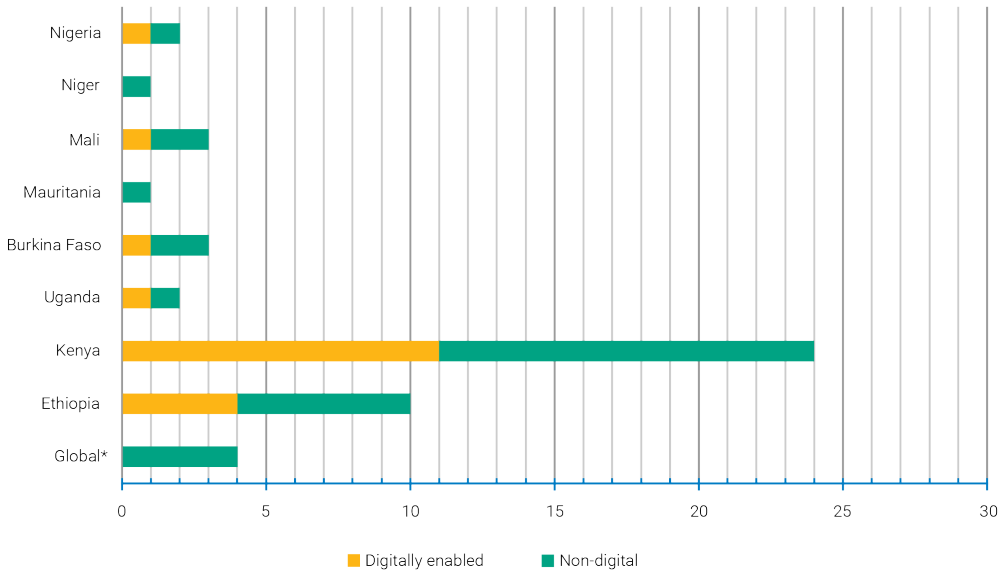
The search for existing innovations centred on the SPARC focus regions of East and West Africa. As such, the identified innovations operate in eight countries with four operating globally (see Figure 4). We find that Kenya and Ethiopia are the most advanced markets in terms of the number and breadth of documented services offered to pastoralists and agro-pastoralists.

What distribution channels are in use?

Innovation developers and service providers are using a range of distribution channels to reach pastoralists and agro-pastoralists, including:

- donors and development programming
- women's social networks (e.g., producer cooperatives, self-help groups)
- radio
- SMS/USSD primarily through feature phones
- smart phones (the relatively high cost of smart phones has historically discouraged development of innovations for pastoralists and agro-pastoralists using this distribution mechanism).

FIGURE 4. NUMBER OF INNOVATIONS REACHING PASTORALISTS AND AGRO-PASTORALISTS IN ASALS AND FCAS IN EAST AND WEST AFRICA



Note: *'Global' meaning innovations operating within SPARC priority regions, but also in use in other parts of the world.
Source: SPARC

What business models and partnerships enable these innovations?

Strategic partnerships are a critical driver for the design, uptake and scale of innovations for pastoral communities. The prevalence of consortia, especially as innovations are being developed and tested, is an indication of the need for diverse skills and roles to work in complex environments.

In the innovation design phase we are seeing partnerships with research institutions, such as ILRI, as key to designing innovative financial services (e.g., index-based livestock insurance (IBLI)), as well as to scientific advancements that support the development of improved forage varieties[13] and that inform livestock breeding[14] to increase livestock productivity. Once an innovative product or service proves it achieves its intended purpose, partnerships with government can accelerate uptake and sustain use by ultra-poor and poor end-users. In Kenya, for example, the government with ILRI and others to adapt IBLI and provide it through the Kenya Livestock Insurance Programme (KLIP). This partnership was important for promoting adoption of IBLI because the government covered the cost of insurance premiums under state-sponsored social protection programming. Product sustainability in relation to the continuation of subsidies requires further investigation, including defining 'sustainability' when extending asset protection services to ultra-poor and poor people.

