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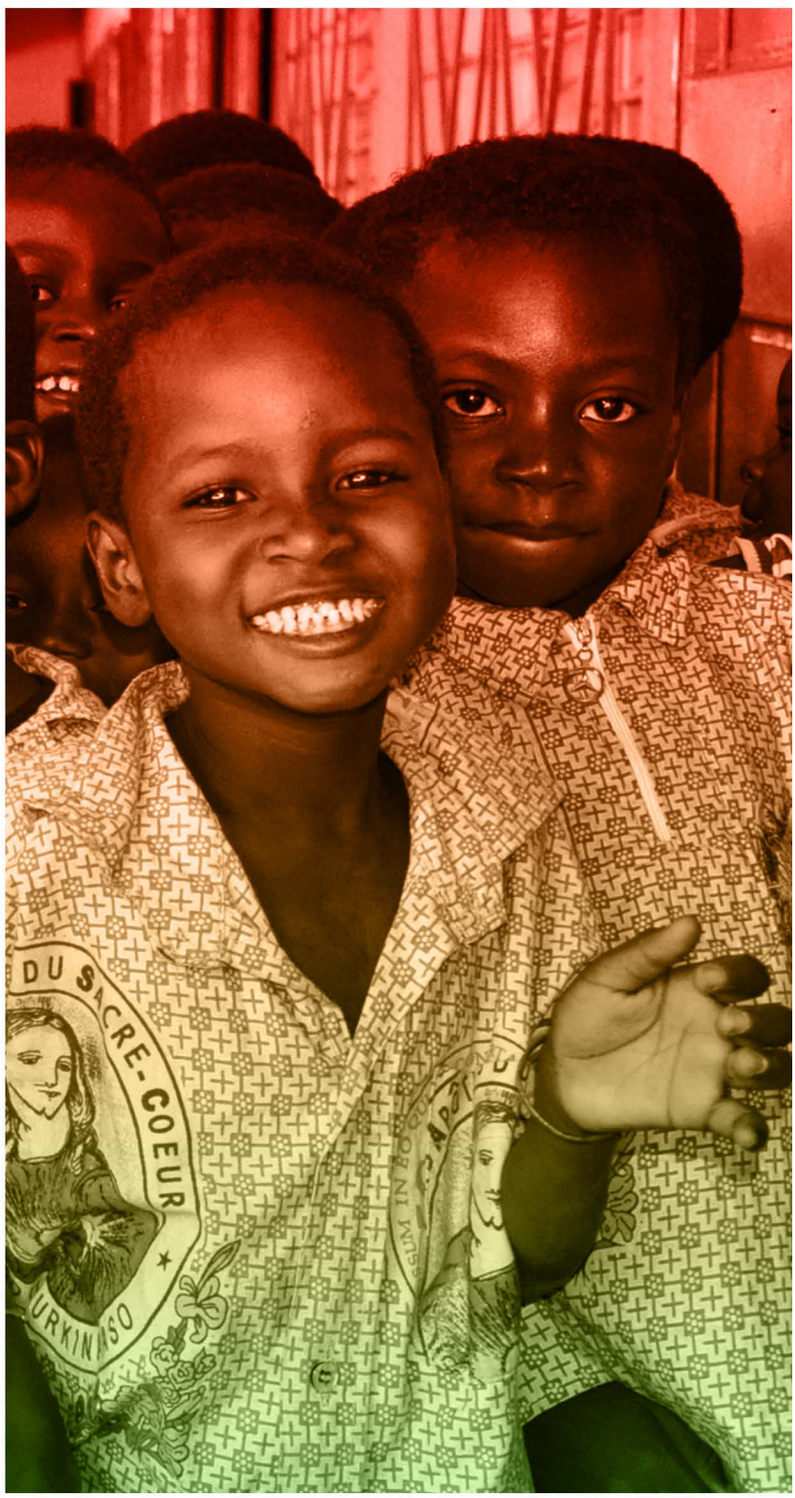
STRENGTHENING FINANCIAL RESILIENCE TO DROUGHT:

A Feasibility Study

For An Index-Based Drought Risk Financing Solution For Pastoralists In Burkina Faso



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The Financial Resilience Program (FRP) is a World Bank partnership with the United States Agency for International Development (USAID) to enhance the capacity of policy makers for improved financial resilience of vulnerable rural households and businesses to climate shocks and natural disasters. The FRP provides technical assistance to governments in the development and implementation of policy to help rural populations and businesses prepare for—and recover more quickly from—the impacts of climate shocks, disasters, and crises; and develops and shares knowledge to inform practitioners and policymakers globally.

The Global Index Insurance Facility is a dedicated World Bank Group program that facilitates access to finance for smallholder farmers, micro-entrepreneurs and micro-finance institutions through the provisions of catastrophic risk transfer solutions and index-based insurance in developing countries. Funded by the European Union, the governments of Germany, Japan and the Netherlands, GIIF has facilitated approximately 9.6 million contracts, covering close to 48 million people, primarily in sub-Saharan Africa, Asia and Latin America and the Caribbean. The program is part of the International Finance Corporation's Financial Institutions Group department.

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List of Acronyms

ACF	Action Contre la Faim
ACMAD	African Centre of Meteorological Applications for Development
ADRiFi	Africa Disaster Risk Financing Program
AFD	Agence Française de Développement
AfDB	African Development Bank
AFPPME	Agence de Financement et de Promotion of SMEs
AGRHYMET	Centre Régional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle
AKAM	Aga Khan Agency for Micro-finance
ANAM	National Meteorological Agency
ANTPIC	Agence Nationale de Promotion des Technologies de l'Information et de la Communication
APSAB	Association Professionnelle des Sociétés d'Assurances du Burkina
ARC	African Risk Capacity
ASAL	Arid and semi-arid lands
ASF	Agronomes et Vétérinaires Sans Frontières
BCEAO	La Banque Centrale des États de l'Afrique de l'Ouest
BMZ	German Federal Ministry for Economic Cooperation and Development
BRACED	Building Resilience and Adaptation to Climate Extremes and Disasters
CAN	National Chamber of Agriculture
CDCAP	Centre for Citizen Monitoring and Analysis of Public Policies
CEGERA	Centrale de Gestion des Risques Agricoles et Alimentaires
CGAP	Consultative Group to Assist the Poor
CHIRPS	Climate Hazards Group Infra-red Precipitation with Station
CILSS	Permanent Inter-State Committee for Drought Control in the Sahel
CIMA	Conférence Interafricaine des Marchés d'Assurances
CLISS	Satelligence and the Permanent Inter-State Committee for Drought Control in the Sahel
CNAMU	National Universal Health Insurance Fund
CNC	National Coordination Cadre for the Promotion of Livestock resources
CNCPDR	National Coordination Cadre for Partners in Decentralized Rural Development
CNFA	Cultivating New Frontier for Agriculture
CNSA	Conseil National de la Sécurité Alimentaire
CONASUR	National Council for Emergency Relief and Rehabilitation
CREWS	Climate Risk Early Warning System

CRS	Catholic Relief Services
CTI	Comité Technique Interministériel de réflexion
CVD	Conseils villageois de Développement
DAMOF	Direction des Affaires Monétaires et Financières
DFS	Digital Financial Solutions
DGEAP	Director General of Pastoral Areas and Facilities
DGRE	General Directorate of Water resources
DGPER	Directorate General for the Promotion of Rural Economy
DGTCP	General Directorate of the Treasury and Public Accounts
DIRISHA	Drought Index Insurance for Resilience in the Sahel and Horn of Africa
DNM	Direction Nationale de la Météorologie
DRF	Drought risk financing
DRFI	Drought risk financing and insurance
DSC-SFD	Department of Supervision and Control of Decentralised Financial Systems
ECONESS	National Council on Environment and Sustainable Development
ECOPARE	Entente pour la Coopération pastorale dans la région de l'Est
ECOWAS	Economic Community of West African States
EM-DAT	Emergency Events Database
eMODIS	Enhanced Moderate Resolution Imaging Spectroradiometer
EROS	Earth resources Observation and Science
EO	Earth observation
EOS	End of season
FAARF	Support Fund for Women's Remunerative Activities
FANAF	Fédération des sociétés d'Assurances de Droit National Africaines
FAO	Food and Agriculture Organization of the United Nations
FCPB	Faitière des Caisse Populaire du Burkina
FEB	National Federation of Livestock Producers
FEWS NET	Famine Early Warning Systems Network
FNS	National Solidarity Fund
GDP	Gross domestic product
GEF	Global Environment Fund
GIIF	Global Index Insurance Facility
GMF	General de Micro-finance
GoBF	Government of Burkina Faso

GoK	Government of Kenya
HDI	Human Development Index
HOA	Horn of Africa
HSNP	Hunger Safety Net Program
IBDRFI	Index – Based Drought Risk Financing and Insurance
IBLI	Index- Based Livestock Insurance
IDPs	Internally Displaced People
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Centre
IG	Inclusive Guarantee
IGAD	Inter-governmental Authority on Development
ILRI	International Livestock Research Institute
INERA	Institute of the Environment and Agricultural Research
IRD	Development Research Institute
IVR	Interactive Voice Responses
JRC	Joint Research Centre
KES	Kenyan Shillings
KLIP	Kenya Livestock Insurance Program
LORP	Loi d'orientation au pastoralisme
MFI	Micro-finance Institutions
MoAFR	Ministry of Animal Fisheries resources
MODHEM	Mobile Data for Moving Herds Management and Better Incomes
NDVI	Normalized Difference Vegetation Index
NGDI	Next Generation Drought Index
NGO	Non-governmental organization
NGS	Number of growing seasons
NUSAF III	Third Northern Ugandan Social Action Fund
OHADA	Organisat'on pour l'Harmonisation du Droit des Affaires en Afrique
OPT	Office des Postes et Télécommunications
OXFAM	Oxford Committee for Famine Relief
PASMEP	Platform for actions to secure pastoral households
PNPS	National Social Protection Policy
PPP	Public Private Partnership
PRESAO	West African Seasonal Forecast

PS	Programmatic scenario
PS-CNPS	Permanent secretariat of the National Council for Social Protection
RBM	Réseau Billital Maroobé
RCPB	Network of the Caisses Populaires du Burkina
RECOPA	Réseau de Communication sur le Pastoralisme
SAABF	Société d'Assurance Agricole du Burkina Faso
SAP	Système d'alerte précoce
SE-CNSA	National Food Security Council
SI	Stock d'Intervention
SIIPE	Satellite Index Insurance for Pastoralists in Ethiopia
SIP	'Système d'information pastorale
SMEs	Small and Medium Enterprise
SNIE	National Environmental Information System
SNS	Stock National de Sécurité
SNV	SNV Netherlands Development Organisation
SONAGESS	Société Nationale de Gestion du Stock de Sécurité Alimentaire
SONAR	National Insurance Company of Burkina
SOS	Start of season
TLU	Tropical Livestock Unit
TWG	Technical Working Group
UNDP	United Nations Development Program
UN DESA	United Nations Department of Economic and Social Affairs
UNECA	United Nations Economic Commission for Africa
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nation' Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Aid
USD	United States Dollar
V4CP	Voice for Change Partnership Program
VSF	Veterinaries Sans Frontiers'
WANEP	West African Network for Peace building
WAP	W-Arly-Pendjari
WASCAL	West African Science Service Centre on Climate Change and Adapted Land Use
WBG	World Bank Group

WFP	World Food Program
WII	Weather index insurance
WMO	World Meteorological Organizations
XOF	West African Financial Cooperation in Central Africa Franc

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Executive Summary

Why financial protection from drought shocks for pastoralists? The regional context

Livestock is fundamental for national economies and household welfare in Sahel countries. It is estimated that about 50 million people, the majority of whom are extremely poor, rely on pastoralism[1] for their livelihoods in the Sahel. Livestock is a key economic factor in most Sahel countries, as evidenced by its contributions to agricultural GDP e.g. Burkina Faso (35%), Mali (39%), Niger (37%) and Senegal (31%).

The Sahel is very prone to droughts and shifting climatic patterns. Drought costs in the Sahel region are extremely high, especially for pastoralists. Between 1970 and 1990, there was a prolonged period when rainfall was well below average resulting in a series of major droughts, famines and huge livestock losses due to insufficient drinking water, diseases and starvation, caused by lack of forage and grazing resources. Post 1990, average rainfall increased but the area is still affected by periodic drought shocks and climatic extremes. This has contributed to the huge cost burden arising from (a) economic losses of livestock and livestock-based products, (b) loss of livelihoods for pastoralists whose animals die and (c) costs of humanitarian assistance.

Livestock contributes about 10% to Burkina Faso's national GDP and is an important Source of export revenue. Livestock play an important role in the cultural and economic reality of Burkina Faso. The livestock sector contributes about one third of agricultural GDP and one tenth of national GDP. There were an estimated 40.7 million head of livestock, excluding poultry, in Burkina Faso in 2019. As per the Food and Agriculture Organization of the United Nations (FAO) data, the national herd is comprised of goats (40%), sheep (26%), cattle (25%), pigs (6%) and donkeys (3%).

Even though Burkina Faso faces various environmental, climatic and natural shocks, the impact of droughts has been by far the greatest, affecting millions of people over the last 30 years. This has been exacerbated by the persistent unsTable security situation in the north of the country. Drought events have widespread impact across the country but some areas, especially in the Sahelian north including the Sahel, Nord and Centre regions, are more prone to frequent droughts than the wetter southern regions. In recent years, Burkina Faso has faced a rapidly deteriorating security situation, affecting particularly the northern and eastern regions of the country. Armed Islamist extremist groups have expanded their influence into northern Burkina Faso since 2016, operating in the Liptako-Gourma region.

Index-based drought financing for pastoralists – how it works

Drought risk financing and insurance solutions have emerged as a powerful tool to protect vulnerable communities against drought impacts. The key idea is to link pre-arranged financing solutions to credible response plans. This can make funding available faster after disasters, strengthen predictability and improve cost effectiveness. Among the various solutions, index-based drought risk financing and insurance (IBDRFI) approaches are particularly suitable for smallholder farming and extensive pastoral systems. These instruments trigger pay-outs/financial responses based on an 'objective' index approximating the impact/loss. The majority of IBDRFI instruments targeting extensive rangelands currently operational in Africa are based on drought indices derived from satellite Normalized Difference Vegetation Indices (NDVI) data. Among these, the Index-based Livestock Insurance (IBLI) drought insurance products have been specifically designed to protect pastoralists in the face of drought.

1. Throughout this report, the definition of 'pastoralists' includes all the herders that, i) mainly depend on livestock (i.e. ruminants) for their livelihood, ii) rely primarily on rangeland resources for feeding their livestock and iii) use some degree of mobility as a herd management practice. As such, our definition refers to nomadic, semi-nomadic and semi-sedentary pastoral communities, including those practicing some cropping practices (i.e. agro-pastoralists).

Recent developments in earth observation (EO) missions, technologies and analytics are opening new opportunities for designing innovative indices for IBDRFI initiatives, including rangeland and extensive pastoral systems. Initiatives such as the World Bank Next Generation Drought Index (NGDI) aim to expand the range of options for designing IBDRFI solutions by developing a practical framework for a set of indices or indicators that will better monitor, anticipate and trigger financial responses to severe drought events.

IBDRFI initiatives specifically designed to protect pastoralists during drought shocks have so far been implemented in Africa with different modalities such as retail micro-insurance products, macro-level insurance schemes for social livelihood protection and scalability mechanisms of social safety net programs. All these initiatives rely on similar EO technologies and indices (i.e. based on NDVI data) and are generally designed with anticipatory response principles, e.g. early drought detection for early action and impact mitigation. Micro-level retail IBLI schemes have been implemented in northern Kenya and southern Ethiopia with private insurance companies involved in marketing, promoting and underwriting the scheme on a voluntary basis with individual pastoralists. Macro-level social livelihood protection insurance schemes are currently operational at national level in eastern Ethiopia, Zambia and Kenya through the Kenyan Livestock Insurance Program (KLIP). Scalability mechanisms of safety net programs have also been implemented in Kenya, under the Hunger Safety Net Program (HSNP) and in Uganda, with the Third Northern Ugandan Social Action Fund (NUSAF III). These social protection schemes can complement sovereign level products like the ones being implemented by the African Risk Capacity (ARC).

Objective of the feasibility assessment

This feasibility study, conducted by the International Livestock Research Institute (ILRI) and the World Bank, aims to inform development and implementation of policies to increase the resilience of pastoralists Burkina Faso and the Sahel against severe drought shocks. It aims to provide the background knowledge to make an informed decision whether and where investing resources in designing and implementing an IBDRFI program can achieve public policy objectives.

The feasibility assessment considers technical (i.e. product design), socio-economic (potential demand and value) and operational (supply chain) factors in the design and implementation of IBDRFI solutions in Burkina Faso.

The socio-economic feasibility analysis assesses the presence of necessary pre-conditions to justify the launch of an IBDRFI scheme (i.e. vulnerability of livestock to drought) and the demand for the IBDRFI solutions from local institutions, pastoral and agro-pastoral households. It examines the relevance of the livestock sector and the impact of drought on the national economy and assesses the socio-economic environment of pastoralists.

The technical feasibility analysis assesses whether key conditions for the technical design of an accurate index and trigger mechanism for drought impacts on pastoral areas are met. The feasibility factors considered include the coverage of rangeland, the rangeland vegetation cover/density and the vegetation seasonality, which are critical not only for the design of NDVI-based indices but also alternative EO drought indices. When conditions are not fully met, the assessment provides indications of the type of work needed to design appropriate technical solutions to refine the product design for the specific context.

The operational feasibility analysis evaluates the conditions required for supplying IBDRFI solutions and for supporting the development of an enabling environment (institutional, regulatory and social) for its large scale and sustainable provision. Thus, it seeks to assess existing financial and insurance infrastructure and services, policy and regulatory environment, potential distribution channels and existing private and public stakeholders (insurers and financial service providers, pastoral associations, intermediaries and NGOs etc.) and their capacity in the financial sector.

A scenario analysis is finally proposed by presenting historical pay-outs and hypothetical costings of proposed IBDRFI structures. This analysis is purely illustrative and aims to show realistic examples of how technical product customization and the choices made on different programmatic options have fundamental cost-benefit implications. It should be noted that the proposed scenarios are not meant to be recommendations for specific options nor do they represent an exhaustive range of IBDRFI solutions. Thus, detailed analysis of alternative programmatic options and product design customizations needs to be planned with local stakeholders during the early implementation stages for future initiatives.

The feasibility study is largely built on technical solutions, experiences and programmatic options implemented in east African countries, which are used as benchmarks. As such, the IBLI product design[2] is used for the technical assessments, while IBDRFI programmatic options are based on the main ones tested so far. Thus micro-level retail

2. From now on, for simplicity the term IBLI is used as a generic term to indicate drought index-insurance products based on Normalized Difference Vegetation Indices (NDVI) satellite imagery designed specifically for pastoralists. Across different programs, the product design often changes, although the underlying technical design principles are largely similar.

and macro-level social livelihood protection schemes that provide direct pay-outs/cash transfers to policyholders or beneficiaries are presented in the scenarios.

However, the feasibility conditions should be considered as widely applicable to alternative IBDRFI options that can and should be evaluated and tailored for the specific context based on the country policy priorities in drought risk management and social protection. During the program design phase, alternative drought index product design approaches might be considered given that the Sahel pastoral regions present significant ecological and socio-economic differences to those in east Africa. More importantly, while alternative programmatic options, such as meso level or sovereign level insurance are not discussed in detail in this report, because of the lack of direct implementation experiences in pastoral areas, the country's policy priorities and the local context, these models might need to be considered.

Key findings of the feasibility assessment

The feasibility assessment indicates that with targeted investments and supportive policies, an IBDRFI initiative targeting livestock keepers could be implemented in the extensive pastoral systems of Burkina Faso

Table E.1 illustrates the key findings of this study with respect to the feasibility criteria considered.

The socio-economic assessment (Table E.1, green) emphasizes the key role of the livestock sector for the Burkinabé economy. It accounts for approximately 10% of the country's GDP and more than 80% of the households in the country rear livestock. Though drought shocks are one of the biggest causes of vulnerability and food insecurity for pastoralists, there is little data on the impact and cost of droughts on the community. Most of the livestock rearing households are sedentary while only a limited proportion is nomadic or practice long range transhumance. Most of the agro-pastoralists are concentrated in the Sahel, Centre-Nord and Est regions of the country. Discussions conducted with pastoral communities and pastoral associations suggest that there is a general interest and potential demand for drought insurance products. Given the high poverty levels and inequality among pastoralists, social protection initiatives for the most vulnerable seem a priority.

