PRISE
Pathways to resilience in semi-arid economies

Value Chain Analysis for Resilience in Drylands (VC-ARID): Identification of adaptation options in key sectors

Step 1

VC-ARID Step 1 Synthesis Report
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Research for climate-resilient futures

Pathways to Resilience in Semi-arid Economies (PRISE) is a five-year, multi-country research project that generates new knowledge about how economic development in semi-arid regions can be made more equitable and resilient to climate change.

PRISE aims to strengthen the commitment of decision-makers in local and national governments, businesses and trade bodies to rapid, inclusive and resilient development in these regions. It does so by deepening their understanding of the threats and opportunities that semi-arid economies face in relation to climate change.

The PRISE consortium comprises the Overseas Development Institute (lead), UK; Grantham Research Institute for Climate Change and the Environment, UK; Innovations Environnement Développement en Afrique, Senegal; and the Sustainable Development Policy Institute, Pakistan; with country research partners the Regional Environmental Centre for Central Asia, Tajikistan; Kenya Markets Trust, Kenya; University of Ouagadougou, Burkina Faso; and the University of Central Asia, Kyrgyzstan.

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Cover image: Succession of African Nguni cattle walking in the bush, ChanelBCreating

Introduction

Climate change threatens development and economic growth in semi-arid lands. Climate-related risks will increase for individuals, businesses and infrastructure and have consequences in all sectors of the economy. Climate change will have significant impacts on economic activity and value chains as economic actors are forced to alter their production systems to maintain their production capabilities under changing conditions.

However, climate change can also lead to new **possibilities** for people and businesses in semi-arid lands, with **opportunities** to create new products and services, develop new markets and access new funding streams and finance mechanisms. Nevertheless, adapting to the impacts of climate change and taking advantage of opportunities arising from it will require action across multiple sectors and from both public and private actors.

The PRISE programme aims to identify opportunities for economic transformation and diversification in the semi-arid lands of PRISE countries, by integrating sectors rooted in semi-arid lands into national economies. Using a common three-step innovative methodology – Value Chain Analysis for Resilience in Drylands (VC-ARID) – it will identify climate risk, adaptation options and opportunities for private sector development in Burkina Faso, Ethiopia, Kenya, Senegal, Pakistan and Tajikistan specifically for the livestock and cotton sectors.

This research is designed to address the issues decision-makers raised during national stakeholder platforms held across all PRISE countries and national policy priorities identified by PRISE partners.

VC-ARID tests the hypothesis that there are two pathways for climate-resilient economic development in semi-arid lands. The first option is through upgrading of key value chains, such as cotton and beef **(vertical transformation)**. The second is through diversification within the sectors or into related tertiary sectors, such as milk or tourism **(horizontal transformation)**. As such, two overarching research questions guide this work:

1. What are the pathways for climate-resilient economic development in semi-arid lands through vertical and horizontal transformation?

2. What are the adaptation options for public and private sector investment opportunities in responding to climate change in semi-arid lands?

The livestock and cotton sectors were chosen against several quantitative and qualitative criteria, including their contribution to national gross domestic product, their national added value, their employment importance and their potential for economic growth in the future.