Mobile network operators can also play an important role when developing an innovation and when an innovation is ready to reach a wide set of users. For instance, in Mali and Burkina Faso, the mobile network operation (MNO) Orange provides the foundational infrastructure and enables payments for GARBAL under the STAMP(+) projects in Mali and Mobile Data for Moving Herd Management and better incomes (MODHEM) in Burkina Faso (Hoefsloot, 2018). Identifying motivations and incentives for all partners is critical to building and maintaining win-win partnerships over the long term.

DIGITAL TECHNOLOGIES IN ASALS AND FRAGILE SETTINGS

Technology has revolutionised our lives globally; in emerging markets and low-income countries, the use of mobile phones has become ubiquitous and provides services that would typically be inaccessible, especially to rural communities. However, it is less understood how far digital technological solutions have penetrated ASALs and FCAS, and to what extent these solutions have been successful in building the resilience of their users and mitigating the impact of recurring shocks, protracted crises and conflict.

From the original pool of 38 unique innovations, we identified 13 digitally enabled solutions (computer-based technologies – both products and services) for pastoralists and agro-pastoralists. Key findings from these digitally enabled solutions include:

1. Most of the digital technological innovations that exist in ASALs and FCAS focus on providing extension services and information about markets.
   - Low-tech platforms, such as radio and USSD/SMS are the main platforms used to deliver this content. In sub-Saharan Africa, 80–90% of households have access to radios, and mobile phone penetration is estimated at 75%. With increasing penetration of affordable smart phones, a growing number of digitally enabled services are being developed for use via apps and/or online portals; however, low literacy remains a barrier to widespread use (Kebebe, 2019; World Bank, 2020).
   - There is limited wide-reaching or sustained innovation around market access services and supply-chain management. There is an opportunity for service providers, in partnership with potentially non-traditional partners, to develop platforms that can facilitate better market linkages to both local and export markets (IDIA, 2019; Kim et al., 2020).

2. Innovations in digitally enabled financial products and services are nascent, but more mature products and services are beginning to reach rural FCAS communities.
   - The main digital financial services offered are mobile money management platforms (savings, transfers, lending) and IBLI. The availability and use of mobile money platforms remains varied across FCAS contexts. Investments in physical service providers (e.g., cash-in/cash-out agents) and their availability of cash (agent liquidity) can reduce current obstacles and ease use of beneficial financial services especially in remote settings (Hernandez et al., 2020).
   - Tech-driven micro-insurance products, such as IBLI, are offered to individuals through private-sector firms. In the case of IBLI, product development occurred in partnership with private and public institutions to become a readily available product. Private insurance companies struggled to keep consumer prices low while also covering the

high transaction costs common when reaching remote and widely dispersed consumers. In 2014, Kenya's Ministry of Agriculture, Livestock and Fisheries and partners ILRI and the World Bank adapted IBLI for macro-level coverage: one policy covering tens of thousands of poor pastoralist households as part of the government's social protection programming (Warner and Alemu, 2018). Compared to other financial products, IBLI is a commercial product that has applications as a public good; it protects the livelihoods of vulnerable households.