The technical assessment (Table E.1, yellow; Figure E.1). indicates that the geographic areas categorised as feasible (green) or feasible but needing review (orange) for the implementation of an IBDRFI product tailored to extensive pastoral systems, cover approximately 25% of Burkina Faso and host about 30% of the national livestock herd. At the border between rangeland-dominated and crop-dominated regions, it would be important to assess possible impacts of land use changes on the risk profiling. For the areas needing review, it would be important to engage with local stakeholders to confirm the suitability of these areas for extensive herding and to eventually customize the product design.

The operational assessment (Table E.1, grey) shows that:

- **Key institutional frameworks are in place to coordinate responses to mitigate drought impacts.** The institutional and regulatory environment is conducive, with national institutions such as National Council for Emergency Relief and Rehabilitation (CONASUR), National Council on Environment and Sustainable Development (ECONESS) and Conseil National de la Sécurité Alimentaire (CNSA) coordinating humanitarian crises response measures, disaster risk reduction policies and regulations and promoting environmental and sustainable development.
- **Overall, there is good potential for establishing IBDRFI distribution infrastructures in pastoral areas.** Growing private sector interest in agricultural index-insurance, good telecommunication, digital financial solution (DFS) networks and a dense network of non-governmental organizations (NGO), international organizations and pastoral associations in the rural areas of the country suggest that the building blocks for effective financial product distribution are in place. However, the lack of a national household registration system might limit effective targeting of vulnerable pastoralists.
- **Targeted investments would be necessary to overcome the barrier of low financial literacy in pastoral areas and reinforce the institutional and private sector capacity to handle large commercial insurance initiatives.** The overall institutional and private sector capacity appears too weak to support large commercial insurance initiatives and, in general, the pastoral regions have only been marginally impacted by investments in financial resilience.
- **The unsTable security situation in vast portions of the pastoral region is a concerning risk factor for the operational implementation of IBDRFI programs and needs to be carefully considered during planning phases.** The activity of armed groups, especially in the northern and eastern parts of the country, has contributed to the rise of inter-communal violence and to growing insecurity. Whilst private sector actors and NGOs are still present in the pastoral regions, there currently face operational constraints due to security concerns.

Table E.1. summarizes the main critical areas that would require targeted investments for IBDRFI implementation (red dots). These include:

- Awareness creation about financial protection mechanisms and insurance among pastoral communities. This is a pre-requisite to stimulate informed demand and to support the creation of a local market. This goal can be achieved by sensitizations campaigns but also through capacity building of insurance or extension agents operating in pastoral regions.
- Technical capacity development of local institutions on index-insurance design and calculation. Though there are multiple national institutions providing extension services for agriculture, they have little or no experience index-based instruments. Capacity development could be supported by regional institutions such as AGHRYMET, ACF, ARC already involved in IBDRFI programs.
- Development of an electronic registration system. This is fundamental for targeting beneficiaries and for the effective management of the initiative. Since in the framework of the national shock-responsive social protection program there are plans to setup an household registration system, synergies should be explored.

The scenario analysis carried out under the study provides illustrative costing scenarios for two alternative 5-year IBDRFI programmatic options aimed at providing a safety net to vulnerable pastoralists in the face of drought. Both scenarios are designed on the experiences of Kenya and Ethiopia, where ongoing initiatives have demonstrated positive impacts on pastoralists' welfare and income, private sector development and government budgets and contingent liability.

- **the global cost of supporting a microlevel retail scheme with 50% subsidies targeting to insure 25,000 pastoralists (from year 5) is estimated to be $5.5m, including $4.8 million subsidies and $0.75 million for program support activities.** This option should stimulate both demand for the insurance product while simultaneously increasing the incentives for insurance providers to invest in marketing and support chains, leading to broader access and longer-term sustainability. At the same time, this option can fail to meet its objectives if the private sector does not invest in the product delivery or on the complementary activities such as marketing and awareness creation, which are critical to creating a sustainable market and meeting the target coverage.
- **the global cost of a social protection program that provides insurance for 5 cattle equivalent for 50,000 pastoralists (from year 5) is estimated to be $18.6 million, including $16.8 million premium subsidies and $1.75 million for program support activities.** This option assures meeting target coverage levels but may not stimulate private investment in product marketing or awareness creation; it may not necessarily create access to insurance for those that do not receive the insurance transfer. The long-term fiscal sustainability poses a second important risk, as this scheme requires considerable medium-term budget allocation commitments by the government.

Photo credit: RobertoVi from Pixabay

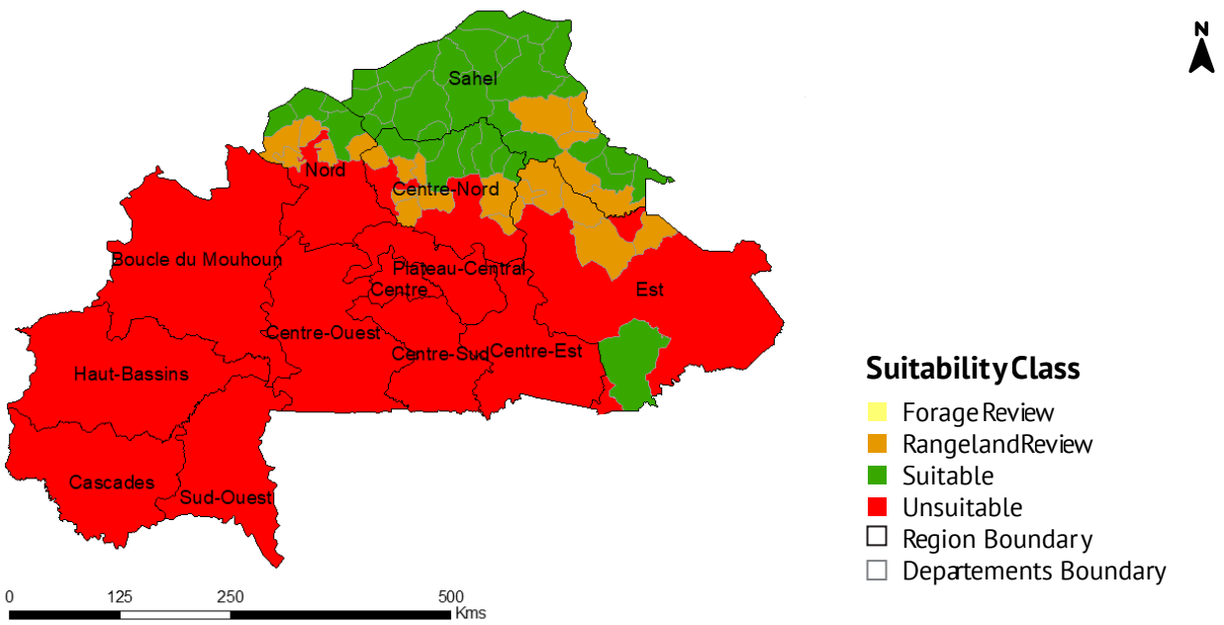
TABLE E.1 FEASIBILITY ASSESSMENT OF THE COUNTRY'S READINESS FOR IBDRFI PRODUCTS TARGETING PASTORALISTS

			Justification
Socio-economic Feasibility	Importance of pastoral livestock to the local economy	🟢	The livestock sector is relevant to Burkina Faso's economy, contributing around 10% to the national GDP. It is an important Source of export revenue. More than 80% of households rear livestock.
	Impact of drought on the livestock sector	🟡	Areas, especially in the Sahelian north including the Sahel, Nord and Centre regions, are more prone to frequent droughts than the wetter southern regions. However, very little data is available on the actual losses due to drought and the impact from recent droughts is more anecdotal than quantifiable evidence. The 2004-05 drought seems to be by far the worst drought experienced in Burkina Faso. More than 70% of the households reduced food consumption and sold property and more than 50% received external aid.
	Vulnerability of pastoralists to drought	🟢	The pastoral regions in the north are not only the most arid parts of the country but also the most exposed to recurrent droughts. Livestock-rich regions in Burkina Faso are generally correlated with lower poverty levels. However, there is substantial inequality among households in these regions, with the poorest being particularly poor and vulnerable. There are also frequent accounts of conflict between the nomadic pastoral and agro-pastoralist communities.
	Production systems	🟡	Most livestock-rearing households are sedentary agro-pastoralists that are also engaged in crop farming. They engage in moderate transhumance. Only a small minority of households, concentrated in the northern Sahel region, are nomadic pastoralists in Burkina Faso. Around 80% of livestock is kept in sedentary agro-pastoralist systems and 17% by nomadic pastoralists. Only 3% of livestock is kept in semi-intensive livestock systems. This would require some caution in product customization, especially in the definition of insurance units, considering the limited herd mobility ranges.
	Pastoralist demand for livestock insurance	🟡	Initial engagements with pastoral communities and associations suggest interest and potential demand. However, the information gathered in this study is not sufficient to accurately evaluate the potential demand.
	Pastoralist financial literacy	🔴	Pastoralist communities have very little understanding of livestock insurance including crop insurance and their introduction would require significant investments in awareness creation.
Technical Feasibility	Rangeland dominance	🟡	Rangelands are the main land cover only in the north of the country, where steppes dominate. Towards the south, rangelands become fragmented with the increase in croplands, human settlements and woody plant covers. This is a culmination of land cover changes over the last fifty years, where a high proportion of savannahs have been replaced by agricultural land.
	Seasonality and signal intensity	🟢	The seasonality is well-defined and homogeneous across the areas that are considered feasible for the implementation of IBLI product design, with the growing season spanning from late June to early November. The only exception is the Est unit in the south of the country, where the rainy season is significantly longer (i.e. from late May to mid-November).
	Overall feasibility of product design	🟢	The areas that would be suitable for IBLI product design cover 16.4% of Burkina Faso. An additional 8.6% is also suitable but requires confirmation from local stakeholders on the extent and use of rangelands during the product customization to eventually customise the product design. These regions host about 30% of the national livestock herd.

			Justification
Operational Feasibility	Technical capacity on index calculation and quality assessment	🔴	There are multiple institutions supporting agro-meteorological and extension services (e.g. National Meteorological Agency (ANAM) and Direction Nationale de la Météorologie (DNM)), but national-level institutional capacity in handling the data component of index-insurance initiative seems limited. There is little or no availability of livestock data or information for linking weather data related to livestock production. Regional institutions such as Centre Régional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle (AGHRYMET), Action Contre la Faim (ACF) or the African Risk Capacity (ARC) could support data management tasks and capacity building at a national level.
	Legal and regulatory insurance environment	🟢	Burkina Faso is a member of Conférence Interafricaine des Marchés d'Assurances (CIMA), which already has regulations in place for IBDRFI. CIMA recently introduced regulations for Sharia-compliant products, although the demand for them has not been expressed.
	Insurance market development	🟠	Burkina Faso has a relatively less developed insurance market compared to its neighbours like Mali and Senegal. There are, however, several private general insurance companies and banks, which have now introduced some crop insurance products, including index-insurance. Furthermore, the Ministry of Animal and Fisheries resources has recently launched a cereal crop insurance covering droughts and climate related losses. This indicates growing interest and capacity in the agricultural insurance sector. However, no initiatives have been conducted in the pastoral regions.
	Interest from insurers in IBDRFI	🟢	Several insurance companies, such as Yelen Insurance, Coris Assurance and Inclusive Guarantee have expressed interest in solutions targeting pastoral areas, which include product design and distribution. The ARC is also operating in the country and has interest in expanding drought cover to rangelands.
	Effective distribution channels	🟠	The insurers' presence in pastoral areas is limited or absent. However, the good DFS network, which is currently used for cash transfer programs and providing micro-savings and credit services might offer the opportunity to support effective distribution channels if targeted investments are made.
	Existing pastoralist beneficiary registries	🔴	Currently there is no registration system in place. So far, most of the registration processes have been done through international development organizations. However, in the framework of the national shock-responsive social protection program, there are plans to establish a household registration system. This could be an asset for an IBDRFI initiative in the country.
	Finance available for premiums	🟠	While this study could not assess the potential for premium subsidy support for IBDRFI in the pastoral regions, ongoing government initiatives on cereal crop insurance supported by the German Federal Ministry for Economic Cooperation and Development (BMZ) indicate that there is interest, and it may be possible to introduce premium financing in the country.
	Interest from government	🟠	The government of Burkina Faso has established a drought risk management framework, including early warning systems, food distribution and cash transfer programs. The government has also indicated a general interest in IBDRFI initiatives targeting pastoral systems. A possible entry point for a pastoral initiative could be the scalability mechanism of the social safety net system that has been recently rolled out.

🔴 = low; 🟠 = medium; 🟢 = high.

FIGURE E.1 TECHNICAL FEASIBILITY OF IBDRFI PRODUCTS IN BURKINA FASO



Source: Authors' own elaboration.

Recommendations

Considering the limited scope of a feasibility study, the next steps toward implementing an IBDRFI initiative in Burkina Faso would require an in-depth engagement with country stakeholders and the planning of analytical studies to address knowledge gaps identified in this assessment. The details are provided in Chapter 5 of the main report.

Next steps

Stakeholders' engagement and policy support

R1: There seems to be willingness from the government of Burkina Faso to consider an IBDRFI initiative. Policy dialogue should be established between the following ministries: Agriculture, Animal and Fishery resources; Finance and Economy and the directorate general for the Promotion of Rural Economy (DGPER), to review the priority objectives and implementation modalities. Based on this feasibility study and indications from national stakeholders, one option to be considered is the linkage of a macro-level social livelihood protection IBDRFI initiative targeting pastoralists with the ongoing efforts to develop a shock responsive scalability mechanism of the social safety net system. This might guarantee that important investments on the DFS infrastructure, registration systems and awareness creation are made and that the most vulnerable households are protected.

R2: In support of the policy dialogue, a technical working group (TWG) should also be established to provide technical backstop and support decision-making. The TWG should ideally include representatives of the relevant ministries, national/regional agro-meteorological institutions, NGOs and development organizations active in the pastoral regions, pastoral associations, peace building and conflict resolution coalitions and private sector actors with interest and/or experience in IBDRFI. The terms of reference for the TWG should be designed to support decision-making by providing technical backstop mechanisms during the program design stage, scheme implementation structures, product design customization, quality assurance, monitoring and evaluation frameworks, awareness creation efforts and evaluation of suitability to specific target areas.

Next steps

Follow-up actions

R3: Cost-benefit analysis.

- **A comparative technical approach is recommended where multiple IBDRFI products can be identified, and a cost-benefit analysis carried out prior to implementation.** This will require linking weather data with livestock production data. Regional institutions such as AGHRYMET, ACF or the ARC could support data management tasks and capacity building at the national level.

R4: Conflict mitigation

- **In-depth analysis of the security situation and the potential operational implications for IBDRFI initiatives.** Though IBDFRI schemes have been implemented in highly insecure areas before, the complexity of issues surrounding conflict and insecurity varies from one area to another. Extremist-led violence, ethnic conflicts and clashes between farmers and pastoralists driven by competition over land resources have different implications on IBDFI implementation. The former two pose operational challenges, while the latter can be potentially mitigated with an IBDRFI initiative, for example, by designing pay-out structures, which could limit transhumance toward cropping areas before harvest. Hence, it would be critical to carry out detailed engagements with stakeholders who have been working in these areas to understand the inter and intra-community dynamics to help design an effective solution.
- **Analysis of potential complementary interventions to enhance IBDRFI pay-out effectiveness, facilitate uptake and mitigate conflicts between pastoral and farming communities.** Complementary interventions targeting feed/fodder supply, veterinary services and livestock production are important to ensure that pay-outs are effective in protecting livestock assets and livelihoods. As such, a review of existing programs in the pastoral areas could be conducted to assess locations where such investments have already been made or are planned, thus presenting ideal conditions for rolling out the scheme.
- **Analysis of potential impacts of IBDRFI pay-outs on conflicts between farmers and pastoralists and consideration for pay-out distribution approaches that would potentially mitigate these conflicts.** It would be critical to address the migration of pastoralist to the southern agro-pastoral and farming areas during the dry season, which is a major cause of conflicts. IBDRFI wet season pay-outs in the event of drought can reduce the need for early transhumance toward cropping areas (i.e. before crop harvest). These mechanisms should be accompanied by broad sensitization of communities to the mutual benefits of the migration process and more efficient use of resources through exchange (e.g. crop residue), in partnership with pastoral associations and relevant ministerial departments to institutionalize this within the Framework Law on Pastoralism.

R5: Product Design

- Once insurance products have been identified for specific agro-ecological zones and assuming there is government buy-in, the index spatial aggregation units should be defined considering the limited mobility of most livestock keepers in the country. The design needs to be carried out consultatively with local stakeholders during the preparatory phases of IBDRFI schemes. One important element is the definition of the insurance unit, which should reflect areas typically used by pastoralists for grazing during the wet season, including their mobility patterns. Considering the limited mobility of pastoralists in Burkina Faso, particular attention should be dedicated to this step, as the size of insurance units might be smaller than in existing IBDRFI programs. In addition, alternative design options (e.g. pay-out schedules) could also be considered.

R6: Public Policy

- **Government must consider investing in building blocks such as data infrastructure, herd registries, weather stations, furthering the reach of the DFS services in pastoral areas etc**. Depending on the type of product(s) chosen (either micro, meso or macro and/or possible combinations), further investigation of premium financing options for both micro-level retail IBDRFI and meso/macro-level covers should be conducted, while identifying ways of aligning different drought risk financing insurance mechanisms and programs for pastoralists.

Next steps

R7: Distribution and delivery

- **Review of alternative distribution models (including meso-level), with the goal of identifying models that could maximize social cohesion and inclusiveness.** Pastoral communities rely strongly on social capital and various traditional practices reinforce this social cohesion. However, there is a growing inequality among pastoral households, with richer households owning disproportionately more livestock than poorer ones. Bearing this in mind, a meso-level (i.e. group-based) distribution might be a better alternative than micro-level distribution for IBDRFI in the country. This also addresses elements of social cohesion and inclusion within pastoral communities. Further engagements with service providers active in pastoral areas would be useful not only to explore such models but to also understand their viability.
- **Study on the potential distribution channels and ongoing DFS initiatives in the country from public, private and international development actors**. Findings and engagements with stakeholders indicated that local banks, micro-finance institutions and cooperatives are better placed to distribute livestock insurance products, while complementing this with digital platforms to reduce the cost of transactions. The use of digital platforms could also be a solution to reach areas with higher insecurity. One aspect deserving special consideration is support for the development of a household registration system, currently under consideration by the government. Furthermore, a better understanding of the demand for services and level of financial access in the pastoral areas is required.

R8: Capacity building and learning

- **Public and private sector capacity needs' assessment.** Capacity building in these sectors has been identified as a priority area of intervention. This would apply primarily to the public institutions that are mandated to undertake agro-meteorological and extension services, but also to institutions tasked with emergency response. For the private sector, capacity assessment would be mainly in the areas of IBDRFI technical design and operational implementation capacity in the pastoral regions.
- **Consideration by the government to invest in building blocks.** Since there is interest from the government in insurance products related to drought risk mitigation, logically it would be important for the GoBF to consider investments in the building blocks for effective IBDRFI solutions such as data infrastructure, herd registry, weather stations, furthering the reach of DFS services in pastoral areas, among others.
- **The issue of financial illiteracy could be a considerable challenge in implementing IBDRFI solutions**. The involvement of local institutions in developing and conducting financial literacy campaigns could be a solution to address this challenge. Extension workers who are part of the national producers' association could be engaged for the same.
- **Monitoring and evaluation strategy, as part of a broader learning framework to ensure that appropriate mechanisms for quality assurance and impact evaluation are in place.** Considering the lack of experience in IBDRFI and the limited financial literacy, it would be essential to establish effective monitoring mechanisms that ensure not only the verification of the project implementation but also the actual engagement with the communities. Their active participation in product reviews through feedback and recommendations on 'what works and what does not work' is vital. In addition, a proper impact assessment study (multi-annual surveys) is recommended to demonstrate, in a rigorous way, the benefits of the proposed initiative on pastoralist resilience and welfare. This will ensure that unwanted secondary impacts (unintended consequences) will not be stimulated by the intervention e.g. pasture degradation and conflicts.

1. Introduction

1.1 Background

This is a report for the project entitled, *'Feasibility analysis for a pre-arranged (DRFI) solution for livestock in the Sahel,'* conducted by the International Livestock Research Institute (ILRI) and the World Bank Group (WBG). The aim of the project was to assess the feasibility of implementing a financial protection solution against drought in the pastoral regions of four Sahelian countries (Burkina Faso, Niger, Mali and Senegal) and to discuss the most effective implementation modalities (as part of wider drought risk management and pastoral development initiatives) with local stakeholders from the public and private sector.