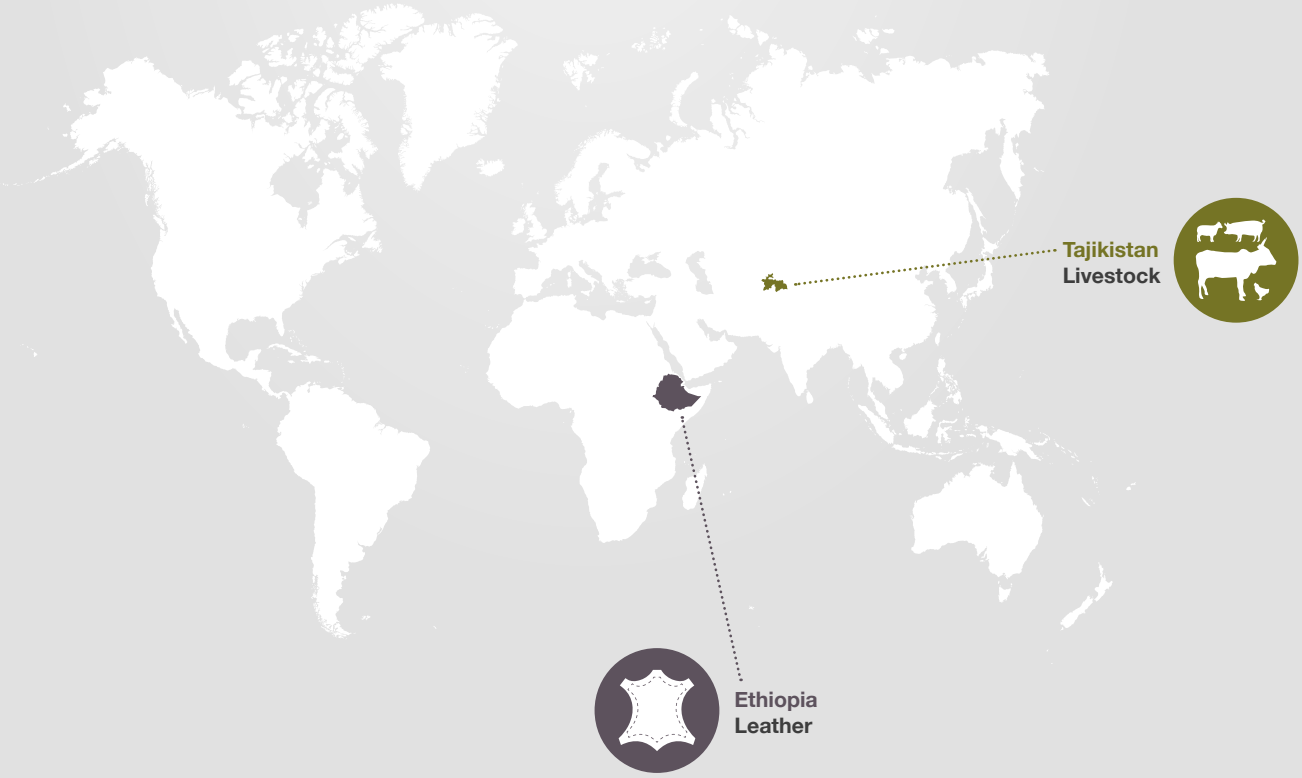
In answering these questions, we describe ways to improve market access and trade relations to protect people but also to stimulate growth by better integrating semi-arid lands into national economies. Figure 1 presents countries and sectors in which VC-ARID is currently being implemented and Figure 2 the expanded studies for 2017.

"...we describe ways to improve market access and trade relations to protect people but also to stimulate growth by better integrating semi-arid lands into national economies."

Image: Cotton, ImagesbyBarbara

Figure 1. VC-ARID countries and sectors

Figure 2. Additional VC-ARID locations



Value Chain Analysis for Resilience in Drylands (VC-ARID)

Key principles

VC-ARID is an **innovative** and **interdisciplinary** approach to value chain analysis in that it takes into account the specific characteristics of semi-arid systems. As such, the VC-ARID methodology integrates key principles that support its application in a territorial – or hotspots – approach as developed within the PRISE programme.
Key to the approach is the recognition that, in semi-arid lands, ecological and socio-economic variability represent key structural differences when compared with other production systems. VC-ARID endeavours to avoid the tendency towards a 'single-path' approach.

For example, extensive livestock production systems are distinct from other productive sectors in their character. Therefore, new approaches are needed to understand them better and to identify appropriate interventions that support, rather than undermine, these systems. The five characteristics outlined below are particularly important to these production systems, and often form the basis of adaptive capacity inherent within these systems. With the VC-ARID approach, PRISE has the **potential** to make a **significant** contribution to development in semi-arid lands. VC-ARID builds on existing value chain analysis approaches but has incorporated the following five key characteristics of semi-arid lands.

Image: Lourd et chargé, Dakar, Senegal, © Christian Bachellier

First, we consider the territorial approach of VC-ARID to be essential in understanding the potential of these sectors to contribute to climate-resilient economic development. For this reason, we focus on value chains that have their production rooted in semi-arid lands. In each country, semi-arid lands have been defined according to annual average rainfall.