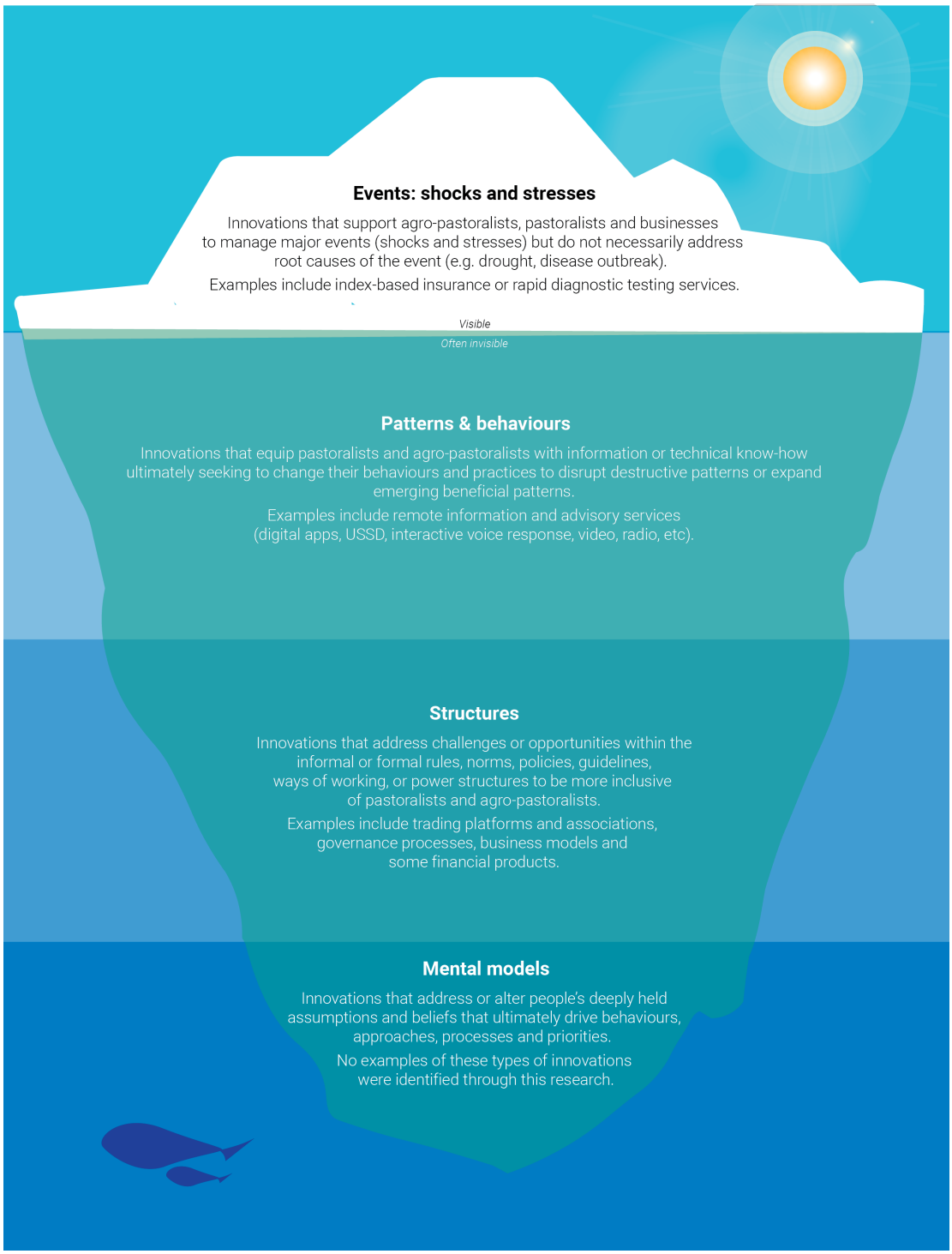
EXPANDING THE REACH OF INNOVATIONS FOR WIDESPREAD DEVELOPMENT: BUILDING ON LESSONS LEARNT

Many of the innovations in ASALs and FCAS focus on addressing shocks and stresses ('the tip of the iceberg,' as seen Figure 5), and not the root causes of the challenges that agro-pastoralists and pastoralists face. Few innovations have expanded outside of their immediate region or are viable without external resources.

There is a significant gap in solutions that can address structural challenges and 'mental models' that limit long-term economic and other well-being outcomes for pastoral communities. Mental models are frameworks or perspectives that we use to understand societal rules, values and, in some cases, how we engage with one another. Dominant 'views of the world' impact how we prioritise investments and efforts, evaluate data and visualise future success. A shift in mental models might include innovations that challenge the generalised view of pastoralism as unproductive and in constant crisis, instead nudging perceptions to prioritise innovations that value the contribution of pastoral and agro-pastoral livelihoods.

Mental models could value the contribution of pastoral and agro-pastoral livelihoods and would not set out to 'transform' pastoralism but, rather, build upon its strengths in dryland systems. For example, innovations that encourage herders to settle or change livestock production systems can aggravate problems of local overgrazing and resource conflict, without generating many tangible gains (Little et al., 2008). Instead, is there an opportunity to design financial and information-sharing products that protect and leverage livestock wealth, or that facilitate strong governance and inclusivity? The tangible innovations are the financial products. When these are developed in concert with a mental-model innovation that frames livestock keepers as asset-rich but not cash-fluid, the financial product changes. In this example, the tangible innovation addresses the specific need of capturing and securing seasonal revenues (sales), or wealth, to either make them available during times of need or diversifying them into quicker-return income streams.