Among the various DRFI solutions, index-based approaches are particularly suitable for smallholder farming and extensive pastoral systems. Index-based drought risk financing and insurance (IBDRFI) instruments trigger pay-outs/ financial response based on an 'objective' index approximating the impact/loss. Indices can be based on ground network measurements (e.g. meteorological and crop yield data) or beey Earth Observation (EO satellite data (e.g. rainfall estimates, vegetation indices and soil moisture).

The study was conducted against the background of an ongoing discussion to scale-up regional or national-level IBDRFI initiatives in the Sahel and Horn of Africa (HOA) as part of a comprehensive agenda to increase the resilience of pastoralists to climatic shocks. For the last decade, IBDRFI solutions for pastoralists have been implemented and scaled-up in Kenya and Ethiopia using different modalities that include micro-insurance, macro-level social livelihood protection, scalable safety nets and sovereign level insurance programs. The positive impacts and overall success of these initiatives have attracted growing demand and interest from African governments and development organizations as they explore the possibility of introducing similar approaches across other pastoral regions on the continent. In addition to the countries targeted by this project, feasibility and pilot studies have been conducted or are ongoing in Djibouti, Somalia, Sudan, Uganda, South Africa and Zambia.

This report presents the main findings and recommendations on the feasibility of implementing an IBDRFI solution for pastoralists in Burkina Faso. This study was conducted from March 2020 to February 2021 by a joint team of ILRI and WBG experts. This was accomplished through a combination of literature reviews, in-country data collection, interviews with key informants (local public and private sector stakeholders) (Appendix 4) and dedicated technical analyses using satellite imagery and risk modelling approaches.

The feasibility study in Burkina Faso was designed to assess the potential of launching IBDRFI initiatives in the country, providing the government, private sector stakeholders and development institutions with sustainable solutions that cushion pastoral households against the impacts of severe drought shocks. The study also provides background knowledge required to make informed decisions on whether investing resources and implementing an IBDRFI program can achieve desired public policy objectives.

The feasibility study investigated the context, needs, challenges and potential solutions for implementing IBDRFI initiatives targeting pastoralists in Burkina Faso. Therefore, the following three main areas were analysed:

1. **The socio-economic context and potential demand for IBDRFI products (socio-economic feasibility, Chapter 2).** From a national perspective, extensive livestock systems should be an important component of the rural economy, making IBDRFI solutions for pastoralists a worthwhile investment. From a development and demand perspective, livestock assets are important to rural households' livelihoods and welfare, such that their protection would be critical for resilience building. These conditions are also critical to understand the type of IBDRFI solutions that would be more relevant (i.e. commercial micro-insurance, social livelihood protection coverage, social safety net etc. See the next section).
2. **The technical design of a satellite-based drought index for extensive rangeland systems (technical feasibility, Chapter 3).** A simple, robust, low-cost index design leading to an accurate IBDRFI product is a critical pre-condition for implementation. Satellite-based indices should be reliable indicators of the impact of droughts on forage resources. The assessment, therefore, evaluates the geographic extent of the area where the technical design of an accurate satellite IBDRFI index would be possible. The feasibility factors considered included the coverage of rangeland, rangeland vegetation cover/density and the vegetation seasonality, which are critical for the design of EO drought indices.

3. **The operational conditions for an IBDRFI scheme (operational feasibility, Chapter 4).** Designing and implementing an efficient supply chain for IBDRFI solutions in extensive pastoral areas is challenging and often requires substantial initial investments. The assessment of existing infrastructures and networks for financial services delivery, institutional and private sector capacity and interest, existing legal and regulatory frameworks and technical and financial constraints is therefore essential to determine the level of investment required to launch the initiative.

In addition, this study provides a simple scenario analysis to illustrate the historical pay-outs and hypothetical costings of example IBDRFI structures (scenario analysis, Chapter 5). This analysis provides an overview of the multiple scenario-based benefits and costs of the proposed insurance scheme to the government of Burkina Faso, private sector and development institutions. This is for illustrative purposes only, with the aim of showing simple examples of how the technical product customization and the choices made on different programmatic options and objectives, have fundamental cost/benefit implications. As such, it should be noted that the proposed scenarios are not meant to be recommendations for a specific option, nor do they represent an exhaustive range of IBDRFI solutions. Thus, a detailed analysis of alternative programmatic options and product design customizations needs to be planned with local stakeholders during the early implementation stages of future initiatives.

Findings from different components of the study are summarized in a set of recommendations for the next stage of implementation (Section 6). It should be noted that the scope of this assessment is limited to the determination of whether important requirements for the development and introduction of an IBDRFI initiative for pastoralists are met and to provide recommendations for the subsequent planning and preparatory stages of implementation.

The feasibility study is largely built on technical solutions, experiences and programmatic options implemented in east African countries, which were used as benchmarks for the assessment. As such, the IBLI product design[3] is used for the technical assessments, while IBDRFI programmatic options were based on the main ones tested so far. Thus micro-level retail and macro-level social livelihood protection schemes that provide direct pay-outs/cash transfers to policyholders or beneficiaries are presented in the scenarios.

However, the feasibility conditions should be considered as widely applicable to alternative IBDRFI options, which should be evaluated and tailored according to the country's policy priorities in drought risk management and social protection. During the program design phase, alternative drought index design approaches might need to be considered, given that the Sahel pastoral regions present significant ecological and socio-economic differences to those prevailing in east Africa. Although alternative programmatic options such as meso-level or sovereign level insurance are not discussed in detail in this report because of the lack of direct implementation experiences in pastoral areas, these models might need to be considered.

1.2 Index-based drought risk financing solutions for pastoralists

Drought risk financing and insurance (DRFI) refers to mechanisms that aim to reduce adverse socio-economic or ecological impacts of potential crises. This can include paying to prevent and reduce the risk, or preparing for and responding to a shock. Drought risk financing and insurance is becoming an integral part of climate risk management frameworks as a key component of financial protection strategic planning for low and middle-income countries.

Multiple DRFI approaches exist, including market-based instruments (e.g. insurance schemes, catastrophe bonds and swaps), contingent financing (e.g. credit), or budgetary tools (i.e. dedicated reserve funds or contingency budgets). These approaches are all designed to increase financial resilience to climate-related shocks, linking the response actions to pre-defined mechanisms for timely release of financial resources. In this way, they aim to ensure rapid and cost effective preparation, assistance, recovery and reconstruction efforts.

Different IBDRFI solutions for pastoralists have been developed and implemented since 2010 in east Africa. These include micro-level retail insurance products, macro-level social livelihood protection coverages, scalable safety nets programs and sovereign-level drought risk financing solutions (see Appendix 1.1 for differences between micro and macro-level products).

- A micro-level retail insurance product, IBLI, has been sold and scaled-up by local insurance companies across northern Kenya and southern Ethiopia since 2010 and 2012, respectively.

3. Henceforth for simplicity, IBLI is used as a generic term to indicate drought index-insurance products based on Normalized Difference Vegetation Indices (NDVI) satellite imagery designed specifically for pastoralists. Across different programs, the product design often changes, although the underlying technical design principles are largely similar.

- Macro-level[4] social livelihood protection programs were implemented in Kenya from 2015 under the Kenya Livestock Insurance Program (KLIP) launched by the government of Kenya with technical support from the WBG and ILRI. In Ethiopia, the programs were implemented by the World Food Program (WFP) and the regional government of the Somali from 2018 under the Satellite Index Insurance for Pastoralists in Ethiopia (SIIPE) program. In 2020, the WFP, International Fund for Agricultural Development (IFAD) and the Ministry of Fisheries and Livestock launched a similar scheme targeting 5 000 livestock keepers in Zambia. This scheme is currently at the pilot stage.
- Scalability mechanisms of safety net programs have since been implemented in Kenya under the hunger safety net program (HSNP) and in Uganda under NUSAF III. In 2015, the government of Kenya (GoK) implemented a flexible scalability mechanism of the HSNP, an unconditional cash transfer program in the arid and semi-arid (ASAL) counties, which expands rapidly to cover additional households in case of drought. Similarly, the NUSAF III program was launched in Uganda in 2016 as a social safety net that includes a scalable public works mechanism, allowing it to rapidly increase financial assistance to affected people during drought periods.
- A sovereign-level drought risk financing solution for rangelands currently offered in east Africa and the Sahel was piloted by the ARC in collaboration with ILRI in Kenya.

Besides the operational options just listed, alternative IBDRFI programmatic implementation schemes might also be promising in the pastoral context considering the lessons learnt in east Africa as well as the context-specific policy objectives (ILRI 2021). For example, while never tested in extensive pastoral regions, the potential for meso-level insurance may hold the greatest promise. This entails selling policies to risk aggregators such as pastoralist cooperatives, rural finance institutions or livestock services organizations e.g. suppliers of veterinary drugs and feed supplements. Meso-level distribution also offers the potential of de-risking lending to pastoralists and thus boosting investments in pastoral value chain upgrades. Box 1.1 presents an overview of micro, meso and macro distribution approaches.

Box 1.1 Applications of index insurance at different levels of aggregation

Micro-level (direct): Policyholders are individuals, e.g. farmers, market vendors or fishers, who hold policies and receive pay-outs directly. These policies are often sold at the local level and retailed through a variety of channels, including micro-finance institutions, farmers' cooperatives, banks, NGOs and local insurance companies. Premiums are either paid in full by clients or subsidized (or both).

Meso-level (indirect): Policyholders are risk aggregators such as associations, cooperatives, mutuals, credit unions or NGOs, whereby a reinsurer makes payments to the risk aggregators, which then provide services to individuals.

Macro-level (indirect): Policies are held by governments or other national agencies, within the international/regional reinsurance market. Pay-outs can be used to manage liquidity gaps, maintain governmental services or finance post-disaster programs and relief efforts for pre-defined target groups. Beneficiaries of these programs can be individuals. These schemes can be operationalized through regional risk pools.

Source: Schaefer and Waters 2016

There are currently several major parallel initiatives in east Africa to study the feasibility of regional scaling up of IBDRFI solutions for pastoral communities. These initiatives can provide useful insights into the design and planning of an IBDRFI program in Burkina Faso and the Sahel. During 2020-21, the Foreign, Commonwealth and Development Office of the government of the United Kingdom funded a study under the Drought Index Insurance for Resilience in the Sahel and HOA (DIRISHA), to scale up IBDRFI solutions for pastoralists in the eight (8) Inter-governmental Authority on Development (IGAD) counties. This study was implemented by a research team from ILRI and the findings have been published. In addition, the African Development Bank (AfDB), WBG and the European Union intend to launch a major investment program (estimated at USD 15 billion) in the HOA.

The intended investment pillars include: (1) regional infrastructure networks, (2) trade and economic integration, (3) building resilience and (4) strengthening human capital. Pillar 3 includes the development of a regional pastoralist livestock insurance scheme. Insurance would enhance the financial inclusion of pastoralists (through promotion of savings and access to credit) to strengthen their drought resilience by protecting their livestock assets. Ultimately, the delivery of insurance with complementary programs designed to improve pastoral production systems would increase livestock productivity, incomes and livelihoods (WBG 2020a). These two initiatives should provide useful insights to the design and implementation of IBDRFI products and programs in Burkina Faso and other Sahel countries with large pastoral communities (ILRI 2021).

4. The difference between macro and micro-level programs in that the former (macro-level) governments receive a lump sum pay-out and then decide how to distribute it among the affected people; whereas for the latter the program makes direct pay-outs to individual pastoralists (beneficiaries).

1.3 The IBLI product design

All IBDRFI solutions for pastoralists currently operational in Africa rely on similar EO technologies and general principles. Satellite indicators of forage condition (NDVI, Box 1.2) are elaborated to derive an index of forage production in a given area and to calculate payments using a pre-defined pay-out function and trigger mechanism. The NDVI is a low-cost, accessible and widely used satellite indicator of drought. There is well-documented evidence of a strong relationship between rangeland biomass and NDVI for ASAL rangelands. Indeed, NDVI has been successfully used to measure the effect of progressive drought conditions on forage and grazing availability over time (Fava and Vrieling 2021).

Among those solutions, the IBLI index design, which is used in this study for technical analysis, is developed for anticipatory action and livestock asset protection in times of severe drought leading to forage scarcity.[5] The forage deficit estimated by the satellite index is used as an early indicator that drought conditions are going to negatively impact forage availability and livestock health and ultimately, pastoralists' livelihoods (Appendix 2). Because the satellite data provides near real-time assessment, pay-outs are triggered at the end of the rainy period (i.e. the most critical period for pastoralists to plan herd management) in the event of a drought. These pay-outs are then able to support pastoralists to make informed and financially supported tactical decisions to better protect their livestock assets and thus cope with the shock. The pastoralists may accomplish this through timely purchase of fodder and animal feed supplements to keep core breeding animals alive well before incurring major livestock losses. Studies in east Africa suggest that an anticipatory response is significantly more cost-effective in protecting assets and livelihoods than humanitarian aid in later stages of crises (USAID 2018).

The IBLI product design is specifically tailored for pastoralists in extensive pastoral systems where mobility is an important herd management practice and livestock mostly depend on rangeland resources. The coverage is offered for relatively large geographical units where the wet season grazing areas are located. The units are designed jointly with local pastoral communities to reflect typical short-range livestock grazing and mobility patterns during the wet season. The product is not currently designed for transhumance corridors or long-distance dry season grazing areas.

Box 1.2 Satellite NDVI

The NDVI is a relative indicator of green vegetation cover or vigour obtained by measuring the difference between near infra-red and reflectance. Higher NDVI values indicate denser cover or healthier vegetation and vice versa. In the context of operational NDVI-based IBDRFI products for pastoralists, NDVI is used as a proxy for forage availability, since during a normal wet year/season, vegetation has higher NDVI than during a drought year/season.

While alternative satellite indices of drought exist, such as satellite rainfall estimates and soil moisture products, NDVI is currently the most widely used indicator for operational systems for drought early warning, monitoring and index insurance in African rangelands. This is because of the well-established relationship between NDVI and vegetation condition, which is in turn directly related to forage resources available for livestock.

Recent developments in EO missions and technologies are opening new opportunities for designing innovative indices for IBDRFI initiatives, including rangelands and extensive pastoral systems (Fava and Vrieling 2021). Alternative EO-derived indicators, e.g. rainfall estimates, evapo-transpiration and soil moisture or drought indices, provide a wide range of options to design new products (Fava and Vrieling 2021). Initiatives such as the NGDI aim to expand the range of options for designing IBDRFI solutions by developing a practical framework for a set of indices or indicators that will better monitor, anticipate and trigger financial responses to severe drought events. Others, such as the University of California, Davis/USAID Quality Index Insurance Certification, aim at establishing effective approaches for IBDRFI product assessment and for defining minimum quality standards. These efforts are expected to permit development of innovative indices tailored to specific needs, co-generated with stakeholders and validated with high quality scientific standards.

5. It should be noted that satellite NDVI is sensitive to multiple factors affecting the vegetation, including some perils other than drought, such as floods, fires and pests etc. The IBLI index is, however, designed to specifically target drought effects on vegetation and minimize the impact of other factors which might affect the NDVI signal. As such, while the NDVI might also be used to design multi-peril insurance coverage, this is not the case for the IBLI design in this study.

1.4 Impacts and lessons learned from implementation

The IBDRFI initiatives implemented by ILRI in Kenya and Ethiopia thus far have produced valuable implementation lessons and evidence on the positive impacts for governments and pastoral communities. Key impacts are summarized in Figure 1.1. They have also provided proof of concept with different implementation schemes tailored to the specific country needs, ranging from commercial insurance programs with various levels of subsidies to government funded macro-level social livelihoods protection programs that target the most vulnerable pastoralists. This has created strong demand for IBDRFI instruments from several countries across the region and greater interest from development partners to respond to this demand.

FIGURE 1.1 SUMMARY OF IMPACTS OF IBDRFI SOLUTIONS IMPLEMENTED UNDER KLIP

1. Protect Gov. budget		Risk-transfer to the private sector	• Premium Payment reduces public financial burden in case of drought • PredicTable and budgeted expenditures allow better reSource allocation and harmonization with complementary initiatives	10 million USD payouts since inception made by the private sector
2. Expand markets		Public investment on subsidies and infrastructure	• Public sector premiums guarantees regular profit. • Investment in infrastructure facilities and crowds-in additional services. • More awareness on the product increases the potential for retail sales.	IBLI coverage expanded from 3 to 8 countries Number of IBLI policies increased from 4k to over 20k
3. Protect vulnerable	Good Seasons	Reduced drought risk	Intensification: Increased investments in higher-returns production strategies. • Strategic livestock sales when prices are high. 1 • Increased investments in veterinary services. 1 • Reduced precautionary savings. 1,2	Greater income 1,2
	Drought Seasons	Reduced income loss during drought	• Early action to mitigate the impact of drought	Improved post drought economic and welfare outcomes.
		Payments in anticipation of drought	• Destocking in anticipation of price and reSource shocks. • Early purchase of inputs to sustain remaining herd during the coming drought. 4	

Source: Fava et al: 2021. [1]Jensen et al. 2017; [2]Matsuda et al. 2019; [3]Janzen and Carter, 2019; [4]Taye et al. 2019

The IBDRFI solutions for pastoralists are still evolving in response to lessons learnt and growing demand from new countries. While there are consolidated operational implementation experiences in east Africa, new programs utilise the vast knowledge capital accumulated over the last 10 years to further improve the existing solutions, tailoring them to the local context and pastoral systems and supporting their harmonization into broader risk management, resilience building and pastoral development policy frameworks.

Evidence from multi-year impact evaluation surveys on the retail micro-insurance IBLI programs in Kenya and Ethiopia show these programs generated considerable social and welfare benefits for pastoralists who insured their livestock (Figure 1.1, Block 3: Protect vulnerable). During good years, insured households respond to their insurance coverage by increasing investments in livestock, veterinary and vaccination services, selling more livestock and reducing their herd size (Jensen et al. 2017; Matsuda et al. 2019). These changes in production strategies result in positive impacts on indicators of well-being even during drought seasons. These include increased household income per adult equivalent and reduced reliance on costly strategies, such as distress selling of livestock or skipping meals (Janzen and Carter 2018; Jensen et al. 2017; Matsuda et al. 2019).

Analyses of the use of pay-outs from pastoralists in Kenya and Ethiopia indicate that pay-outs influenced the decision-making of pastoralists on coping strategies and were used both for livelihood protection and for purchasing livestock inputs. A study using data from a survey of over 1 000 KLIP beneficiaries in Marsabit and Isiolo after the 2016-17 drought examined how the beneficiaries changed their coping strategies in anticipation of payments and how they spent those funds once they were received. A large majority (70%) of respondents reported using some of the pay-outs for human food, but others also used pay-outs to buy inputs such as forage/fodder, water and veterinary services for their livestock (Taye et al. 2019).

The experience of KLIP has provided evidence that the establishment of a public-private partnership (PPP) model for implementing IBDRFI is effective in transferring risk to the private sector while crowding-in private sector capacity and stimulating market expansions. The PPP model was preferred for KLIP because private sector-only implementation proved difficult to scale-up and maintain the private sector's appetite to offer micro-level retail coverage, due to the high costs of distribution and the relatively low uptake. The PPP helped in developing a new model for implementing IBDRFI solutions. Lessons learned from the implementation of KLIP are summarized as follows:

- Government leadership and direct investment in IBDRFI initiatives are possible and can be effective if associated with a strong partnership with the private sector with clearly defined roles and incentive structures. A mechanism for long-term public commitment needs to be established to guarantee the stability of the scheme.
- Premium subsidies for scaling up and consolidating the scheme are important and instrumental, but they also need to be associated with smart targeting mechanisms and incentives to the private sector to allow market development and expansion.
- Financial education, specifically insurance education, awareness creation and capacity strengthening at all levels is fundamental and requires enough resources for such schemes to achieve sustainability.
- Impact assessment requires investment, planning and preparation. It is, therefore, recommended to include a rigorous impact study and cost-benefit analysis of the program during the design phase, to ensure that evidence is gathered.
- The introduction of an anticipatory logic in the IBLI and KLIP index design (for drought early detection and livestock-asset protection) has been a fundamental step to improve the value and cost-effectiveness of the scheme.
- Accurate insurance product design is critical to create trust and effectiveness, but nowadays the data infrastructure for products' quality assessment and comparison is weak, if not absent. The need for robust, transparent and actionable strategies and methodologies for quality assessments of index insurance products is thus a priority.
- Establishing effective pay-out delivery channels to guarantee timely payments is essential and requires dedicated strategies and mechanisms. Even though the product is optimally designed to provide early pay-outs for asset protection, any operational inefficiencies in the disbursement of payments, especially for large pay-outs, might compromise the effectiveness of the insurance cover and damage its credibility from a client's perspective.
- Engaging with local and international stakeholders and tailoring the IBDRFI product to the specific agro-ecological and socio-economic context and evolving environmental conditions is a fundamental necessity during the program design phases as well as the entire program implementation cycle.
- Effective implementation is just as important as technical design. It is important to ensure that any premium collection design includes a robust digital payment infrastructure such as the use of Mpesa in Kenya and Bel-Cash in Ethiopia before the launch of similar schemes. Leveraging on existing financial service infrastructures is crucial to ensure development impact is achieved, trust is built and the scheme is sustainable.
- Scaling up IBDRFI initiatives requires strong coordination and harmonization efforts using different drought risk management instruments to optimize their finance mechanisms, targeting approaches, data and management infrastructures.