Second, VC-ARID is novel in its approach to analysing climate risk. At each step of each value chain, climate risk is assessed using both qualitative and quantitative methods. This allows us to start understanding response to risk and possible adaptation options across these chains in systems that are going to face increasing vulnerability as climate change interacts with other factors (according to the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, for example).

Third, even before we consider climate change and increasing variability, semi-arid lands are already highly variable in their climatic and ecological conditions. This has huge implications for supply and therefore the entire chain, so VC-ARID explicitly considers rainy and dry seasonal effects.

Fourth, there is already significant economic activity taking place in semi-arid lands, with approximately 2 billion people making a living in these areas[1]. However, a lot of production and trading activity is informal, as these areas have been relatively marginalised both politically and economically. Therefore, the VC-ARID methodology incorporates both informal and formal chains.

Fifth, there are also significant gender dimensions to consider. In Pakistan, the gendered roles of cotton production, picking, weaving and ginning are explicitly recognised in the chain. In Senegal, inclusion of the cow's milk value chain, in which the actors are predominantly female, alongside the beef value chain, which involves primarily male actors, allows us to explore the opportunities for diversification of the livestock value chain to include both men and women.

[1] Kimani, S.K., Esilaba, A.O., Njeru, P.N.M., Miriti, J.M., Lekasi, J.K. and Koala, S. (2014) 'Improving livelihoods in semi-arid regions of Africa through reduced vulnerability to climate variability and promotion of climate resilience', in Leal Filho, W., Esilaba, A.O., Rao, K.P.C. and Sridhar, G. (eds) Adapting African agriculture to climate change. Climate Change Management Series. pp.25–33.

Three-step methodology

Across the locations and sectors, VC-ARID follows a common three-step methodology:

Step 1:

Mapping the value chain

Following the United States Agency for International Development (USAID), Food and Agriculture Organization of the United Nations (FAO) and European Union (EU) approaches, seven value chains have been mapped. This step includes a literature review and the results of key informant interviews and focus group discussions. This report explains the results of Step 1.

Step 2:

Assessing climate risks at each level of the value chain

Climate risk is assessed both qualitatively, through key informant interviews at each level of the value chains, and quantitatively, through carrying out surveys of producers and, in some cases, traders. Climate information is used at two levels. First, IPCC projections of average temperature, rainfall and extremes, such as drought, heat waves and extreme rainfall, for each region are combined with the responses research participants provide, to qualitatively assess climate risk at each step up to 2100. Second, for some countries climate projections are available at a more regional or national scale; these are integrated with models to better understand the potential impacts of climate change on the cotton and livestock production systems.

Step 3:

Identifying adaptation and private sector investment options for climate-resilient value chain transformation

We will first analyse adaptation options identified by participants in this research. Continuing on from the logic of the value chain approach, we will identify the potential options for climate-resilient value chain transformations. We will assess existing and required adaptive capacity to accommodate current and future climate impacts into potential transformations to the value chain, and where private sector investments and services can meet these needs. Second, these more specific options will be clustered into broader types of adaptation that are applicable to all the value chains for cross-country and cross-sector comparison and that are more transformational in their nature.

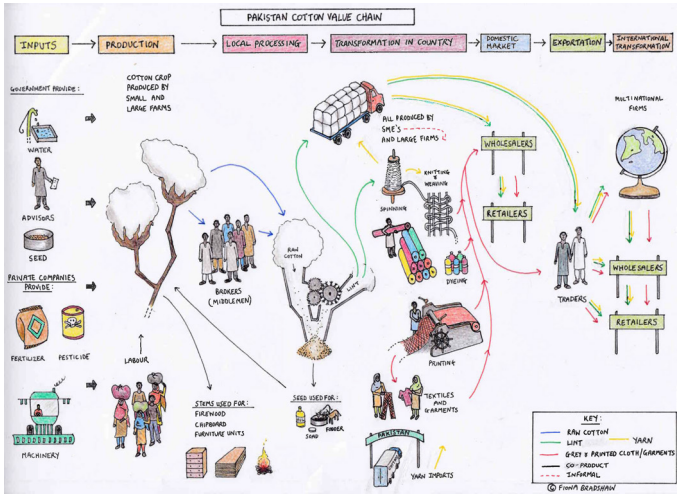
Value chain actors and stakeholders working in partnership with PRISE