FIGURE 5. MANY INNOVATIONS FOCUS ON ADDRESSING ONLY THE TIP OF THE ICEBERG



Source: SPARC

There is a general call for more investment in innovation in order to meet development challenges and pressures due to climate change; however, innovative technologies alone cannot address issues of wide-spread reach, use and sustainability. Despite the growing body of knowledge surrounding agricultural innovations, gaps remain in dryland-specific solutions and practical insights into the challenges of scale.

Existing literature from academic and institutional researchers recognise these gaps and stress the importance of an 'innovation systems approach'[15] moving forward (Kumar et al., 2016; Pigford et al., 2018). An innovation systems approach stimulates and facilitates the interaction of actors and their networks across sectors, and it leverages institutional arrangements in the promotion of innovations. 'Innovation happens as a result of the interplay of actors (e.g. firms, government, research institutes, NGOs, etc.) situated in networks and contextualised by institutions (e.g. formal rules and regulations as well as norms and values)' (van Welie et al., 2020: 335). Findings and lessons learnt from programmes that support innovations mirror these same challenges (IDIA, 2019). To facilitate adoption and long-term sustainability while reaching larger populations, it is critical to better understand and address the political, institutional, economic and social factors that shape the systems in which innovations are implemented.

Infrastructure and policy should enable innovation

Exemplifying the call for greater investment in innovation, the World Bank (2020) asserts that agricultural innovations can reduce costs and access inequalities, provide more data and faster, improve farmers' decision-making, and make small-scale farmers more competitive. It stresses the importance of also investing in the larger system, including greater focus on underlying infrastructure and policy. According to the World Bank (ibid.), digital solutions make up over 75% of (perceived) scalable agricultural innovations; and that without more investment in digital ecosystems, few emerging digital solutions will achieve wide-spread impact that is inclusive of pastoralists and agro-pastoralists. Investment in broader infrastructure can help overcome barriers to product adoption and continued use; in its research, the Boston Consulting Group identified roads, digital telecommunications networks and electrical supply as specific areas for improvement in Africa (Maher, et al., 2021).

Beyond infrastructure, the World Bank (2020) includes policy recommendations for governments in its research. Some of these recommendations are for investing in data collection, access policies and platforms; for e-agriculture strategy and e-governance systems; and for enabling policies for telecommunications infrastructure and agri-technology start-ups. Building enabling policy for innovation can have positive effects across stakeholder groups. For instance, based on empirical evidence on how young people engage in the rural economy of sub-Saharan Africa, Abay et al. (2021) suggest that investment and policy interventions that improve the overall economy and infrastructure should be prioritised over interventions that specifically target young people.

Contextual solutions should bridge sectors and institutions

Weak, siloed sectors and institutions can stifle innovation and hinder scalability. Grounded in the agricultural innovation systems approach, Kebebe (2019) analysed factors that led to slow technological change and innovation in the Ethiopian livestock sector. He finds that weak entrepreneurship, knowledge diffusion, market development and policy advocacy contributed to the low adoption of livestock innovations. Kebebe concludes that technology and economic opportunities are not enough; instead, changes along livestock value chains, such as strengthening producer bargaining power and improving access to markets for more tangible returns on investment, are necessary to overcome barriers to adoption.

Building upon the same agricultural innovation systems approach as Kebebe, Pigford et al. (2018) argue that integrating 'innovation ecosystems thinking' into existing systems could lead to improved sustainability, and thus they suggest a hybrid 'agricultural innovation ecosystems

approach' that would recognise the role of multiple stakeholders and power dynamics, expand the definition of innovation actors, and connect innovation systems across scales, paradigms and sectors. The authors underline the potential of this new perspective, which is centred on innovation niches and alternative forms of agriculture, to loosen the hold of normative paradigms in industrial agriculture and to find stronger solutions to challenges. Nevertheless, they note that gaps remain on how to operationalise this new approach.