However, lessons learnt so far also show that there are still significant challenges to be addressed in implementing IBDRFI in extensive pastoral regions, particularly in terms of financial sustainability and effective product distribution. The micro-level retail insurance schemes still have significant challenges in terms of low adoption rates and significantly high transactions costs for marketing and distribution, making the products unattractive for private insurance companies if they are not significantly subsidized. On the other hand, the macro-level and safety net schemes for social livelihood protection encounter challenges related to the long-term commitment of government budgets and efficiency of the distribution model.

A recent study conducted under the DIRISHA program clearly shows that there is a need to identify new low-cost distribution channels for IBDRFI in east Africa (ILRI 2021) and that meso-level channels might represent a feasible option. This is likely to apply equally in Burkina Faso and other parts of the Sahel. Over the past decade the micro-

level IBLI programs in Kenya and Ethiopia have operated at a financial loss because of the very high administration and operating costs of implementing insurance with individual pastoralists who are often located in very remote areas. The unit costs of promotion, awareness and education, policy issuance and premium collection for individual pastoralists have exceeded the premiums generated from each micro-level policy sale. For micro-level IBLI programs to operate at a commercial profit, they will require new and more cost-effective ways of marketing and delivering cover to clients.

The experience of IBLI and KLIP in Kenya and Ethiopia, respectively, also shows the need for parallel investments in resilience building and market development for pastoral communities. Insurance by itself cannot build drought resilience and protect livelihoods. Insurance is only one of many essential elements for a comprehensive risk management framework. On one hand, building resilience requires broader investments in risk information (e.g. probabilistic drought risk assessments), risk reduction (e.g. improved natural reSource management practices) and preparedness building (e.g. live animal offtake markets). On the other hand, index-insurance requires certain elements to function well. Not only is there a need for more concerted financial literacy and insurance training for pastoralists, but also systems for targeting and registering pastoralists require improvement. Strengthening of private sector markets for fodder and feed supplements and provision of veterinary services are also required because without these, pastoralists receiving pay-outs are unable to use the money to sustain their livestock (ILRI 2021).

Overall, evidence from operational insurance programs suggests significant benefits from IBDRFI instruments, both in terms of establishing mutual benefits between the public and private sectors and delivering positive outcomes for the welfare and livelihoods of pastoralists during crisis and non-crisis periods. There is still a need for better understanding of the short and long-term impacts of these programs on individual, community and environmental outcomes. Investments in robust monitoring and evaluation infrastructure and rigorous impact assessment studies are important to assess and increase the product value and to ensure the delivery of tailor-made initiatives for resilience-building of pastoral communities.

Photo credit: Anton Wagner from Pixabay

2. Socio-economic assessment

2.1 General socio-economic context

The overall conditions for economic development in Burkina Faso are extremely difficult. Burkina Faso is a landlocked country covering some 274,000 km^2. It has an estimated population of 20.3 million with an annual population growth rate that ranks among the world's highest at about 3%. The population is expected to more than double in the next three decades. Agriculture is the most important Source of livelihood for most of the population. Burkina Faso has been troubled by a rapidly deteriorating security situation in recent years, especially in the northern and eastern regions of the country. A growing disillusionment with the government has led to further deteriorating security conditions, with armed extremist groups expanding their influence into northern Burkina Faso from 2016 and operating across the Liptako-Gourma region, where Mali, Niger and Burkina Faso borders meet (AXCO 2020).

According to the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), the emergence of non-state armed groups has led to the displacement of one million people in the northern and eastern regions of Burkina Faso in 2019 and 2020 alone, resulting in 3.5 million people requiring humanitarian assistance, an unprecedented humanitarian emergency. The country is now experiencing the spread of inter-ethnic communal clashes. There is also a general lack of trust between institutions and citizens, which has been further aggravated by the ongoing COVID crisis (OCHA 2021).

Violent extremism is mainly localized in the Sahel and in the east. In northern Burkina Faso, especially in the Sahel, the reasons for conflict are not entirely religious, but rather rooted in the population's frustrations over under-development and uneven social order. In the eastern part of the country, the reasons for violence are linked to poor governance, which has led to a feeling of neglect and marginalization among the local communities (IPSS 2020; AXCO 2020). The uneven access to economic opportunities as well as basic services in the northern regions, coupled with inequalities within communities at the local level, especially the division of the Fulani community into classes, has further led to tensions in the recent years (IPSS 2020).

Since the late 2000s, gold mining has become a Source of conflict in Burkina Faso. In 2014, there were more than 700 local artisanal mines. The mines are generally accompanied by conflicts between local communities and artisanal miners on the one hand and the state and industrial companies' security forces on the other. Locally, communities are frequently engaged in violent clashes with artisanal miners mainly over water pollution and other issues such as degradation of fertile lands (IPSS 2020).

Burkina Faso is an agriculture-based economy that was able to show some growth before the security situation started to deteriorate rapidly in 2019. Agriculture is the key sector of the Burkinabè economy, providing for the livelihood of 80% of the population and contributing about one third of the national gross domestic product (GDP). At least 70% of the population lives in rural areas and 58.2% of women participate in the labour force.[6] Under-employment, low qualifications and low pay for workers, especially in rural areas, are the main drivers of poverty. Moreover, the development of the private sector is very slow and cannot absorb the growing mass of job seekers.

The contribution of agriculture to the national GDP is declining due to the emergence of other sectors, such as gold mining. Prior to the ongoing security crisis, national GDP grew on average by about 5.8% per annum (Table 2.1). There were also some economic policy successes, with Burkina Faso ranking 86/182 on the 2020 Transparency International Corruption Perception Index and 151/190 on the 2020 Ease of Doing Business Index, both relatively better than its poverty levels and human development ranking suggest. Poverty remains high with more than 40% of the population living below the national poverty line in 2018. Gross domestic product per capita amounted to USD 787 in 2019. Burkina Faso has one of the lowest Human Development Index (HDI) values in the world, ranking 182 out of 189 countries in 2020.

6. ILO STAT, accessed 26 February 2020.

TABLE 2.1 SELECTED ECONOMIC AND AGRICULTURE INDICATORS IN BURKINA FASO

Indicator	Value	Period	Source
Population (million)	20.3	2019	WBG 2021
Rural population (%)	70.0	2019	WBG 2021
Annual GDP growth (%)	5.8	2011-18	WBG 2021
GDP / capita (USD)	787	2019	WBG 2021
National poverty (% of total)	41.4	2018	WBG 2021
Ag GDP (% of total GDP)	32.6	2016	WBG 2017a
Workforce occupied in farming and livestock (% of total)	86	2016	WBG 2017a

In 2012, Burkina Faso adopted its first National Social Protection Policy (PNPS) with the aim of improving the living conditions of the vulnerable through, (i) the development of adequate and sustainable mechanisms for the prevention and coverage of major risks and the management of shocks and (ii) the extension of social insurance to all categories of workers and a broader range of benefits to cover all social risks. According to the government's social development strategy, it intends to combine the social protection schemes together with the promotion of employment, particularly targeting women and youth under the National Economic and Social Development Plan.

The PNPS also pursues the objective of achieving universal health coverage. The government adopted a law on universal health insurance in 2015 and subsequently created the National Universal Health Insurance Fund (CNAMU) in 2018. A program for exemption of health fees for children under five and pregnant women was implemented in 2016 under this fund. The priority measures now include the establishment of a single social register targeting vulnerable groups and the development of a national program to meet the needs of those groups. Due to the current security situation, the need for humanitarian assistance, especially for the displaced population is immense. Therefore, the PNPS has now been expanded in scope to include shock responses (UNICEF 2020).

2.2 Importance of livestock to the national economy

Livestock is a crucial economic sector in Burkina Faso, contributing about a third of agricultural GDP and a tenth of national GDP, in addition to being an important Source of export revenue (Table 2.2). Livestock plays an overwhelmingly important role in the cultural and economic reality of Burkina Faso. Directly or indirectly, it provides income to about 86% of the population (WBG 2017b). There is a growing appetite for meat products among its neighbours, with Ghana, Benin, Côte d'Ivoire and Niger being the main destinations for livestock exports from Burkina Faso (FEWS NET 2017). Livestock is the third most valuable of all the export commodities, after gold and cotton. In 2014, of the 45,725 t of beef and goat meat produced nationally, 2,060 t were exported (WBG 2017a).

The livestock sector is, however, growing slowly compared to the rest of the economy. From 2006 to 2013, the sector's economic performance grew on average by 2.4% per year, while sectors such as mining, communication, transport and energy grew by more than 10% per year during the same period. One reason could be the overall low level of government support to the livestock sector. While the government traditionally allocates a substantial share of the government budget to agriculture, only 1% of that tends to be allocated to the livestock sector (WBG 2017b).

Photo credit: Maljaarsreinier123 from Pixabay

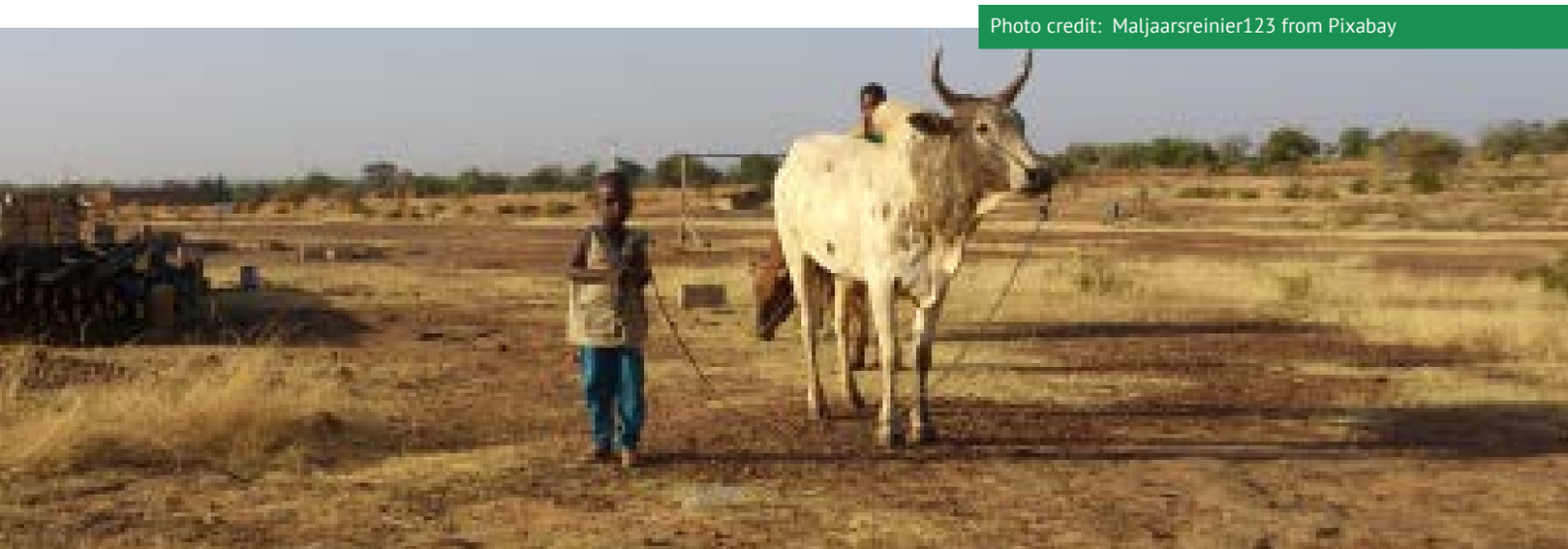


TABLE 2.2 BURKINA FASO'S LIVESTOCK SECTOR AND SELECTED ECONOMIC INDICATORS

Indicator	Value	Period	Source
Livestock sector, contribution to national GDP (% of total)	≈10	2013	WBG 2017b
Livestock sector, contribution to agriculture GDP (% of total)	35	2013	WBG 2017a
Households rearing livestock (% of total)	82	2008	GoBF and UNDP 2011
Pastoralists (nomadic pastoralists and agro-pastoralists) (% of total population)	11.5	2015	UNECA 2017
Livestock in nomadic pastoral systems (% of total)	17	2016	WBG 2017a
Livestock in sedentary agro-pastoral systems (% of total)	80	2016	WBG 2017a
Livestock in semi-intensive systems (% of total)	3	2016	WBG 2017a

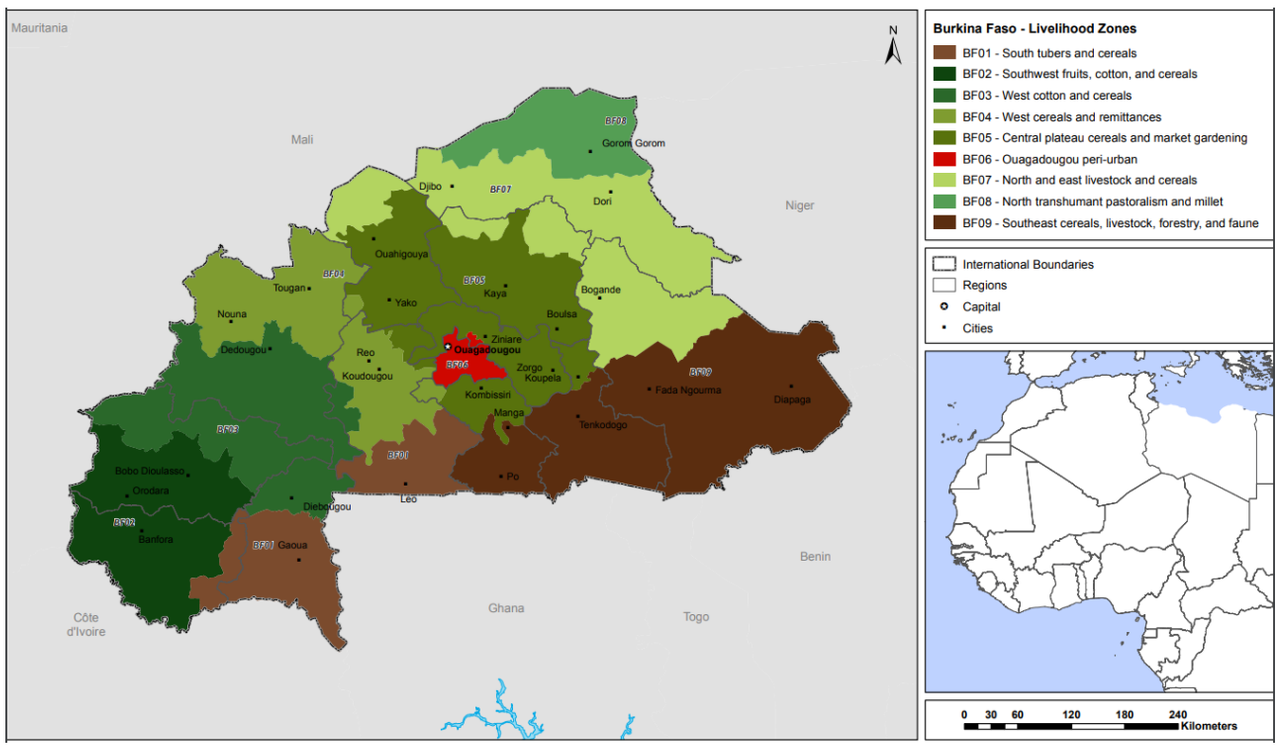
Agro-pastoralism is by far the most dominant form of livelihood in Burkina Faso. Like other Sahel countries, three broad livestock production systems can be differentiated in Burkina Faso:

1. ***Nomadic pastoralism,*** which is the traditional form of livestock production where livestock are reared extensively on communal grazing lands accompanied by seasonal migration (transhumance). However, due to large-scale droughts in the 1970s and 1980s and the growing pressures on pastoralist lifestyles, many farmers have given up this form of production, becoming sedentary (Pearson and Niaufre 2013). Today, nomadic pastoralism is practiced by a small minority of livestock producers in the northern Sahel region of the country (FEWS NET Livelihood Zone 8 Figure 2.1).[7] There are also some inflows into the country from migrating nomadic pastoralists from Mali and Niger during the dry seasons.
2. ***Sedentary agro-pastoralism.*** The vast majority of Burkinabè agriculture and livestock producers have turned to sedentary agro-pastoralism. They also maintain livestock but have fixed incomes, sedentary homes, cultivate crops, construct corrals for their livestock when necessary and, to a lesser extent, practice transhumance (Greenough and Neya 2016). The patterns of transhumance vary widely according to the climatic context and access to natural resources (Hampshire 2006). Agro-pastoralists can be found throughout the country but are particularly concentrated in the Sahel, Centre-Nord and Est regions of the country (FEWS NET Livelihood Zones 7 and 8, Figure 2.1). The Hauts-Bassin region in the west of the country is also an important agro-pastoralist region.
3. ***Semi-intensive production systems*** exist mainly in urban or peri-urban areas, but also in certain villages. These systems are mostly focused on poultry farming, pig rearing, dairy production and cattle farming and are export-oriented (WBG 2017a).

7. While only few relevant statistics are available, the number of truly nomadic pastoralists in Burkina Faso seems to be very small. For example, a study that surveyed 465 randomly sampled households in the most pastoralist-prone areas of the Sahel region in 2012 found that 96% of households engaged in crop farming and 93% in livestock rearing. This indicates that nomadic pastoralists are very rare and indeed, the vast majority of participants in the study stated that they practiced sedentary agro-pastoralism (Traore and Owiyo 2013).

Photo credit: YODA Adaman From Unsplash

FIGURE 2.1 LIVELIHOOD ZONES OF BURKINA FASO



Source: FEWS NET 2010

There were an estimated 40.7 million head of livestock in Burkina Faso in 2019, excluding poultry. As per FAO data, the national herd is comprised of goats (40%), sheep (26%), cattle (25%), pigs (6%) and donkeys (3%). Similar to other Sahel countries, the herd composition has changed over the years, e.g. in 1970, cattle accounted for 36% of the national herd while goats and sheep accounted for 35% and 23%, respectively. Livestock numbers have grown consistently over the years. Tropical livestock units (TLU)[8] of cattle, goats, sheep and camels are estimated to have grown on average by 2.1% per year between 2004 and 2019 or by a cumulative 38% (Figure 2.2). The higher livestock numbers seen in 2003 were recorded during the second national livestock survey (GoBF 2004).

8. Tropical livestock units (TLUs) allow comparison of the nutritional requirements across livestock species. Using ILRI's classification for the Horn of Africa, 1 adult cow weighing on average 250 kg is deemed to be equivalent to 1.0 TLU. In terms of nutritional requirements, a camel is equivalent to 1.4 TLUs and sheep and goats are equivalent to 0.1 TLU. It is noted that different institutions use different TLU conversion factors. For example, Houerou and Hoste (1977) use the following conversion factors for pastoral / nomadic herds: 1 cow = 1 TLU; cattle in a herd = 0.7 TLU; sheep = 0.1 TLU; goats = 0.08 TLU and camels = 1.25 TLU.