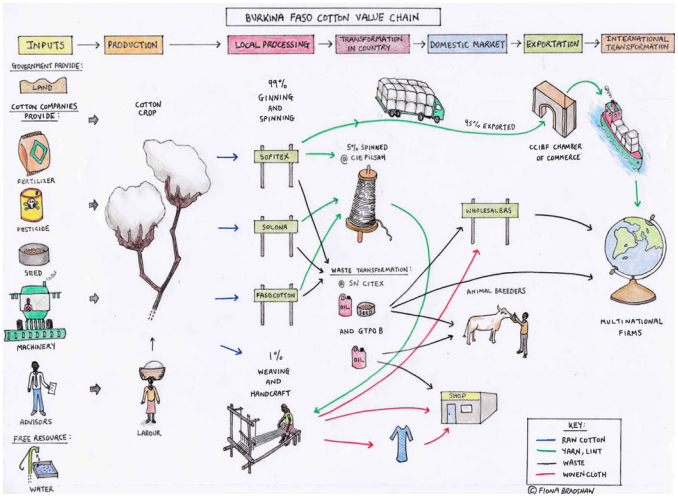
During this final step, stakeholders and actors in the value chains will work together with country partners to identify potential adaptation options. Particular focus will be placed on assessing the opportunities for innovative services and providing an enabling environment necessary for private sector investment. In line with PRISE's theory of change, this step will directly engage with businesses, umbrella business organisations, producer organisations, women's associations, research institutes and think tanks, civil society networks and non-governmental organisations, state technical services and policy-makers from local and national government departments and ministries, which will include not only the livestock and agriculture ministries but also those related to economic development, planning, finance and trade.

Unprecedented opportunities for comparison and insight

The VC-ARID methodology can be applied to any value chain where climate change should be considered and particularly those rooted in arid and semi-arid lands or other geographical hotspots. VC-ARID is replicated by seven research teams in five countries, offering unprecedented opportunities for comparison between semi-arid regions of the world. This research project has the potential to provide significant insights on appropriate methodological approaches for analysing these systems, as well as ways to harness them for private sector investment through appropriate risk management. These findings will contribute to an emerging new narrative about semi-arid systems that is framed more around development **opportunities** and adaptation rather than poverty and vulnerability.

Results of Step 1: Mapping the value chains





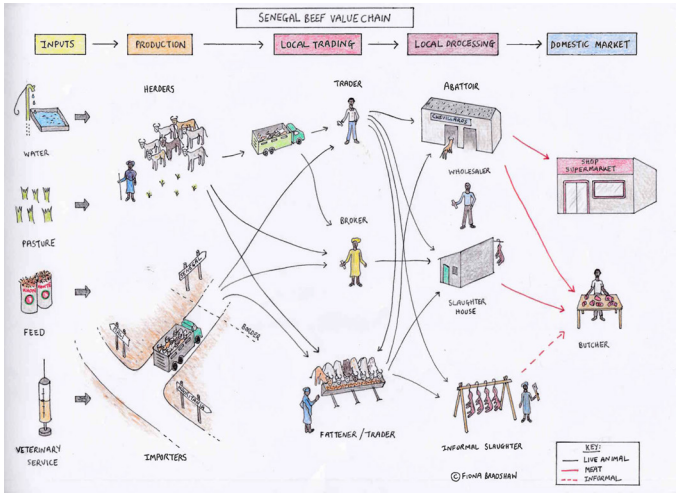
Key findings from Pakistan's cotton value chain:

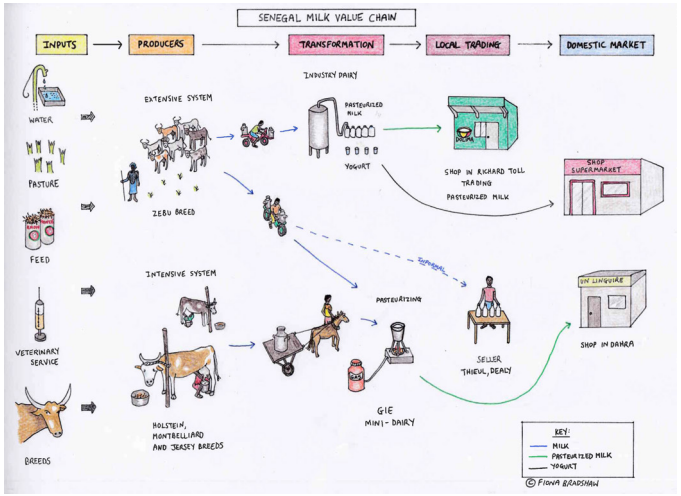
- There is a disconnect between cotton farmers and actors higher up the value chain, owing to the reliance of textile manufacturers on imported cotton.
- A primary factor determining the economic resilience of any farming household is access to credit. Currently, credit is accessible only by those farmers with some kind of land ownership status. Seasonal labourers cannot access credit so resort to employment in small and medium-sized enterprises, such as local ice factories or brick kilns.
- Currently, policies are skewed towards the higher end of the value chain. Prices are set in a monopolised system that favours large textile companies, leaving little profit margin to farmers.
- Cotton farmers are generally well aware of the direct climate risks facing their production. However, they know relatively little about adaptation measures, and rely mostly on local methods such as using hand pumps to remove excess water from fields.

Key findings from Burkina Faso's cotton value chain:

- National cotton companies fix prices well before the start of the production season. This can have the effect of protecting producers against price fluctuations in the international market but can also have adverse effects if global prices rise.
- The value chain remains underdeveloped and relatively short, with production and primary processing taking place – but very little transformation. As a result, opportunities for adding value and employment are lost.
- The national government plays a key role. First, three national companies manage most exports, so there is virtually no competition. Second, the same companies provide pesticides and fertilisers on credit, then taking a share of production as payment.
- There is renewed demand for woven cloths, which should benefit women weavers. However, availability of inputs remains a challenge. Good quality products are generally exported, and it is the files of medium quality that are sold on the local market.

Results of Step 1: Mapping the value chains





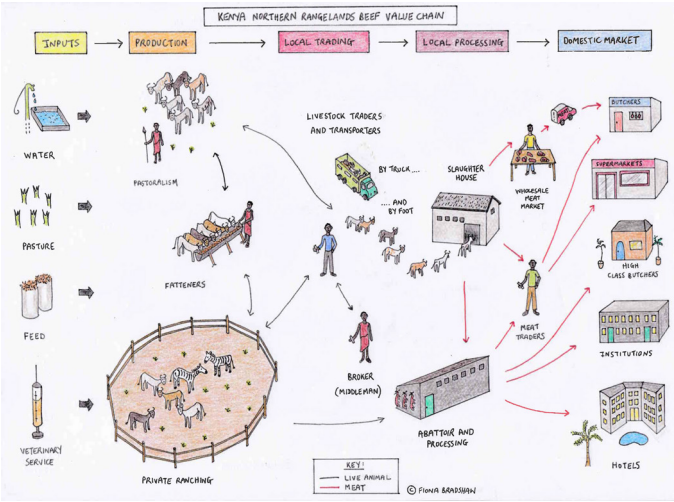
Key findings from Senegal's beef value chain:

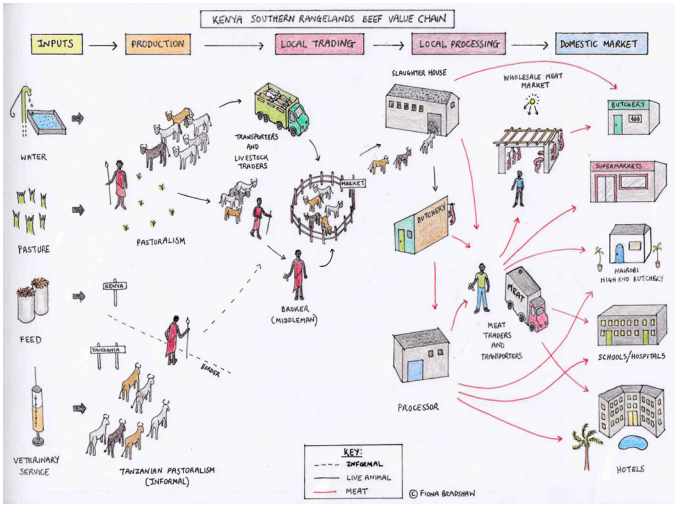
- There is a good flow of information about prices, quality and quantity between producers and local markets because of the dual role herders play as traders.
- Integration of markets across the region depends heavily on the maintenance of transhumance corridors within Senegal and with neighbouring countries. These corridors are essential routes for trading activity.
- The main constraint on the value chain relates to inputs, including water, fodder and veterinary services. Currently, producers bear these costs.
- Domestic demand for meat is likely to grow with the expansion of urban development around the capital Dakar. This provides an opportunity for transformation of the value chain.

Key findings from Senegal's cow's milk value chain:

- There are two parallel chains in operation. One is the traditional (and mostly informal) chain and the other is more industrialised milk transformation (formal).
- In the extensive system, milk production is the responsibility primarily of women. Women also manage income from trading milk.
- Actors in the intensive system face financial and logistical constraints. The collection, storage and distribution of milk are a challenge. This has an impact on quality and therefore price.
- Seasonal fluctuations in production are a major constraint for both chains, affecting supply.
- Exotic breeds may not be climate-resilient in the long term, even though returns are higher in the short term as a result of increased productivity.

Results of Step 1: Mapping the value chains





Key findings from Kenya's northern rangelands beef value chain:

- There are two parallel chains in operation. One is more formal and incorporates fattening livestock on privately owned ranches. The other is more informal and involves more traditional extensive pastoralism.
- Private ranches benefit from the value added of fattening livestock, and this is mostly a trader-level activity.
- Brokers dominate local markets, setting low prices that do not transfer value to producers.
- There is evidence of diversification of the value chain into the tourism sector via wildlife management. Almost all communities in the area have access to wildlife conservancies for dry season grazing, as well as benefiting from employment and other forms of additional income associated with tourism.
- Producers rely on mobility for coping with climate risk. For example, herders move to the highland areas around Mount Kenya during times of drought and practise rotational grazing where access allows.

Key findings from Kenya's southern rangelands beef value chain:

- As with Kenya's northern rangelands, most producers are pastoralists, but they are managing their production more commonly on communal land. There are also smaller parcels of privately owned land within this system.
- There is a disconnect between pastoralists and the end market, meaning producers do not have good access to market opportunities. There are inefficiencies along the value chain and many actors are involved in a single transaction.
- Significant cross-border trade drives the beef value chain. For example, at least 50% of cattle is imported on-the-hoof from Tanzania. This indicates that the Kenyan herd is not meeting increasing domestic demand for meat.
- There is minimal value addition in the chain or diversification of the product. This is incentivising supply of low quality meat sold cheaply in the Nairobi end market.
- As with Kenya's northern rangelands, there are some conservancies in operation, which offer dry season grazing for pastoralists and generate tourism-related income opportunities.

Conclusions from PRISE VC-ARID Step 1

Across the six value chains, there is a disconnect between producers and terminal markets (national or international). This means the producers are often subject to inequitable price conditions and incur transactional costs. This can result in unequal distribution of the added value along the chain. The disconnect indicates that there are opportunities for efficiency improvements along the chains by supporting greater vertical integration (e.g. through an improved enabling environment), while retaining the important characteristics of the production system that maintain adaptive capacity.

In all cases, there are challenges to some extent in accessing the benefits of international trade and export markets. The cotton value chains demonstrate international trade, but this is largely absent from the livestock value chains, with the exception of Kenya's southern rangelands, where some informal trading activity takes place across the international border with Tanzania. As such, there are opportunities to consider in strengthening exports in these value chains. Upscaling the value chain from national to global can be considered a means of leveraging economic development, exports being key drivers of national economic growth. Providing the disconnect discussed above can be overcome, the sectors can be considered key pillars of future national and semi-arid economies through improved connection to international markets.