In Africa's drylands, agricultural and pastoral livelihoods are affected by compounded shocks and stressors that span humanitarian, development and peace issues. While many agricultural innovations in these contexts fit neatly into the development sector, humanitarian institutions do engage in innovation as well. Elrha (2017), in its phase one mapping exercise of the Global Prioritisation Exercise for Humanitarian Research and Innovation (GPE) initiative, finds that innovations by and large focus on rural natural hazards, mostly in the health sector, followed by food security and early recovery. Overall, gaps in humanitarian innovation arose in multiple areas including partnership, coordination, focus outside response phases, displacement, and environment and climate. This parallel innovation sector could be an opportunity to develop context-specific solutions to complex issues.

Partnerships with local institutions support user-centric design and greater contextualisation

Through a systematic literature review, Totin et al. (2018) find that discussions of climate-smart agriculture skew towards more quantifiable investment factors, such as knowledge infrastructure, market structure and hard institutional aspects. They highlight the existing knowledge gap in how historical, political and social factors affect adoption, and thus the scalability and sustainability of innovations. This focus on social context is echoed by several other researchers and development practitioners (Ngwenya and Hagmann, 2011; Adenle et al., 2019; IDIA, 2019) and has been coupled with a call to strengthen the partnership and local ownership of innovations for more user-centric design (IDIA, 2019; OECD, 2020).

It is standard that innovation design must be centred on the end-user to ensure that products and services meet user needs, aspirations and behaviours (Grist and Harvey, 2017; AgriFin, 2020; World Bank, 2020). Identifying a business case from the onset and, after proof of concept, charting its pathway to widespread reach are important steps to ensure the viability and sustainability of the innovation (AgriFin, 2020; World Bank, 2020). Still, innovators must move beyond user needs and business cases to consider the larger system in which innovations can be implemented to stimulate user adoption. Partnership with local institutions borne from local operating norms strengthens the innovation's contextualisation and appropriateness (IDIA, 2019; Kumar et al., 2016).

Krishnan et al. (2020) underline the importance of context and stakeholders' experience of the effects of agricultural innovations to create appropriate policy and implement innovations. Similarly, Wiggins et al. (2021) argue that focusing on technological innovations alone is insufficient for policy; instead, a broad review of the operating and enabling environment in which the innovation will function should practically frame and contextually ground technology within the lives of farmers, their communities and realistic value chains. Policy should thus include the participation of multiple stakeholders and mitigate risk by resolving market failures. Wiggins et al. (2021) call for researchers to focus on the understudied private sector and small, or informal, enterprises in supply chains within the organic innovation experiments taking place across Africa. Specifically, within the context of vulnerability and climate change

in the drylands, Galvin (2021) observes transformational adaptation in response to pressures among pastoralists and offers scenario planning among multiple stakeholders as an important method in answering the 'who, how and why' of change. King et al. (2019) identify West and North Africa as areas with a particular lack of understanding around socio-ecological systems, ultimately calling for a systems approach to better situate solutions, and therefore innovations, in drylands contexts.

Partnership has emerged as a key factor in understanding the social context and improving sustainability. King et al. (2019) argue that innovators and project managers must bridge social capital and trust to ensure meaningful iteration of human-centred design that builds and maintains confidence among participants. Notably, the authors stress the importance of research integrated throughout the development processes with local partners rather than research that says what development should look like, in order to better contextualise knowledge and solutions, build local partnerships and foster the co-production of knowledge. Similarly, Kumar et al. (2016) review the Consultative Group on International Agricultural Research's (CGIAR) investment in innovation platforms in the drylands using an innovation systems approach, with a focus on local partnership and stakeholder inclusion. They find that, through innovating by doing in situ, innovation platforms helped implement and co-design farming systems, facilitated non-linear relationships among actors, and promoted the capacity and ownership of stakeholders.