Photo credit: Imo Deen from Pixabay

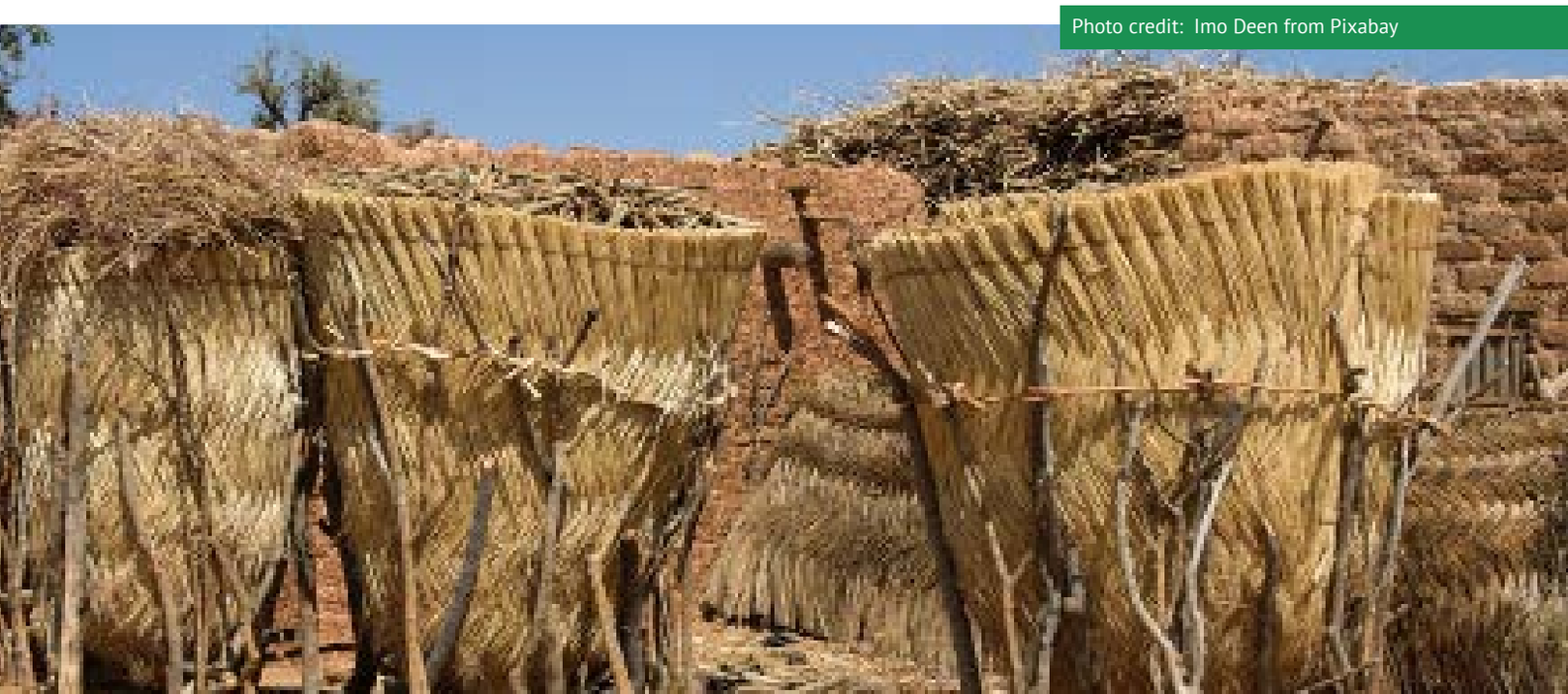
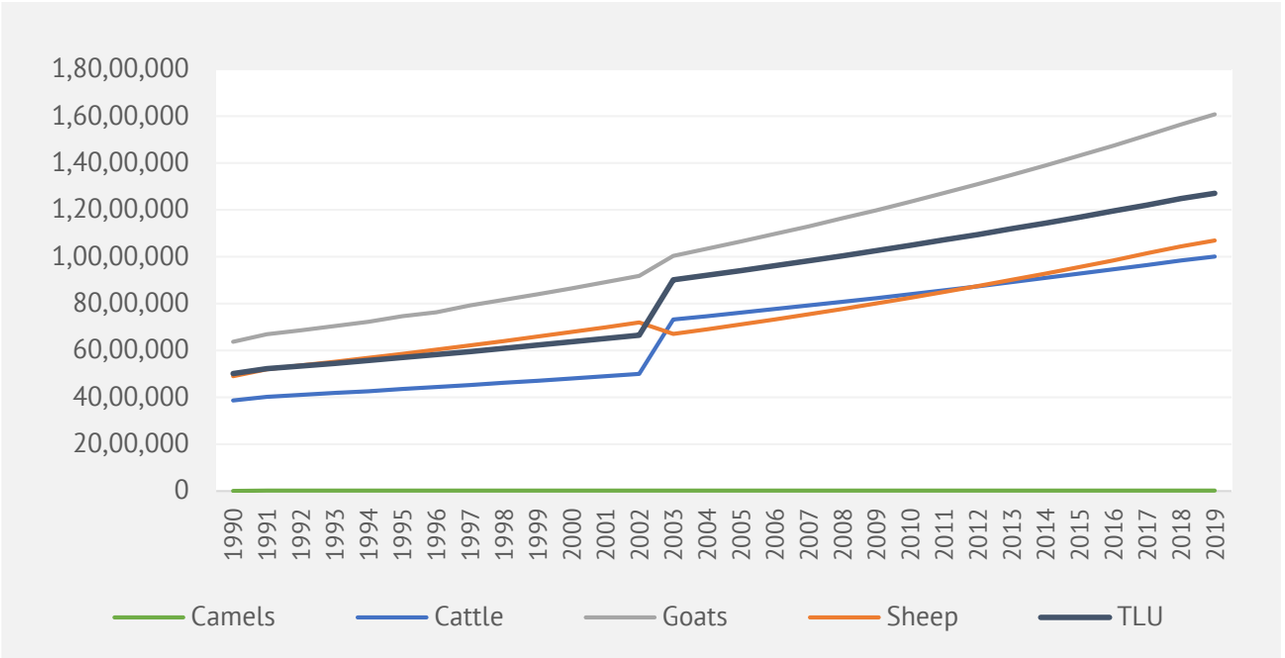


FIGURE 2.2 TOTAL NUMBER OF SELECTED LIVESTOCK SPECIES



Source : FAOSTAT 2020

Agro-pastoralists are by far the most important livestock producer group. There are conflicting data around the number of nomadic pastoralists and agro-pastoralists in the country. UNECA (2017) reports that 11.5% of the total population are either pastoralists or agro-pastoralists. However, this number seems low given that more than 80% of the population depend on agriculture for their livelihoods and various Sources report that agro-pastoralism is omnipresent in the country (e.g. GoBF 2011; FEWS NET 2017; WBG 2017b). Government data from 2007-08, show that around 82% of households own livestock and of these, 85% can be considered as sedentary agro-pastoralists (GoBF and UNDP 2011). In terms of ownership, around 80% of livestock is owned by agro-pastoralists, 17% by nomadic pastoralists and 3% by semi-intensive producers (WBG 2017a). While livestock production is practiced everywhere in the country, the Sahel region is the top producer of cattle, sheep and goats (GoBF 2008, Table 2.3).

TABLE 2.3 BURKINA FASO'S LIVESTOCK NUMBERS (THOUSANDS) BY REGION IN 2014

Region	Cattle	Goats	Sheep	Pigs	Chickens	Guinea fowl
Boucle du Mouhoun	803	1,195	761	271	4,163	1,115
Cascades	676	226	236	53	884	324
Centre	156	338	224	186	1,330	196
Centre-Est	427	1,073	731	218	2,793	521
Centre-Nord	512	1,280	1,027	76	2,436	296
Centre-Ouest	706	1,684	1,032	457	4,898	2,120
Centre-Sud	318	756	400	125	2,534	871
Est	1,034	1,470	950	130	2,535	445
Hauts-Bassins	1,509	813	850	265	4,226	896
Nord	415	1,246	921	136	2,868	588
Plateau Central	324	861	577	113	2,071	280
Sahel	1,868	2,329	1,301	4	1,383	225
Sud-Ouest	343	620	268	312	1,632	591

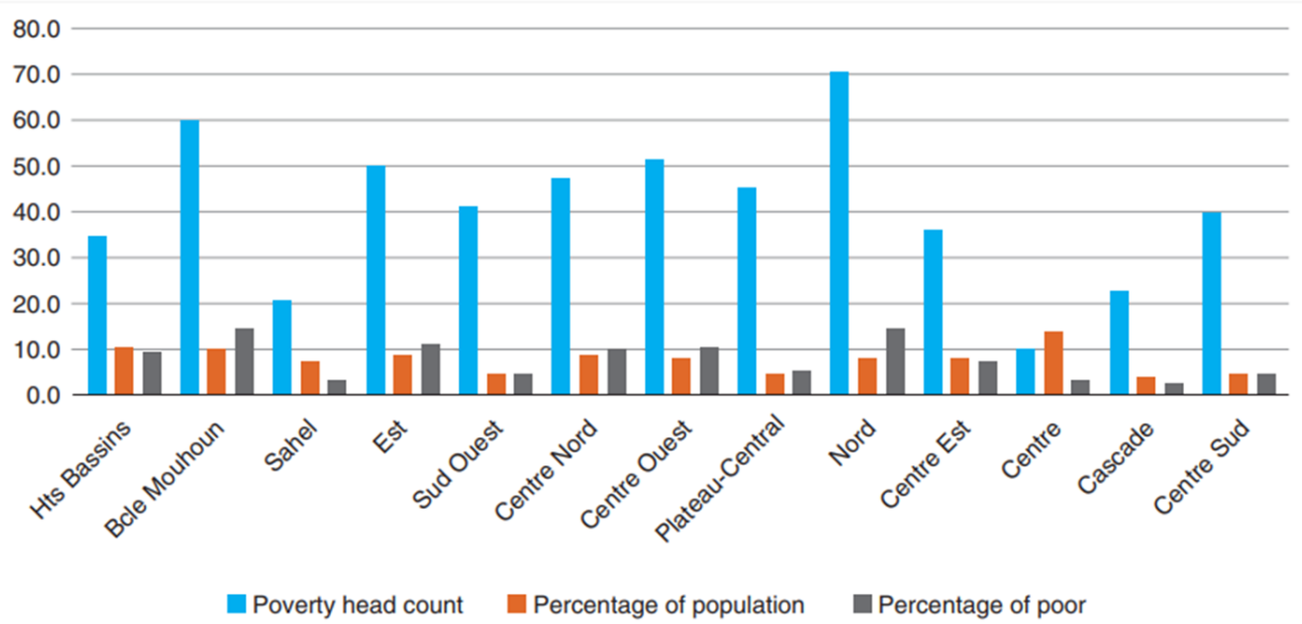
Source: GoBF 2015

2.3 Pastoral livelihoods, challenges and issues

The evidence on the relationship between livestock ownership, household wealth and food security is not entirely conclusive.

- **Regions with relatively large livestock sectors seem be less poor than regions with relatively smaller livestock sectors in Burkina Faso (Figure 2.3).** The Sahel region is the main livestock-producing region in the country, where rural households derive at least 69% of their income from livestock compared with the national average of 39% (USAID 2016). Strikingly, the Sahel region has the lowest proportion of people living below the poverty line. Meanwhile, the poverty headcount is very high in the bordering Nord region and roughly in line with the national average in the Centre-Nord and Est regions that also share a border with the Sahel region. While these three regions have relatively higher ownership of livestock among households, the proportion is lower than in the Sahel region. This has led World Bank analysts to speculate that the differences in terms of regional wealth are livestock-driven (WBG 2016). Indeed, based on 2003 government data, GoBF and UNDP (2011) similarly concluded that higher per capita ownership of cattle in some regions is associated with lower poverty levels. It should be noted, however, that the data are not granular enough to arrive at definitive conclusions.

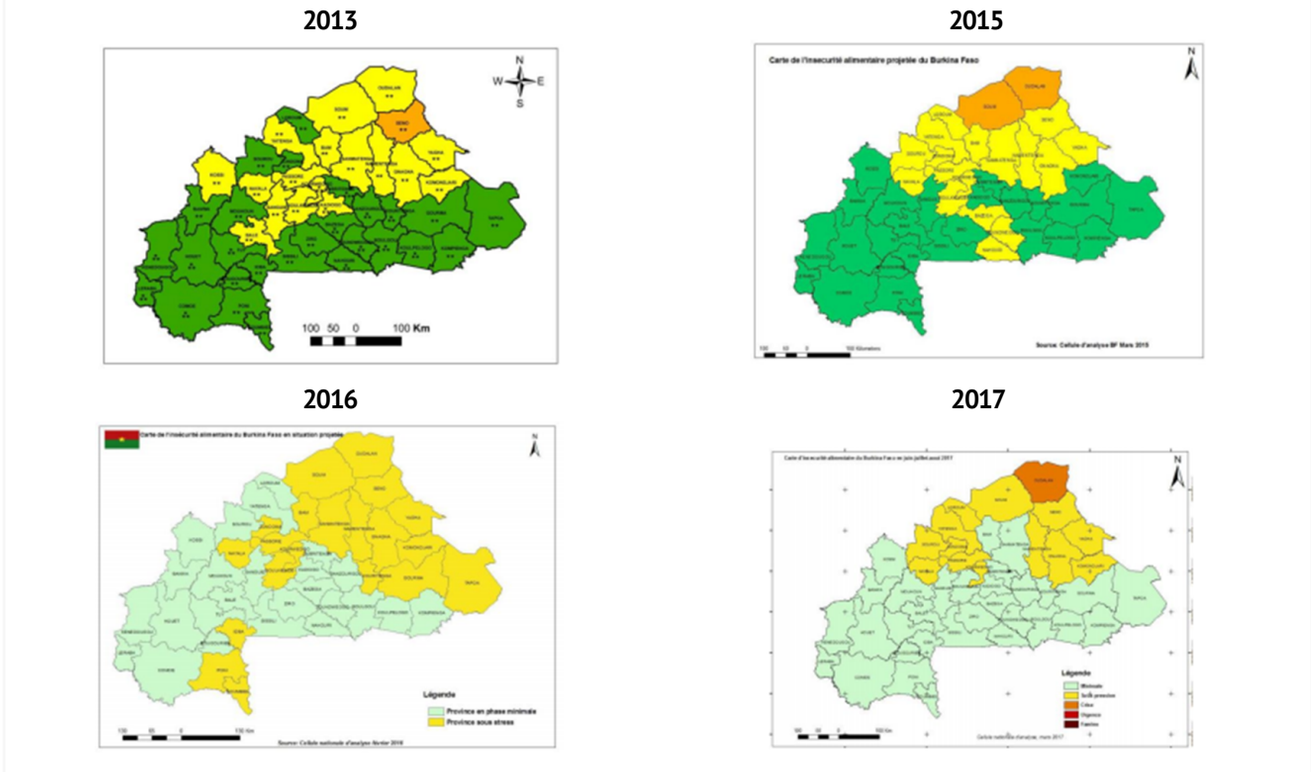
FIGURE 2.3 POVERTY DISTRIBUTION ACROSS ADMINISTRATIVE DEPARTMENTS IN BURKINA FASO



Source: WBG 2016

- **The livestock-rearing regions are relatively more food insecure than other regions in the country.** Analysis by the WFP shows that the Sahel, Nord, Centre-Nord and northern Est regions are the most exposed to recurrent food insecurity (WFP 2017, Figure 2.4), indicating low levels of resilience to external shocks in these areas.

FIGURE 2.4 FOOD INSECURITY DURING LEAN SEASONS (JUNE-AUGUST 2013-17) IN BURKINA FASO



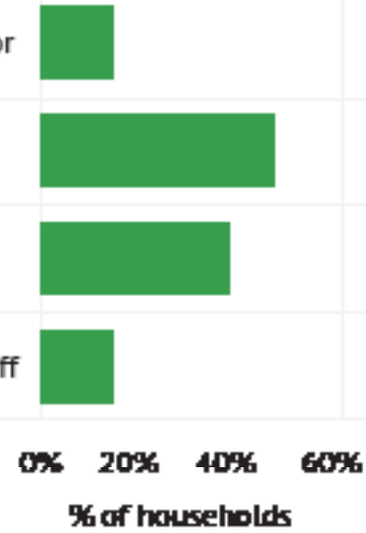
Legend:

Minimal	Stressed	Crisis	Emergency	Famine

Source: WFP 2017

- **One potential explanation is that there are high levels of inequality within the livestock-rearing regions, with richer households owning disproportionately more livestock than poorer ones.** The Famine Early Warning Systems Network (FEWS NET, 2010) presents household economy analysis data demonstrating the major inequities between poor and non-poor households in the livestock rearing regions. For example, in the far north of the country (FEWS NET Livelihood Zone 8), households classified as very poor and poor own on average 0 and 1–3 cattle, respectively, while the middle and better-off households own on average 15–20 and 45–55 cattle, respectively. In the bordering southern regions (FEWS NET Livelihood Zone 7), the situation is similar, with very poor and poor households owning 0 and 2–4 cattle, respectively, while middle and better-off households own on average 10–20 and 40–50 cattle, respectively (Figure 2.5). This difference between poor and rich households is much more pronounced in these livelihood zones.

FIGURE 2.5 (PANEL A) WEALTH GROUP CHARACTERISTICS IN LIVELIHOOD ZONE 7, BURKINA FASO



Wealth Groups Characteristics

	HH size	Land area cultivated	Livestock holdings	Other assets
Very Poor	4-6	1.5 - 2.5 ha	4-6 goats, 6-8 hens	none
Poor	6-8	3-5 ha	2-4 cattle, 8-12 goats, 3-5 sheep, 9-15 hens	none
Middle	11-15	8-12 ha	10-20 cattle, 15-25 goats, 10-15 sheep, 18-22 hens, 0-2 donkeys	0-2 carts
Better-off	16-20	15-20 ha	40-50 cattle, 35-45 goats, 20-25 sheep, 30-40 hens, 1-3 donkeys	1-3 carts