Across the value chains, there is significant potential to upgrade processing to add value and provide additional socio-economic benefits, including employment opportunities. The exception is the Pakistan cotton value chain, which has a well-developed textile industry of national economic importance. The implication is that there are significant opportunities for vertical transformation in these value chains, which could address some of the constraints at production and international market levels.

For example, by harnessing the opportunities of urban growth, the Senegalese beef value chain could meet increasing demand through vertical integration. Similarly, renewed interest in high quality traditional clothing in Burkina Faso is a window to increase the supply of cotton from semi-arid regions, for which there is a consumer preference.

Additional constraints that are common to the value chains to differing extents include poor infrastructure, inadequate provision of financial services, limited access to markets for producers and lack of appropriate regulations. This is reflective of the relatively marginalised position of semi-arid lands in national economies. Clearly, there are significant opportunities to improve the enabling environment for these sectors in ways that are also climate-resilient and inclusive.

In general, climate risk and the direct impacts of climate change on the quality and quantity of production and prices is well understood at producer level. However, there is limited knowledge on how to adapt to climate risk beyond coping mechanisms. Where adaptation action is identified, producers have limited capacity to put this into practice. Similarly, in terms of climate change adaptation policy, there is a corresponding disconnect for producers with the higher end of the value chain. It is therefore important to analyse the economic opportunities identified along the value chains, including those relating to transformation or improvements in the enabling environment, in order to inform appropriate adaptation policies. Step 2 of the VC-ARID methodology will complete this analysis.

Initial results and emerging questions

Preliminary findings indicate that gender and informality are important dynamics that may form the basis for more inclusive adaptation options. For example, the informal chains present across the livestock beef and milk value chains offer routes to markets for more marginal groups, including pastoralists and women. In some cases, such as Kenya's beef value chains, pastoralists are able to exploit the multiple pathways in the value chain. This complementarity within the chains is an important source of adaptive capacity in systems where seasonality and mobility are key to production and trading activity.

Replicating the common VC-ARID methodology across several countries and sectors has highlighted sets of specific and common questions to address in the next steps as well as opportunities for learning between regions. Specific questions that have arisen from Step 1 include:

1. What can Burkina Faso's nationalised cotton sector learn from the more industrialised Pakistan cotton trade?
2. What can Senegal's domestic livestock market learn from Kenya's financial and pharmaceutical livestock services?
3. What can be learnt from Senegal's diversification of the livestock value chain to benefit both men, through beef, and women, through cow's milk?
4. How can resilience be measured at producer/household level through different indicators, for example food security, income, assets?

Broader questions

In common with all value chains are broader questions that speak to the PRISE programme as a whole:

1. How can macroeconomic structures and regulatory frameworks enhance or constrain the resilience of key sectors?
2. How can improvements in supporting services bring about adaptive economic changes in key sectors?
3. What gender-sensitive investment, policy and planning measures are there for climate-resilient development in semi-arid lands?
4. How can we better understand risk and resilience in marginalised contexts?

Moving forward

We have carried out producer-level quantitative surveys for all value chains (average sample size of 400) and qualitative semi-structured interviews and focus group discussions with processors and market actors. Across the countries, the research tools include common sections on household characteristics; current livelihood activities and access to services; perceptions of climate change and extremes and responses to these over the past 10–15 years; perceptions of and responses to a named climate extreme event (e.g. drought or flood); perceptions of and responses to future climate trends; and perceptions of and responses to other shocks (including conflict, price shocks, idiosyncratic shocks – such as the death of a household member or a robbery). Results will be available in a second edition of this report, to be published by August 2017.

Looking ahead to Step 3, attention will turn to sharing this evidence with stakeholders. The aim of this step will be to work closely together to generate sets of evidence-based adaptation options that can address climate risk and promote inclusive and climate-resilient economic development in these sectors. In identifying these options, other risks such as price shocks, geopolitical shifts and changes in demand will be considered, in order to provide sustainable and relevant adaptation options in line with the value chain development opportunities identified during the preliminary steps of VC-ARID.

Image: Cotton Field, Riley MacLean

Research for climate–resilient futures

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