Innovation success factors

There is a general lack of rigorous research surrounding the factors that contribute to the successful growth and adoption of innovation. The following are early anecdotal success factors that have been observed in recent innovation programmes:

- Innovation in fragile contexts and at the last mile requires that service providers take a holistic approach and offer a suite of services, given the limited number of service providers operating in these areas (AECF, 2018).
- Patient or long-term capital is important to seed innovation (AECF, 2018).
- Development actors play a significant role as innovation partners, particularly in de-risking innovation for products and services that target underserved populations, such as smallholder farmers and women (IDIA, 2019).
- Partnerships with the private sector, community-based organisations, research institutions and government are key to ensure innovations reach scale and are sustainable (Banerjee et al., 2019; Ruhweza, 2020).
- Market intelligence, convening for review and discussion, and information dissemination can shape the ecosystem and concentrate activity and resources that support innovation (IDIA, 2019; Krishnan et al., 2020).

Based on the literature and interviews in the innovation landscape analysis, the lack of innovations identified that successfully broadened their reach and impact could be due to the critical importance of context when implementing innovations. This points to the need for further investigation to confirm any cross-cutting barriers to success.

SECTION 3

CONCLUSION

EMERGING INSIGHTS ON ENABLING FACTORS FOR SUCCESSFUL PASTORAL INNOVATIONS

As part of the innovation landscape analysis, we assessed success factors for innovations to identify and understand relevant business models and enabling policies and principles. These insights are preliminary and will be validated through research with SPARC innovation partners. Key elements of successful business models for innovations for agro-pastoralists and pastoralists in ASALs and FCAS include:

- Strategic partnerships between non-traditional partners such as governments, mobile network operators, donors and research institutions to address dryland-specific opportunities and challenges, enable innovations and expand their reach (e.g., strategic subsidies to overcome high investment costs of building cash-liquid, mobile money agent networks to continue to operate during periods of peak demand for pay-out services).

- Public resources and patient capital to bridge lengthy timelines before innovations grow sufficiently to be self-sustaining and to stimulate innovation in poorly reached locations or underserved populations. Innovation can be very expensive, and partners may not be able to absorb the costs. Public resources and philanthropic investors de-risk maturation of innovation for private and social innovators. There remains a huge opportunity to invest in more nascent regions for innovation, such as the Sahel. Although there are examples of innovation that have emerged by necessity, these have not been communicated widely necessarily and do not receive the attention or resources needed to scale.

- Bundling products and services to i) reduce transaction costs and increase value gained by end-users in dryland communities and ii) bridge the gap between dryland and other communities in order to drive product adoption and use (e.g., insurance with inputs and/or information).

- Designing market-driven innovations tailored to the (semi-)nomadic lifestyle of agro-pastoralists and pastoralists, as well as leveraging existing infrastructures (such as women's social networks) that can drive uptake of innovative solutions.

- An enabling environment to foster innovation, including but not limited to policy and regulatory openness, existing infrastructure (including mobile phone networks and roads) and a robust marketplace that drives an appetite to invest in innovations in ASALs and FCAS.

OPPORTUNITIES FOR FURTHER RESEARCH AND INNOVATION AREAS

Pastoral livelihoods remain underserved and marginalised, despite their centrality to local and regional economies in ASAL (70% of Africa's rural ASAL population is either partially or entirely dependent on pastoral and agro-pastoral livelihood activities). Greater attention is needed to learn from the innovations emerging from and operating in the ASAL and FCAS context(s) to inform policy and future investment.

From the interviews conducted under the innovation landscape analysis, six questions stand out with which investors, service providers and development practitioners grapple:

1. How might service providers achieve sustainability and impact? How do they increase the value gained by end-users to, in turn, increase recurrent adoption and use?

2. How might service providers manage the high cost of service delivery at the last mile? What distribution channels (digital and analogue) are cost effective yet impactful?

3. Beyond addressing immediate shocks and stresses, what innovations can promote long-term economic and other well-being outcomes for pastoral communities, and break the cycle of poverty and vulnerability to shocks?

4. What enabling environment is required to expand the reach of impactful innovations in ASALs and FCAS?

5. What innovations currently exist for smallholder farmers in higher rainfall and more stable areas that can be extended to agro-pastoralists in ASAL and FCAS contexts?

6. What role do pastoralist women and young people (under 25 years) play in enhancing the resilience of pastoral livelihoods? What innovations are relevant to women and youth, and to what extent are these innovations responsive and/or transformative with respect to gender and age?