Source: FEWS NET 2010

Photo credit: RobertoVi from Pixabay

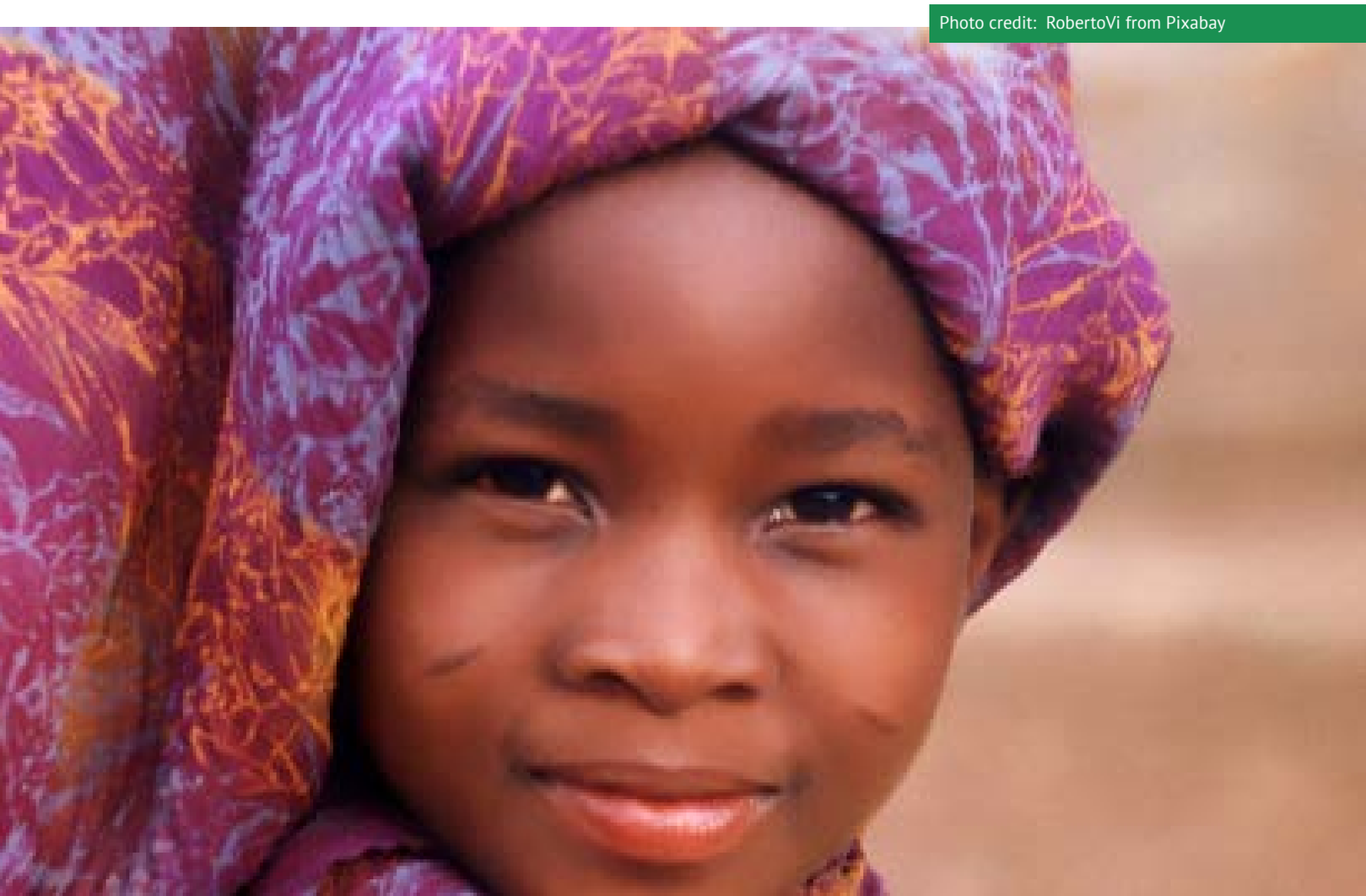
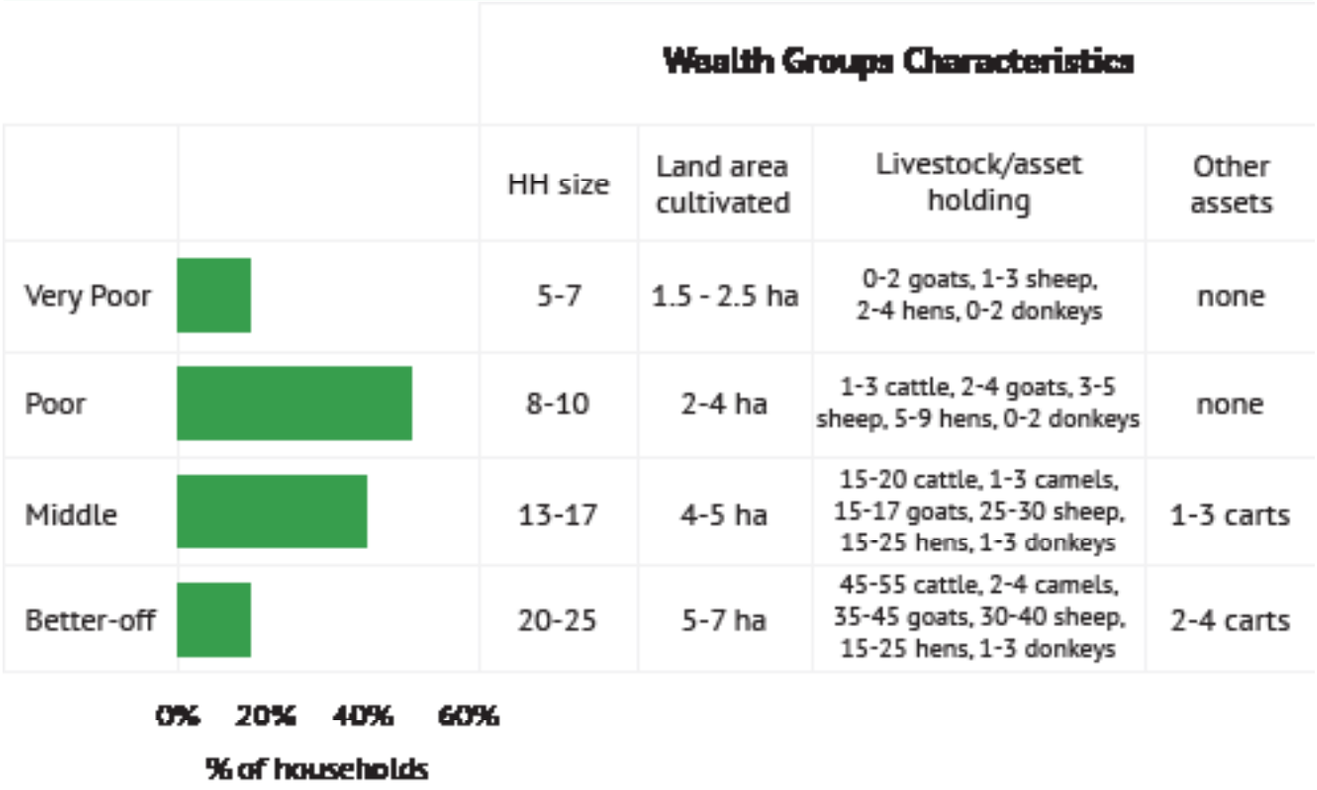


FIGURE 2.5 (PANEL B) WEALTH GROUP CHARACTERISTICS IN LIVELIHOOD ZONE 8, BURKINA FASO



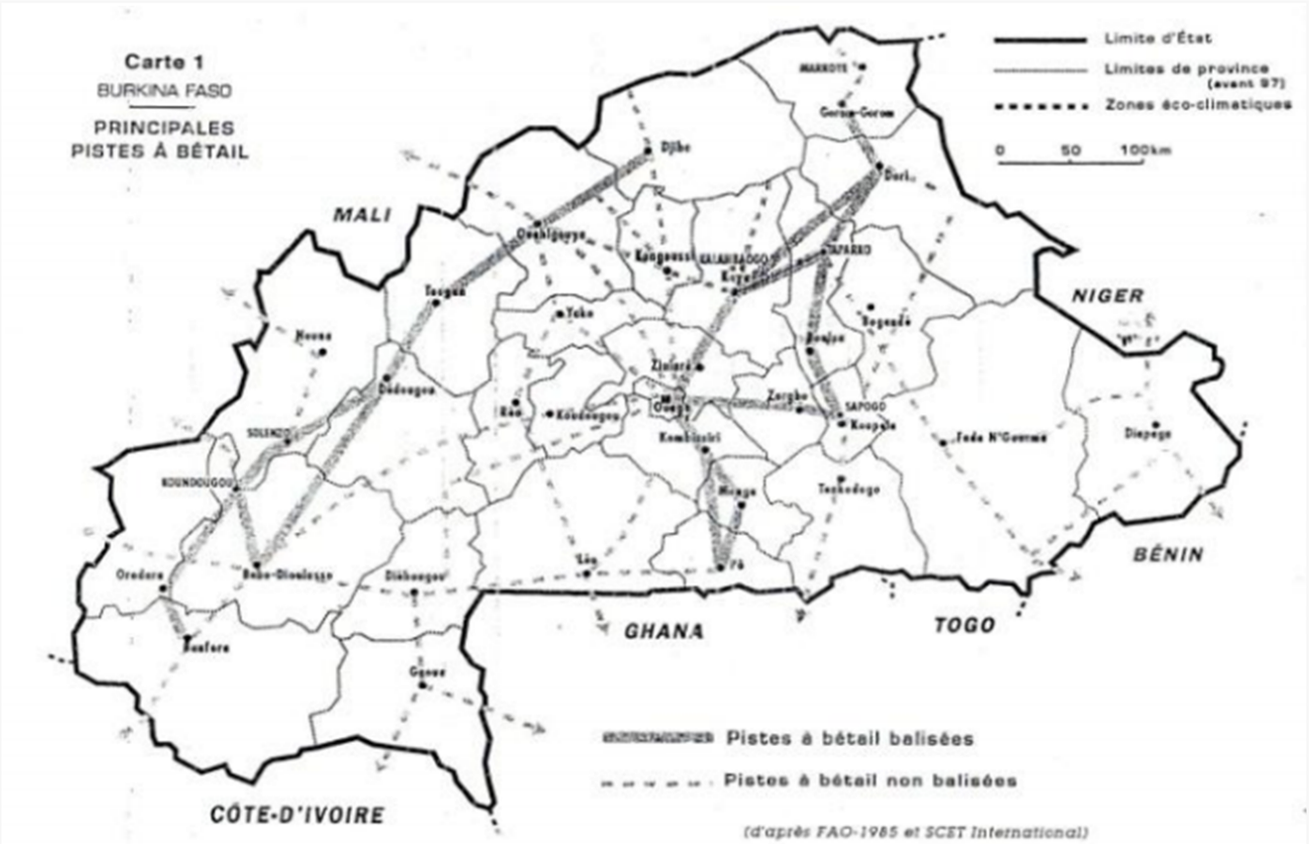
	HH size	Land area cultivated	Livestock/asset holding	Other assets
Very Poor	5-7	1.5 - 2.5 ha	0-2 goats, 1-3 sheep, 2-4 hens, 0-2 donkeys	none
Poor	8-10	2-4 ha	1-3 cattle, 2-4 goats, 3-5 sheep, 5-9 hens, 0-2 donkeys	none
Middle	13-17	4-5 ha	15-20 cattle, 1-3 camels, 15-17 goats, 25-30 sheep, 15-25 hens, 1-3 donkeys	1-3 carts
Better-off	20-25	5-7 ha	45-55 cattle, 2-4 camels, 35-45 goats, 30-40 sheep, 15-25 hens, 1-3 donkeys	2-4 carts

Source: FEWS NET 2010

- **Like in some parts of the Sahel, livestock rearing in Burkina Faso is traditionally subject to transhumance, but this is becoming less prevalent as nomadic pastoralists choose a sedentary lifestyle.** Seasonal migrations (transhumance) are traditionally an important way for pastoralists to respond to changing availability of pastoral resources, particularly water and pasture. Burkinabè pastoralists traditionally keep their herds in the northern areas during the rainy season from May/June until September/October and start moving them southwards from December/January. Cross-border migration is also common, with many pastoralists from Mali and Niger entering Burkina Faso during the dry season. The main transhumance corridors are shown in Figure 2.6. However, with changing pastoralist lifestyles, migratory patterns have also started to shift. As sedentary agro-pastoralism has become the norm nowadays, migratory distances have decreased significantly, often to less than 10 km per year. It is no longer whole families that migrate together with their animals but only a few young men who tend to go alone with the cattle. In addition, many agro-pastoralists now pursue seasonal rural-to-urban labour migration instead of livestock transhumance (Hampshire 2006).

Photo credit: EAP Photo Collection/ World Bank

FIGURE 2.6 MIGRATORY MOVEMENTS OF PASTORAL HERDS, BURKINA FASO



Source: FAO 2012

The little information that is available on gender roles in livestock rearing points towards men taking the primary responsibility for livestock. For example, a recent study of different livestock rearing systems in south-west Burkina Faso showed that across all systems, men had the primary responsibility for livestock and thus took key decisions such as the purchase of cattle, feed supplements and veterinary services. Men were also responsible for preventing losses through theft, searching for lost animals and solving conflicts with other farmers. Women were mostly responsible for calves, sick animals, small ruminants, watering animals and milking (Zoma-Traoré et al. 2020).

Similar to other Sahel areas, the livelihoods of nomadic pastoralists and agro-pastoralists are subject to many different challenges, including lack of access to the most basic services and growing land pressures. With many pastoral areas being very remote, pastoralists often lack access to basic social and sanitary services, means of transportation, financial services and access to markets. There are limited disease control measures and access to inputs that could improve productivity, especially animal feeds and veterinary services (WBG 2017a; 2017b). While livestock-rearing areas are generally not the poorest, they are marked by high inequality and the poor are often extremely poor and particularly vulnerable. In addition, the pastoral areas are subject to growing land pressures as a result of rapid population growth, frequent and severe droughts and soil degradation (see next section). This leads to land scarcity and thus increases the existing pressures on pastoralists.

Nomadic pastoralists also receive little political support and relevant public institutions are weak. Some researchers have reported that Burkinabè nomadic pastoralists are subjected to structural marginalisation (Bisson et al. 2021). The following challenges have been identified:

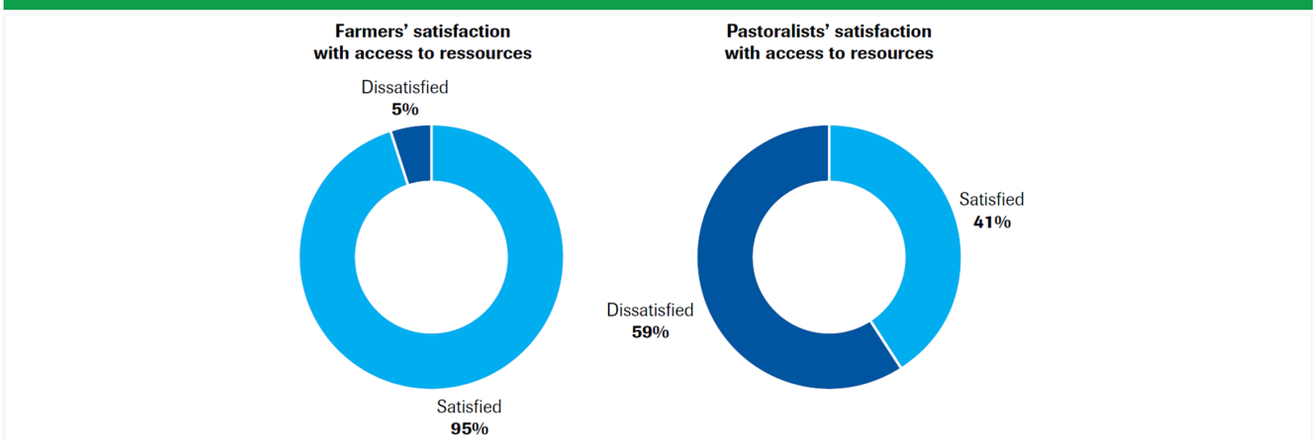
- **Public push for sedentary lifestyle:** Livestock sector policies in the latter half of the past century were often aimed at diversification of activities for sedentary farmers and have attempted to reduce the migratory habits of nomadic pastoralists, e.g. through pastoral centres and herding areas. These policies are considered by some scholars to be still 'at the top of policymakers' agendas' (Gonin and Gautier 2015). This push is captured in the existing legislation,

which often mentions, 'transforming traditional herd breeding into intensive or semi-intensive livestock husbandry,'[9] as a goal. In combination with the pressures mentioned above, many nomadic pastoralists have become sedentary and taken up crop farming thus decreasing pasture availability for migrating herders (Pfeifer et al. 2020; Gonin 2016).

- **Lack of legal protection:** Until 2002, no statutory legislation on pastoralism or rangeland management had been passed. In 2002, the 'Loi d'orientation au pastoralisme 2009-034' (LORP) was adopted as a major step forward in this respect, creating protected pastoral grazing land areas and establishing herd mobility as a fundamental right, as well as regulating it through the issuance of transhumance certificates. However, the implementation of LORP decrees was delayed by 5 years during which many open access rangelands had already been appropriated by sedentary farmers. Recent research by Bisson et al. (2021) revealed that the LORP is largely not applied by public institutions and cannot be invoked by affected people in court. In effect, it has not improved the status of nomadic pastoralists but created a double burden for them. Not only does it limit their mobility by creating protected areas and requiring transhumance certificates, it also fails to protect their rights to mobility with their herds.
- **Lack of representation:** Communal land distribution systems tend to be controlled by central groups and elites with little participation by pastoralists. For example, local natural reSource management and land allocation tend to be controlled by village development councils (CVD). In most cases, crop farmers are much better represented than nomadic pastoralists, therefore, pastoralist interests with respect to land distribution and rangeland management are often disregarded (Bisson et al. 2021).

Like other Sahel countries, the relationship between nomadic pastoralists and agro-pastoralists is characterized by frequent conflict. The above mentioned dynamics have led to major dissatisfaction among many pastoralists who feel insufficiently represented and unfairly treated by national and local governments. The dissatisfaction is, for example, illustrated in recent data collected by Bisson et al. (2021), which show that the vast majority of farmers (95%) tend to be satisfied with access to resources, while most pastoralists (59%) feel the opposite (Figure 2.7). As less rangeland is available and migrating pastoralists' livestock compete with agro-pastoralists for animal forage, conflict between them has become frequent and is often violent. As is becoming increasingly clear, the dissatisfaction among many pastoralists is also reflected in the growing support of radical non-state groups responsible for the upsurge in violence in recent years, particularly in Burkina Faso (Roger and Diallo 2020; Bisson et al. 2021).

FIGURE 2.7 FARMERS' AND PASTORALISTS' SATISFACTION WITH ACCESS TO RESOURCES IN BURKINA FASO[10]



Source: Bisson et al. 2021

Despite weak institutions supporting the pastoral communities, the Ministry of Animal and Fisheries resources (MoAFR) has several departments meant for pastoral development. The Director General of Pastoral Areas and Facilities (DGEAP) is responsible for and coordinates all the activities related to pastoralism in collaboration with the permanent secretariat in charge of crisis management and vulnerabilities in livestock farming. The permanent secretariat through the Pastoral Information System is responsible for working and coordinating with various

9. See e.g. Plan d'actions et program d' investissements du sous-secteur de l'élevage 2010-15 2010; Politique nationale de développement durable de l'élevage au Burkina Faso 2010; Stratégie d'aménagement, de sécurisation et de valorisation des espaces et aménagements pastoraux 2009 (Bisson et al. 2021).

10. 2019-20 data collected across 15 municipalities in 19 locations in 3 regions in Burkina Faso.

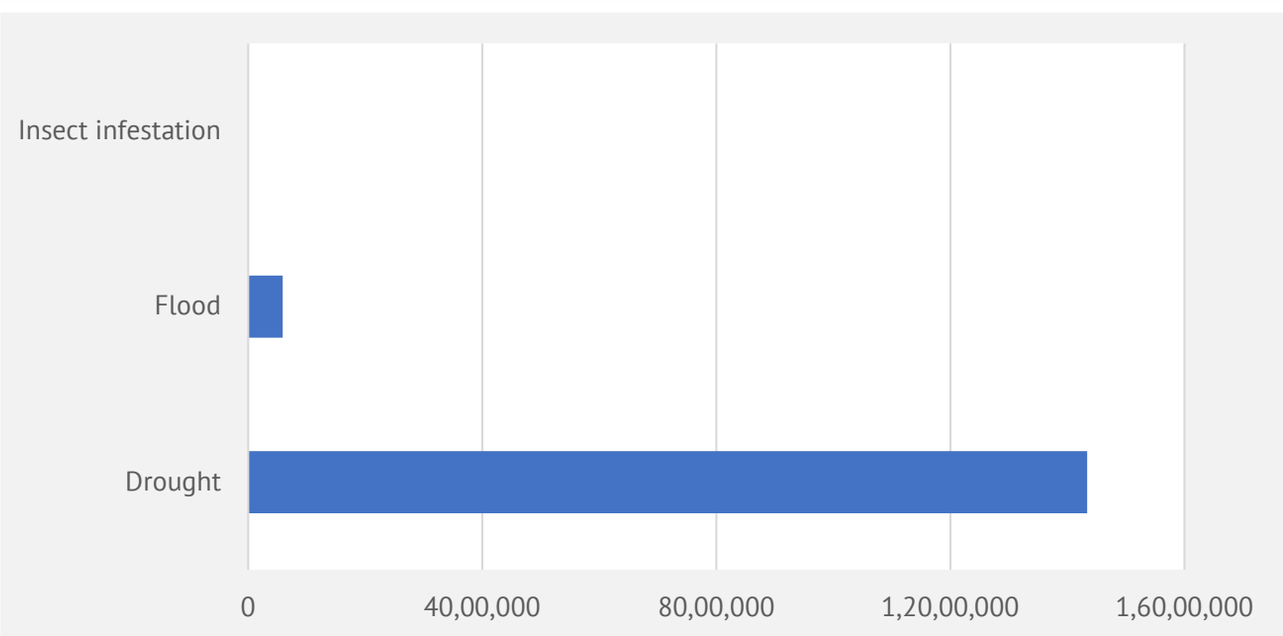
humanitarian institutions in the country. These include the executive secretariat of the National Food Security Council (SE-CNSA), CONASUR, National Early Warning System, Direction Générales des Etudes et des Statistiques Sectorielles, Ministère de l'Agriculture et des Aménagements Hydrauliques, permanent secretariat of the National Council for Sustainable Development, General Directorate of Water resources (DGRE), ANAM and the Institute of the Environment and Agricultural Research (INERA) amongst others.

Some of the activities that are coordinated with several other offices of pastoral development are related to i) securing pastoral activities including regulations, ii) securing animal feed, iii) pastoral water supply, iv) prevention and crisis management, amongst others. Through these activities, the objective is to strengthen pastoral and agro-pastoral production systems. A large part of the work involves design, programming and coordination of the inventory and mapping of pastoral spaces and facilities.

2.4 Impact of drought and other shocks on the livestock sector

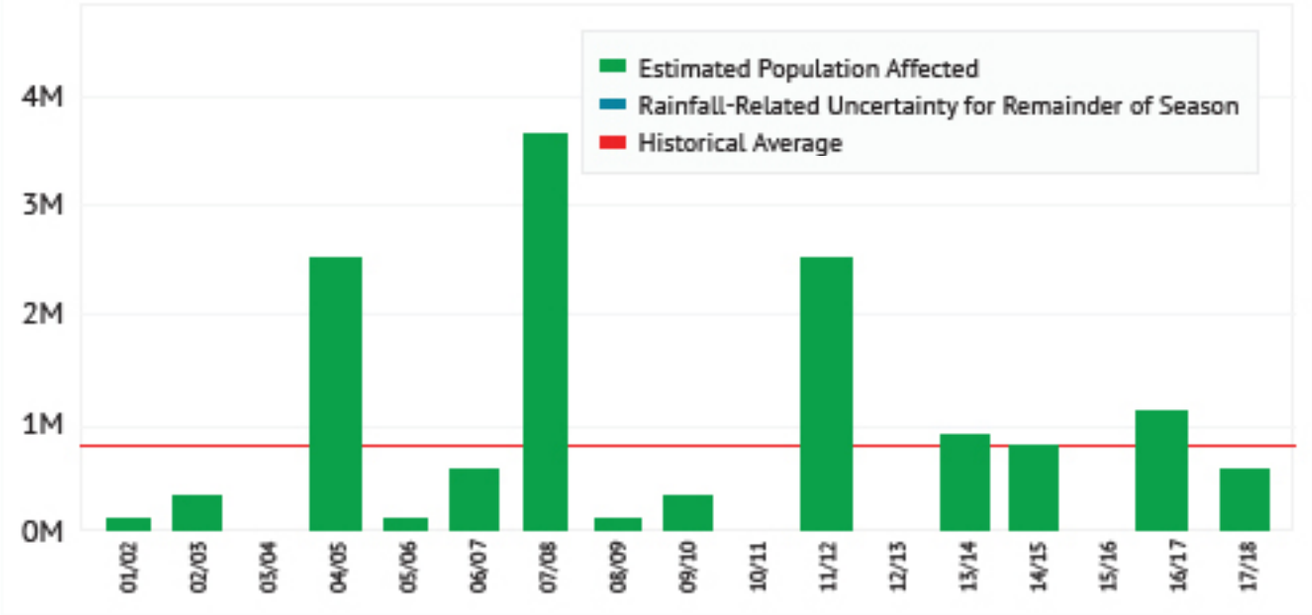
Crop and livestock production in Burkina Faso faces various environmental, climatic and natural shocks including droughts, floods and pests/diseases. Droughts are widespread across the country, varying spatially from year to year, especially in the last two decades (Brown et al. 2008; Murphy et al. 2017). Areas in the Sahelian north including the Sahel, Nord and Centre regions, are more prone to frequent droughts than the wetter southern regions (Murphy et al. 2017). Data from the emergency events database (EM-DAT), show that Burkina Faso has experienced 36 major floods, locust infestations and droughts from 1970 to 2020 (Figure 2.8). Floods accounted for most of these shocks, occurring 23 times during that period while major droughts and locust invasions occurred 10 and 3 times, respectively. The impact of droughts has by far been the greatest, affecting more than 14 million people during that period. Given that EM-DAT often underestimates the difficult-to-quantify impact of droughts, the actual Figure is likely to be much higher. This is also reflected in modelled Figures by the ARC, which estimates around 11.5 million people to have experienced drought-induced food insecurity between 2001 and 2017 alone (Figure 2.9). Major droughts occurred in 1972-73, 1983-84, 1996-97, 2004-05, 2008-09 and 2011-12.

FIGURE 2.8 NUMBER OF PEOPLE AFFECTED BY DISASTER TYPE FROM 1970-2020 IN BURKINA FASO



Source: EM-DAT database

FIGURE 2.9 ESTIMATED POPULATION AFFECTED BY DROUGHT IN BURKINA FASO FROM 2001-17



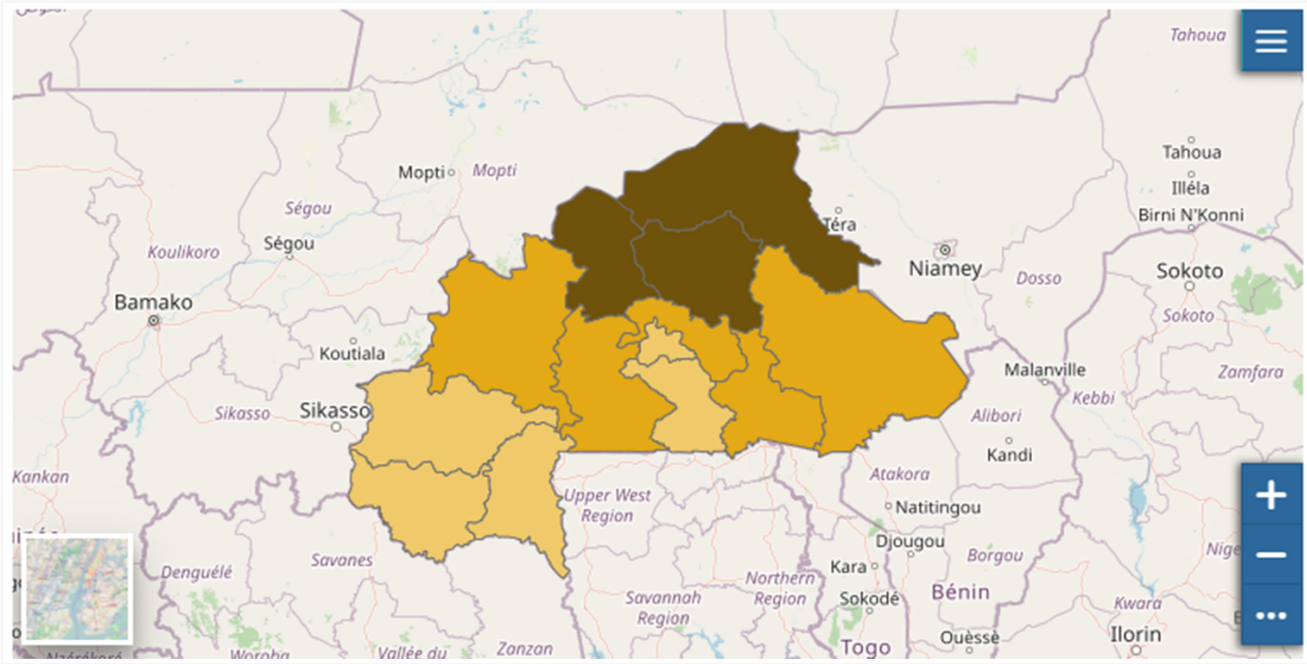
Source: ARC 2017

The pastoral areas in the north tend to be most affected by droughts. Analysis by the WFP shows that the northern parts of the country, i.e. the pastoral areas, experience the highest drought risk. In Figure 2.10, brown colour indicates areas that experienced seven to eight poor growing seasons during the 1981 to 2015 period (WFP 2018a).[11] In other words, droughts in these areas occur approximately once every 4.4 to 5 years.

11. Drought was defined as an agricultural season in which average rainfall as measured by CHIRPS in the respective area was below 80% of the long-term mean. For a detailed description of the methodology see WFP 2018.

Photo credit: EAP Photo Collection/ World Bank

FIGURE 2.10 NUMBER OF POOR GROWING SEASONS EXPERIENCED FROM 1981 TO 2015 IN BURKINA FASO



Legend:

	Low (1-4 poor growing seasons)
	Medium (5-6 poor growing seasons)
	High (7-8 poor growing seasons)

Source: WFP 2018

Droughts pose a serious problem to many livestock producers, but little information is available on the costs of drought in Burkina Faso, especially in the livestock sector. As one might expect from their frequency in the country, droughts are a significant challenge for livestock owners particularly in the northern parts of the country. This is illustrated in a 2012 study of households in the northern-most areas of the Sahel region, where 98% of respondents stated that drought was the key climate stressor and 93% stated that drought had impacted them severely (Traore and Owiyo 2013). To the best of the authors' knowledge, no systematic reviews of the impacts and costs of drought have been conducted for Burkina Faso. Thus, evidence on the impact of drought remains anecdotal and has been summarized below in Table 2.4.

A recent study performed by the WBG for the ECOWAS region indicates that Burkina Faso may expect an average 2.38% loss in rangeland productivity annually and up to a cumulative 12.6% in 100 years (WBG 2021b). The WBG study also reveals that pastoral areas may expect average annual losses of 2.3% in rangeland productivity and up to a cumulative 16.2% in 100 years.

TABLE 2.4 REPORTED DROUGHT IMPACTS ON THE LIVESTOCK SECTOR IN BURKINA FASO

Drought year	Reported impact and Source
1972-74	◆ "In the Sahel, the 1972-73 dry season will be for long remembered as the time when livestock died like flies," (Derrick 1977). ◆ An estimated 43% of all livestock died.[12]
1983-85	◆ Widespread livestock death. ◆ Pastoralists lost 'most of their livestock'; massive drop of livestock prices as pastoralists desperately tried to sell their weakened animals (Binns 1986).

12. Interview with official at the National Council for Emergency Relief and Rehabilitation (CONASUR)

Drought year	Reported impact and Source
1996-97	◆ An estimated 25% of all cattle died.[13] ◆ More than 250,000 people faced severe levels of food insecurity (Roncoli, Ingram and Kirshen 2001). ◆ One study looked at the area of Bonam on the Central Plateau, where food prices soared by 50%, large livestock distress sales occurred, with 39% of all small ruminants and 38% of all cattle sold by June 1998 and other distress coping mechanisms were undertaken (Roncoli, Ingram and Kirshen 2001).
2004-05	◆ In a study of households in the northern Sahel region, more than 70% of households reduced food consumption and sold property. ◆ More than 50% of households received external aid. ◆ 71% of households stated that the undertaken coping measures were insufficient to avert negative effects (Traore and Owiyo 2013).
2008-09	◆ In a study of households in the northern Sahel region, more than 70% of households reduced food consumption and sold property. ◆ More than 50% of households received external aid. ◆ 71% of households stated that the undertaken coping measures were insufficient to avert negative effects (Traore and Owiyo 2013).
2011-12	◆ From the community interactions, it was reported that in the Sahel region most of the people experienced hunger and there was disease outbreak among the animals because of lack of water.

Source: As indicated

Key takeaways from Chapter 2: Socio-economic assessment	
Economic importance	The livestock sector is of key importance for the Burkinabè economy. Not only does it contribute approximately 10% to the national GDP but more than 80% of households rear livestock.
Conflict and insecurity	Most areas affected by conflicts and insecurity are in the northern and eastern regions of the country. Besides violence triggered by religious extremism, conflicts have arisen from mining activities (which also cause water pollution and loss of soil fertility). The population in the north and east of the country feel marginalized and neglected by the government, a situation that has increased incidences of violence and unrest in recent years.
Cost and impact of droughts on pastoral livelihoods	Limited evidence is available on the impact and cost of droughts for pastoralists. Droughts tend to occur mostly in the north of the country where most pastoralists are based and by extension, where most animals are kept. This is also the region experiencing the highest levels of recurrent food insecurity.
Production systems	Most livestock-rearing households are sedentary agro-pastoralists who are also engaged in crop farming. They engage in moderate transhumance. Only a small minority of households, concentrated in the northern Sahel region, are nomadic pastoralists in Burkina Faso. Around 80% of livestock is kept in sedentary agro-pastoralist systems and 17% by nomadic pastoralists. Only 3% of livestock is kept in semi-intensive livestock systems.
Vulnerability	Livestock-rich regions in Burkina Faso are generally correlated with lower poverty levels. However, there is substantial inequality among households in these regions, with the poorest being particularly poor and vulnerable.

13. Interview with official at CONASUR

3. Technical Assessment

This section illustrates the results of the technical feasibility assessment, aimed at evaluating the possibility of designing an IBDRFI product for the extensive pastoral areas of Burkina Faso. An IBLI product based on NDVI as a proxy for forage availability has been used for the assessment (Appendix 2). The datasets and methodology used are described in Appendix 3.

3.1 Agro-ecological characterization and rangeland distribution

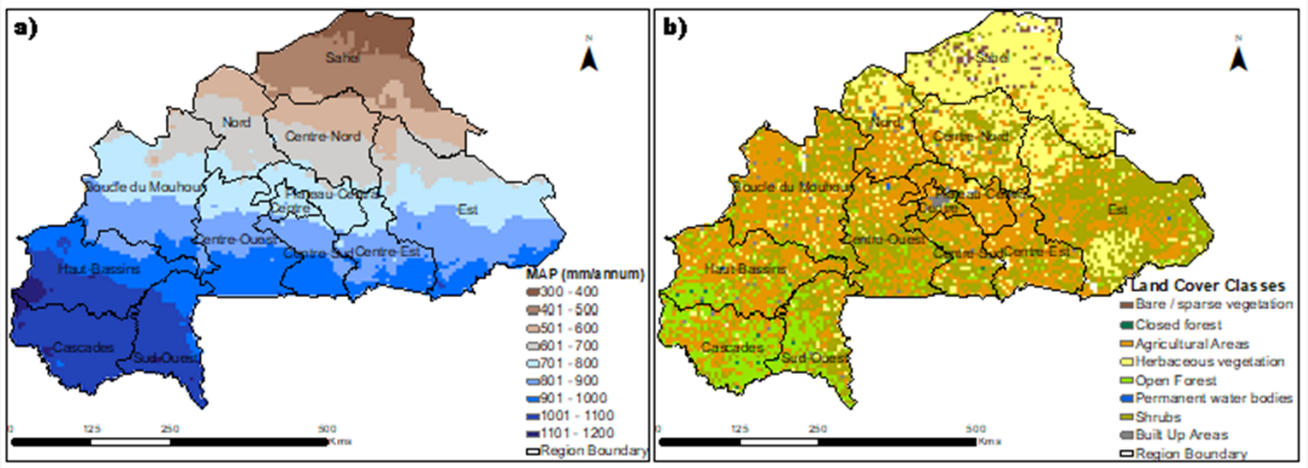
The climatic conditions in Burkina Faso are challenging; rainfall is low,[14] erratic, poorly distributed and seemingly on a downward trend in recent years. Burkina Faso primarily experiences a tropical climate characterized by a single precipitation season. The dry and wet seasons are well-defined, with the wet season observed from June to and a dry period from October to May September in the northern region. In the south, the rains are more prolonged (May to October), making this region wetter with higher potential for vegetation productivity. Like other Sahelian countries, the Burkina Faso dry season is dust-laden, experiencing dust storms brought about by the Harmattan winds from the northeast. Climatic conditions in Burkina Faso are predicted to worsen with climate change (WBG 2017a).

Burkina Faso falls into two major bioclimatic regions, the semi-arid Sahel zone in the north and the more humid Sudanian zone in the south (Figure 3.1). In the Sahel region, precipitation ranges between 300 and 600 mm. The biome is generally characterized by open herbaceous vegetation, mainly short annuals (steppe and short grass savannah) often mixed with relatively low woody vegetation. The Sudanian region, which falls south of the Sahel, has higher precipitation that ranges between 600 and 1,200 mm. Due to higher precipitation, this area is suitable for crop farming, thus has a higher population density. In addition, the region is characterized by a mosaic of croplands and open natural forests/savannah vegetation (Figure 3.1b). In the remnant savannahs, the herbaceous vegetation comprises of tall, perennial grasses. This bioclimatic region is also home to some of the small remnant forested ecosystems and a major transboundary biosphere, the W-Arly-Pendjari (WAP) ecological complex, a typical Sudano-Sahelian savannah ecosystem within the Est region, that straddles the borders of Benin, Burkina Faso and Niger.

14. Annual average of 500 mm in the northern Sahelian zone and 800-1,000 mm in the southern Sudano-Sahelian zone.

Photo credit: MSF/Mario Fawaz

FIGURE 3.1 BURKINA FASO'S CLIMATIC CONDITIONS AND LAND COVER CHARACTERISTICS BASED ON MEAN ANNUAL PRECIPITATION FROM CHIRPS[15] (A) AND LAND COVER CLASSES (B), RESPECTIVELY



Source: Authors.

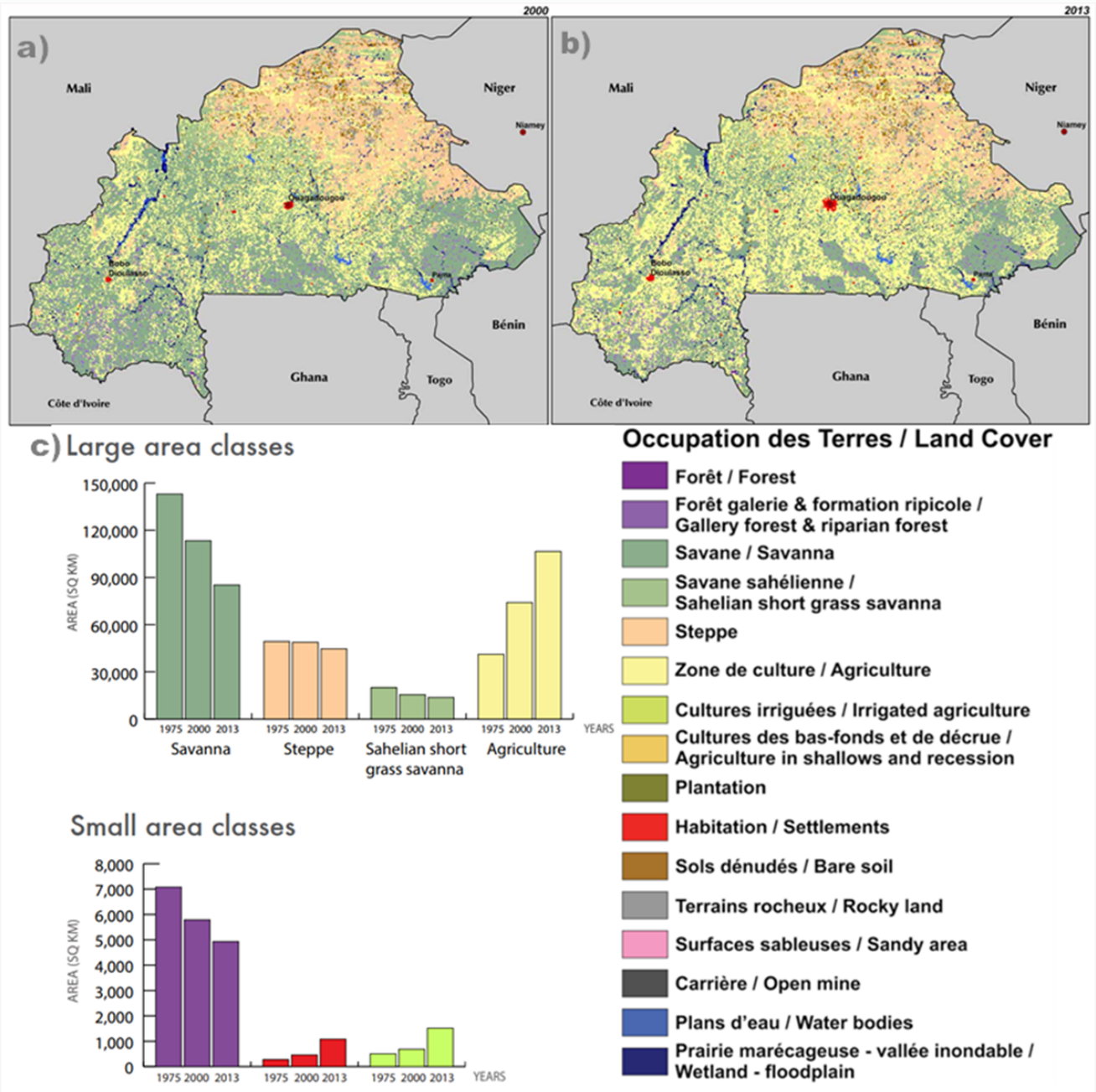
Rangelands dominate the northern semi-arid Sahelian region and parts of the eastern regions, while croplands dominate the southern region (Figure 3.1b) within the Sudanian bioclimatic zone, comprising over 60% of the county's arable land (CILSS 2016). Towards the wetter southern part, mixed farming and livestock rearing are practiced due to the favourable climate and widespread permanent rivers, making this part of the country highly suitable for cultivation of food and cash crops. This area is, therefore, regarded as the country's agricultural breadbasket in contrast to the northern and eastern drier Sahelian regions, which are dominated by pastoralism and support about a third of the country's cattle population (Gonin et al. 2015). Unlike other Sahelian countries with pastoral zones concentrated in the north, Burkina Faso has pastoral enclaves throughout the country within the extensive mosaics of croplands and natural vegetation (Greenough 2016).