Through its Innovation Research Facility, SPARC will continue to stimulate discussions with existing innovation hubs, social investors and influential stakeholders in the agriculture innovation space and advocate approaches and technologies borne from and adapted to ASAL or FCAS contexts. SPARC will partner with innovators and experts to conduct research that investigates the questions above. This consortium will seek to generate evidence on what works, why, under what circumstances and at what scale, as well as to bridge the gap between the experiences of individual innovations and those of larger innovation ecosystems. We will ensure that SPARC research is relevant, timely and generates discussions that inform the decisions of donors, host governments, private-sector actors, investors and other scaling agents.

ENDNOTES

1 In this case, the value that is created is primarily within the realm of social impact, but it could also be economic.

2 See http://www.sparc-knowledge.org/.

3 The 'last mile' describes the geographical segment of delivering goods and services to customers/consumers. Often used in reference to rural and remote populations, last-mile distribution logistics tend to be complex and costly to providers of goods and services who deliver to these areas.

4 With patient capital, the investor is willing to make a financial investment in a business, often an early-stage enterprise, with no expectation of returns in the short term; the investor is willing to forgo an immediate return for returns in the longer term.

5 See https://events.globallandscapesforum.org/africa-2021/.

6 The '(s)' at the end of pastoralist and agro-pastoralist context is used deliberately to emphasise the diversity even within drylands and FCAS.

7 See https://savory.global/our-mission/.

8 See https://arab.org/directory/acacias-for-all/.

9 'Deadpooled' is a term given to a start-up that fails to raise the necessary funds before self-sufficiency.

10 See https://amfratech.com/.

11 See https://www.crescentsacco.com/products.html.

12 In September 2021, PCI merged with Global Communities. See https://globalcommunities.org/press-releases/global-communities-pci-complete-merger-2/.

13 The ILRI Genebank in Addis Ababa, Ethiopia, holds a diverse collection of forage accessions and related information (it conserves approximately 19,000 accessions of over 1,000 species). It makes this available as part of a global system of genetic resources conservation and sustainable use. See https://www.ilri.org/research/facilities/ilri-genebank.

14 The Centre for Tropical Livestock Genetics and Health (CTLGH) supports programmes that improve livestock-based livelihoods in the tropics. It is a strategic alliance of ILRI, the Roslin Institute at the University of Edinburgh, and Scotland's Rural College. See https://www.ctlgh.org/.

15 The innovation systems approach uses a pre-defined analytical tool or framework that enables the analyses and understanding of the innovation process with the aim of finding out the institutional configurations that best support innovation for beneficial economic outcomes (Lundvall et al., 2009).

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ANNEX

TABLE A1. OTHER PROGRAMMES FOCUSED ON INNOVATIONS FOR DEVELOPMENT*

Innovation programme	Programme description
WFP World Food Programme	The WFP Innovation Accelerator sources, supports and scales high-potential solutions to end hunger worldwide.
MERCY CORPS AGRIFIN	Mercy Corps AgriFin Program leverages the prevalence of digital technology to develop digital products and services that smallholder farmers need to increase their productivity, incomes and resilience.
UNCDF	UNCDF's Financial Innovation Lab design and manage Challenge Funds to find and support solutions that help promote inclusive and connected digital economies.
USAID FROM THE AMERICAN PEOPLE	Development Innovation Ventures (DIV) is USAID's open innovation programme that invests in breakthrough solutions to the world's most intractable development challenges.
FEED THE FUTURE	The Feed the Future Innovation Labs draw on the expertise of top U.S. universities and developing country research institutions to tackle some of the world's greatest challenges in agriculture and food security.
HDIF	The Human Development Innovation Fund (HDIF) is catalysing the development of new models of service delivery, the use of new technologies, the involvement of new providers and the establishment of new partnerships, with a focus on the private sector and public-private partnerships.
aecf	The Africa Enterprise Challenge Fund (AECF) is a development institution that supports businesses to innovate, create jobs, leverage investments and markets in an effort to create resilience and sustainable incomes in rural and marginalised communities in Africa.
HIF Humanitarian Innovation Fund elrha	Elrha is a global charity that finds solutions to complex humanitarian problems through research and innovation.
GSMA	The GSMA Innovation Fund for Mobile Internet Adoption and Digital Inclusion supports innovative digital solutions in emerging markets.

Note: *as of December 2020.
Source: SPARC

TABLE A2. INNOVATIONS IDENTIFIED THROUGH THE INNOVATION LANDSCAPE ANALYSIS

Digitally enabled	Type of innovation	Approach category	Innovation name	Lead organisation
✓	Product & service	Access to information	AfriScout	Project Concern International (PCI)
✓	Product & service	Access to information	GARBAL	SNV Netherlands Development Organization
✓	Product & service	Access to information	SimPastoralist	Feed the Future Innovations Lab for Markets, Risks & Resilience
✓	Product & service	Asset management	Index Based Livestock Insurance (IBLI) / Index-based drought risk financing (IBDRF)	ILRI
✓	Product & service	Asset management	Land Potential Knowledge System (LandPKS)	US Department of Agriculture
✓	Product & service	Bundled services	myAnga	Amfratch
✓	Product & service	Bundled services	Jaguza Livestock App	Jaguza Farm
✓	Product & service	Bundled services	VetAfrica Mobile; VetAfrica Hub; VetAfrica Expert	Cojengo
✓	Product & service	Governance	Kenya Livestock Insurance Program (KLIP)	Government of Kenya
✓	Product & service	Governance	Community Inclusion Currencies	Grassroots Economics
✓	Product & service	Access to markets	Mifugo Auction	PRASOL Consult
✓	Product & service	Access to markets	mifugo.trade	Mifugo Trade Ltd
✓	Product & service	Bundled services	Index Based Agriculture Insurance	Pula
	Product & service	Access to finance	Mifugo Kash Kash	Crescent Takaful SACCO
	Product & service	Access to finance	Community Enterprise Development Impact Bond (CEDIB)	Great Vision Research and Consultancy (GVRC) Limited
	Product & service	Access to information	Feed Assessment Tool (FEAST)	ILRI
	Product & service	Bundled services	Green Roads for Water	MetaMeta
	Product & service	Bundled services	Agro-ecology/holistic farming	Acacia for All
	Product & service	Governance	Northern Rangelands Trust (NRT)	Northern Rangelands Trust
	Product or service	Knowledge management	Savory Hub Network	The Savory Institue
	Process	Asset management	Farmer Managed Natural Regeneration	World Vision Australia
	Process	Asset management	Holistic Management and Holistic Planned Grazing	Africa Centre for Holistic Management
	Process	Knowledge management	Innovations in Outcomes Measurement (IOM)	TechnoServe
	Process	Knowledge management	Resilient Rural Livelihoods in Ecologically Fragile Drylands of the Sahel	Groundswell International
	Process	Partnership model	CLIMARK Project	CTA
	Process	Partnership model	Sustainable Technology Adaptation for Mali's Pastoralists (STAMP+) / Mobile Data for Moving Herd Management and better incomes (MODHEM)	SNV Netherlands Development Organization
	Process	Partnership model	The Zeer Pot - local fabrication	Mohammed Bah Abba
	Process	Product management	Camel milk cooling – Sisal wrapped containers	Yabello Pastoral and Dry land Agriculture Research Center
	Business model	Access to information	The Smallholder Farmers Rural Radio Station	Smallholders Foundation
	Business model	Access to information	Pastoralist Field Schools	FAO (East Africa)
	Business model	Access to information	Farm Radio	Farm Radio International
	Business model	Access to markets	Livestock business hubs	CLIMARK
	Business model	Access to markets	Livestock-to-Markets	NRT Trading (NRTT)
	Business model	Bundled services	Animal Health Franchise	Sidai Africa
	Business model	Bundled services	Ethiopian Rainwater Harvesting Ecosystem and Blended Financing Facility	Danish Red Cross
	Business model	Partnership model	NRT Trading (NRTT)	Northern Rangelands Trust
	Business model	Value-addition	Anolei Women Camel Milk Cooperative	SNV Netherlands Development Organization
	Business model	Value-addition	Camel Milk Dairy	Laitière de Mauritanie (now Tiviski)

Note: The innovation landscape analysis was conducted from November 2020 through to early February 2021.
Source: SPARC

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