Burkina Faso has experienced significant changes in land use/cover in the last few decades, mainly due to anthropogenic activities that have impacted pastoral lands across the country. Expansion of croplands has been the most apparent and widespread change across Burkina Faso (CILSS 2016; Knauer et al. 2017; Sanou et al. 2018) (Figure 3.2). In the mid-1970s, savannahs were the most dominant land cover type. However, significant changes in the last four decades have led to fragmentation, degradation and loss of these natural habitats. In the southern wetter parts of the country, croplands have experienced major transformations, whereas in the northern steppes, minimal changes have occurred due to anthropogenic activities.

A study carried out by the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) in2016 on land use/cover changes in the country revealed that over 30% of the formerly pristine landscapes including forests, savannahs and steppes, have been altered. In the period between 1975 and 2013, savannahs in both the Sahelian and Sudanian ecoregions declined by almost 40%, while rainfed croplands increased by ≈160% (Figure 3.2c). Croplands increased marginally in the semi-arid Sahelian region, which is characterized by low, erratic and unfavourable rainfall and poor soil conditions. In another study, Knauer et al. (2017) reported that rainfed agricultural land increased from 22% of the country's land area in 2001 to ≈ 42% in 2014. Although rainfed agriculture is more common across the country, the size of land under irrigation has also increased significantly due to commissioning of developmental projects.

15. Climate Hazards Group Infra-red Precipitation with Station

FIGURE 3.2 LAND COVER/USE CHANGES IN BURKINA FASO



Source: CILSS (2016)

Land use/cover change has led to the loss and fragmentation of rangelands (savannahs and woodlands), replacing them with cultivated and natural habitat mosaics (Figure 3.2) (CILSS 2016; Sanou et al. 2018). These changes have also led to other adverse impacts such as land degradation, loss of biodiversity and increased human conflicts. These dramatic changes are driven by increasing demand for land for agriculture and settlements (Knauer et al. 2017) as the population, estimated at 21 million in 2019 (UN DESA 2019), continues to increase. With a rapidly growing population (UN DESA 2019) that is not supported by agricultural intensification, the country might exhaust arable land by 2030, according to Knauer et al. (2017). The human population has also led to increased pressure on protected and adjacent areas. This is evident in the dramatic loss of wooded savannah and gallery forests surrounding the WAP complex's borders leading to decimation /fragmentation of the natural savannah ecosystems and loss of biodiversity in the area. If the current rate of land use change continues, it is expected that in the near future all the natural landscapes

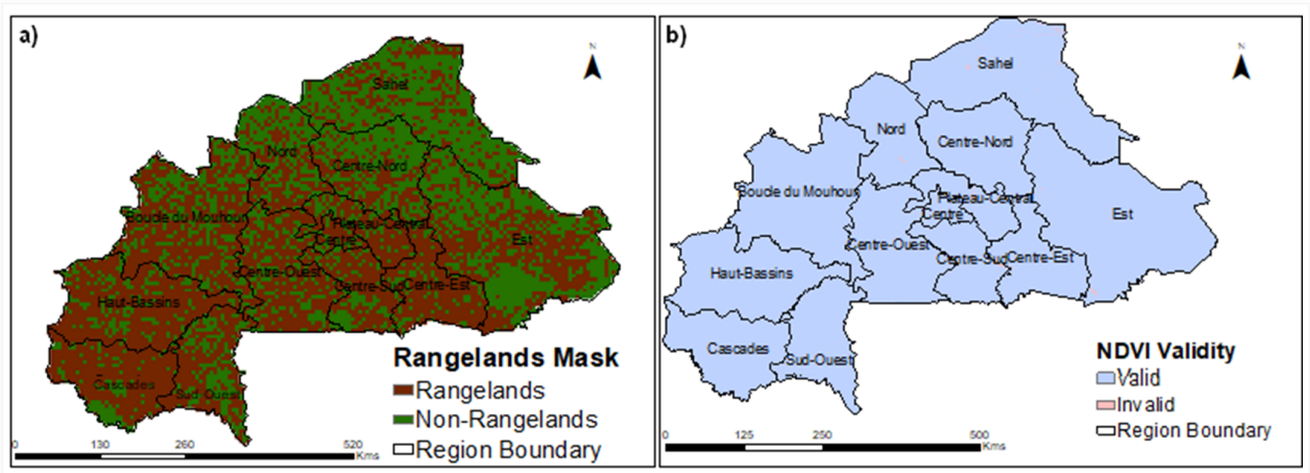
including savannahs, woodlands and forests may only exist in a few protected areas without any natural corridor connections (CILSS 2016).

Natural and human-driven bush fires are recurrent phenomena in Burkina Faso especially in the open forests and savannahs of Cascades, Centre-Ouest, Sud-Ouest, Centre-Sud and Est regions due to the presence of high amounts of herbaceous biomass (Archibald et al. 2013; Giglio et al. 2013; Kahiu et al. 2018; Rüth 2010). In contrast, the central part of the country experiences less frequent fires due to the discontinuity in the herbaceous biomass (Kahiu et al. 2018; Mäkelä et al. 2007). Fires are important as they maintain the structure of the savannah biomes by keeping the tree layer/cover low thus preventing forest encroachment onto grasslands (Bond 2001; Bowman et al. 2009). Fires also allow rejuvenation and sprouting of more nutritious grass for both wild and livestock herbivores. However, bush fires can also be a risk for herders and farmers, which might worsen with climate change induced effects such as dry conditions, heat waves and strong winds (Kalame et al. 2009).

3.2 Assessment of feasible areas for IBLI product design

Extensive rangelands, where IBLI product design is suitable, dominate a large portion of the north within the Sahelian region of Burkina Faso, Figure 3.3a. In the western and southern parts of the country, the dominance of croplands, human settlements and high woody cover (Figure 3.1b) are limiting factors for IBLI product design. Human-landscape (built up and croplands) dominated areas are considered unsuitable, while mosaics of savannahs, high woody cover and other land uses need to be reviewed with local stakeholders to confirm their effective use as extensive pastoral areas.

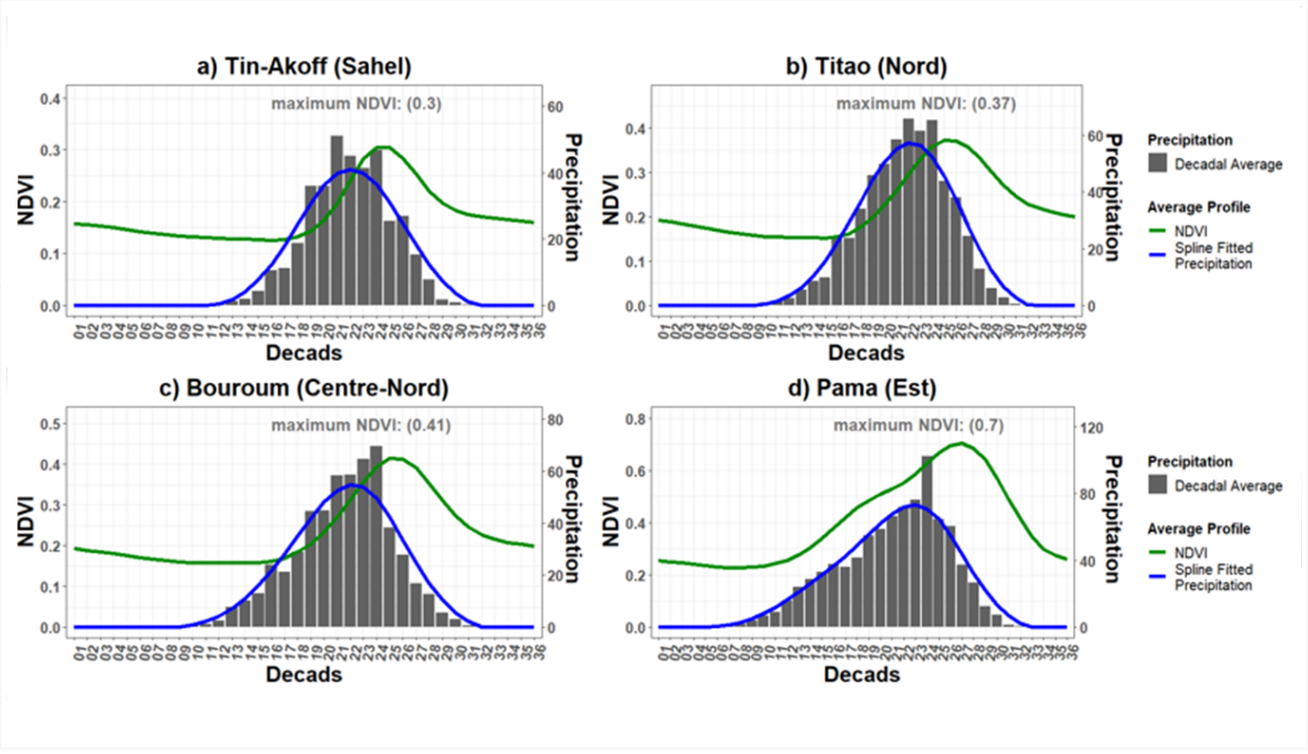
FIGURE 3.3 A) RANGELANDS MASK AND B) NDVI INTENSITY FOR BURKINA FASO



NDVI Intensity: The NDVI is sufficiently high for most of the rangeland-dominated ecosystems in Burkina Faso. The rangeland ecosystems show sufficiently high NDVI values that can be considered as a good proxy of forage availability (Figure 3.3b).

The rainfall and vegetation growth patterns in the rangeland-dominated regions show well-defined seasonality, allowing for the definition of one distinct drought risk period. The pasture and rangeland vegetation growing season begins about a month after the onset of precipitation and runs from June (starts a bit earlier in the south) up to October/November in the north Sahelian region, showing clear and geographically consistent patterns, as shown in Figure 3.4. This permits the definition of a forage availability risk period (between May and November) within the pastoral areas in Burkina Faso. As shown also in Figure 3.5, NDVI decadal averages reflect consistent vegetation growth over the season across the rangelands.

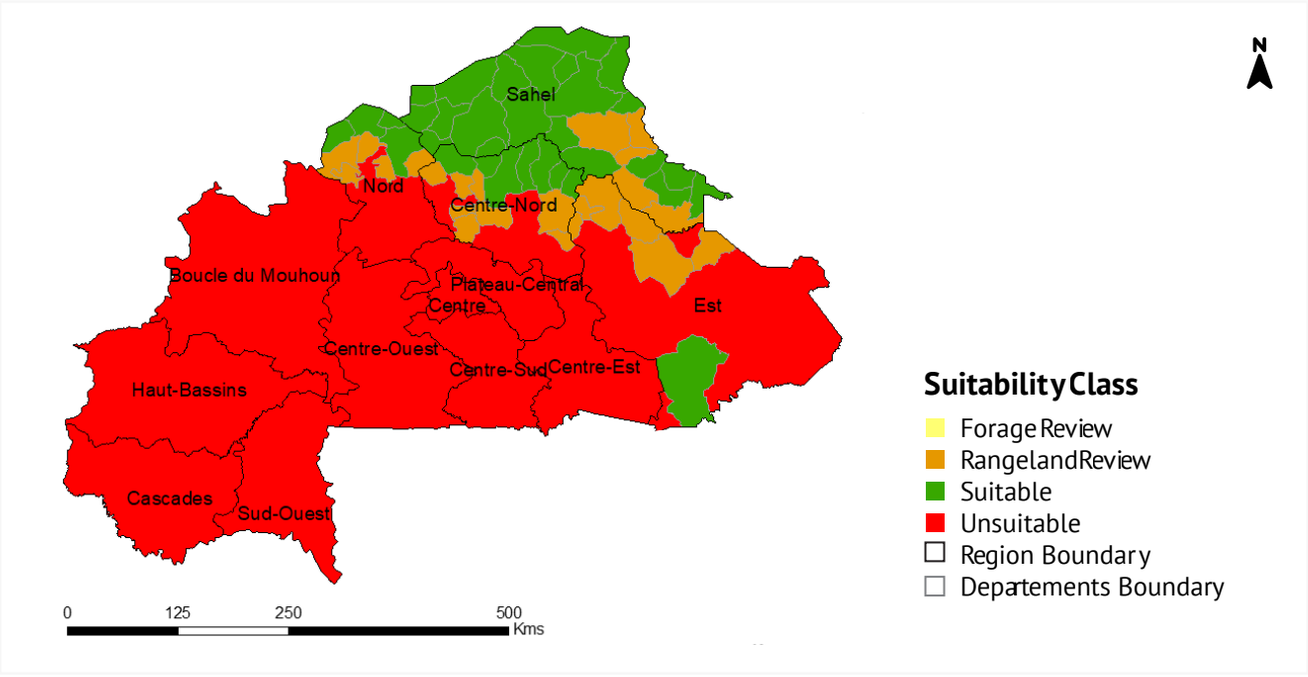
FIGURE 3.4 ANNUAL AVERAGE VEGETATION AND PRECIPITATION CLIMATOLOGY OF FOUR NORTHERN PASTORAL UNITS IN BURKINA FASO



The final classification of Burkina Faso's administrative units (i.e. Départements) in Figure 3.5 into feasibility classes, indicates that about 16.4% of Burkina Faso's land area (marked in green) would be feasible for IBDRFI solutions, while 8.6% (marked in orange) is suitable (meets most of the suitability criteria) but requires further review with local stakeholders to confirm rangeland use for extensive herding (Figure 3.6). This includes the northern and eastern purely pastoral lands, but also areas characterized by agro-pastoral activities. Unsuitable units dominate the southern and western regions, where crop production, forestry, urban settlement and other economic activities are practiced.

Photo credit: Noelie Sawadogo/MSF

FIGURE 3.5 TECHNICAL FEASIBILITY OF IBLI PRODUCTS IN BURKINA FASO



Source: Authors.

3.3 Characterization of the feasible units

The average vegetation growing season is rather homogeneous, although vegetation production gradually increases with increase in precipitation towards the south (Figure 3.6). However, annual variability is quite significant, with a tendency towards delayed onset of the season during drought years.

Photo credit: EAP Photo Collection/ World Bank

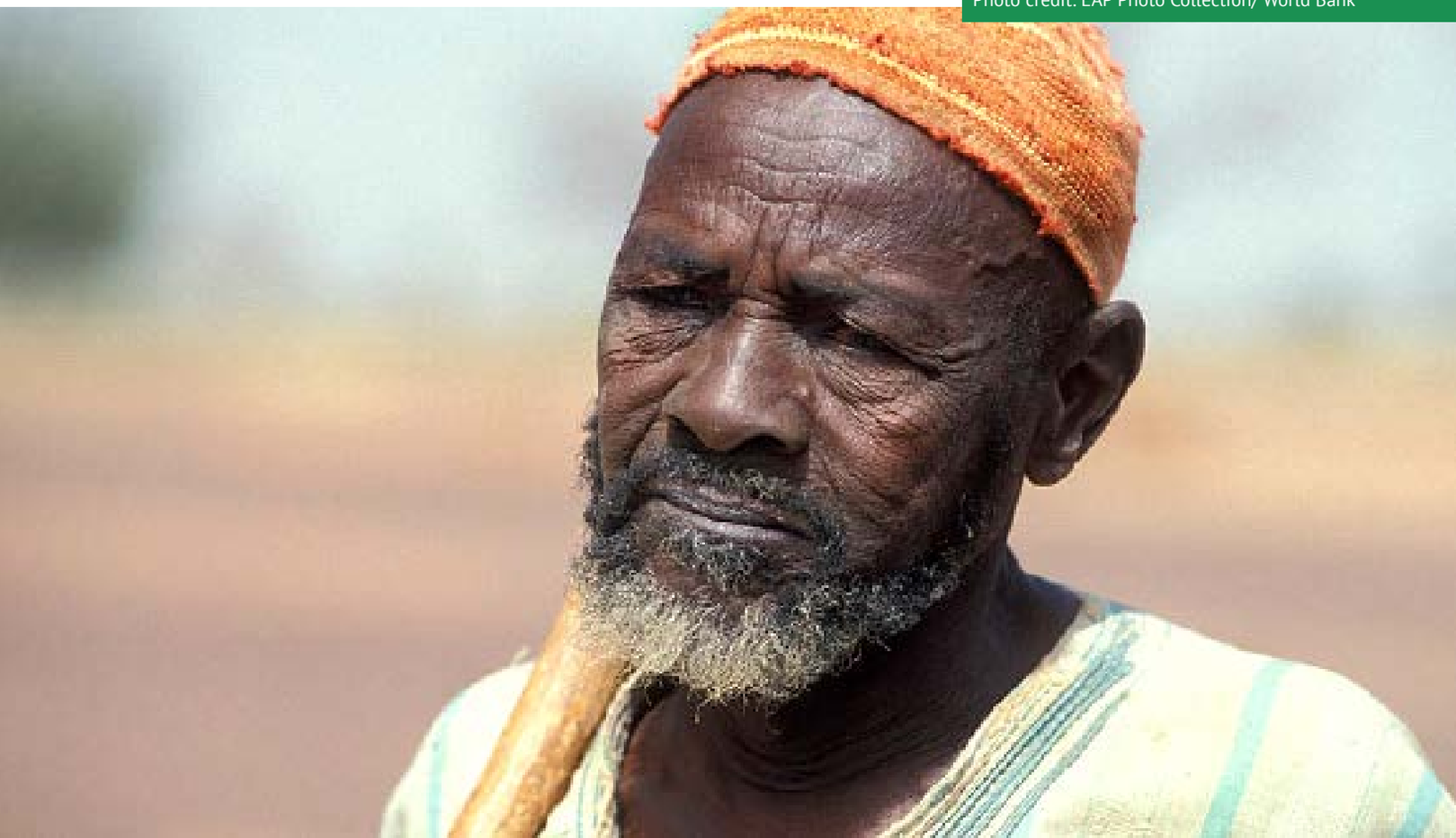
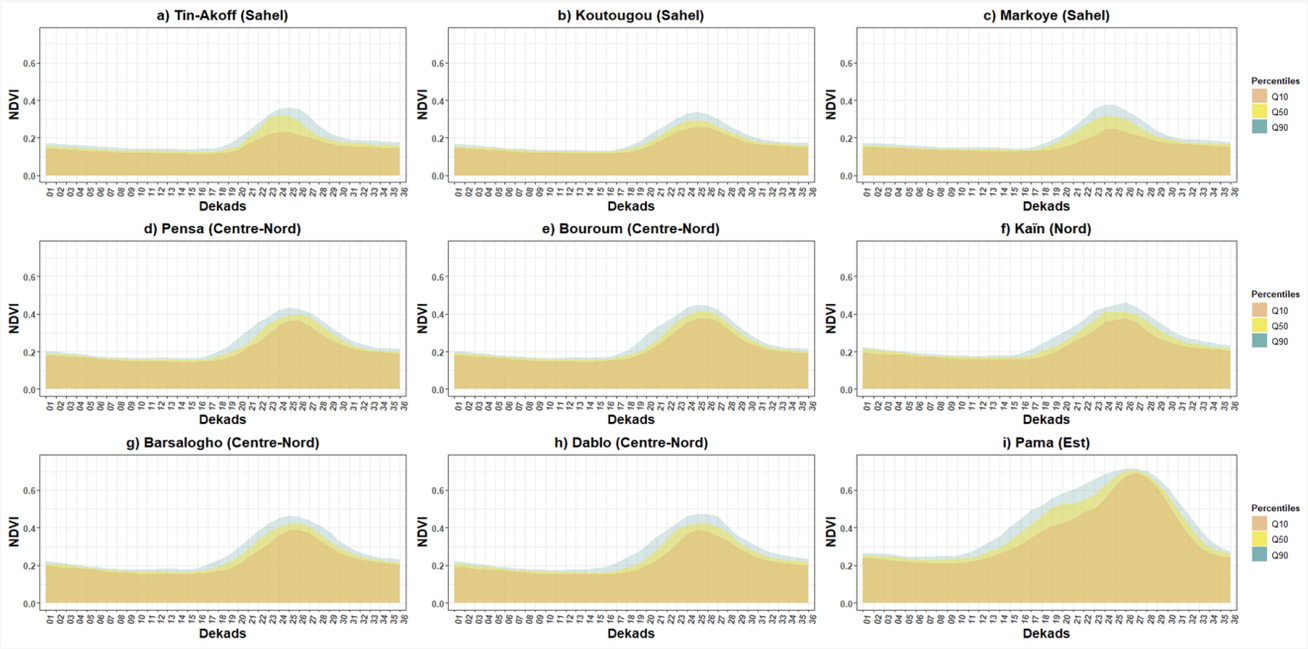


FIGURE 3.6 VARIABILITY IN NDVI OVER SELECTED PASTORAL AREAS IN BURKINA FASO SHOWN USING THE 10TH, 50TH AND 90TH PERCENTILE RANGES

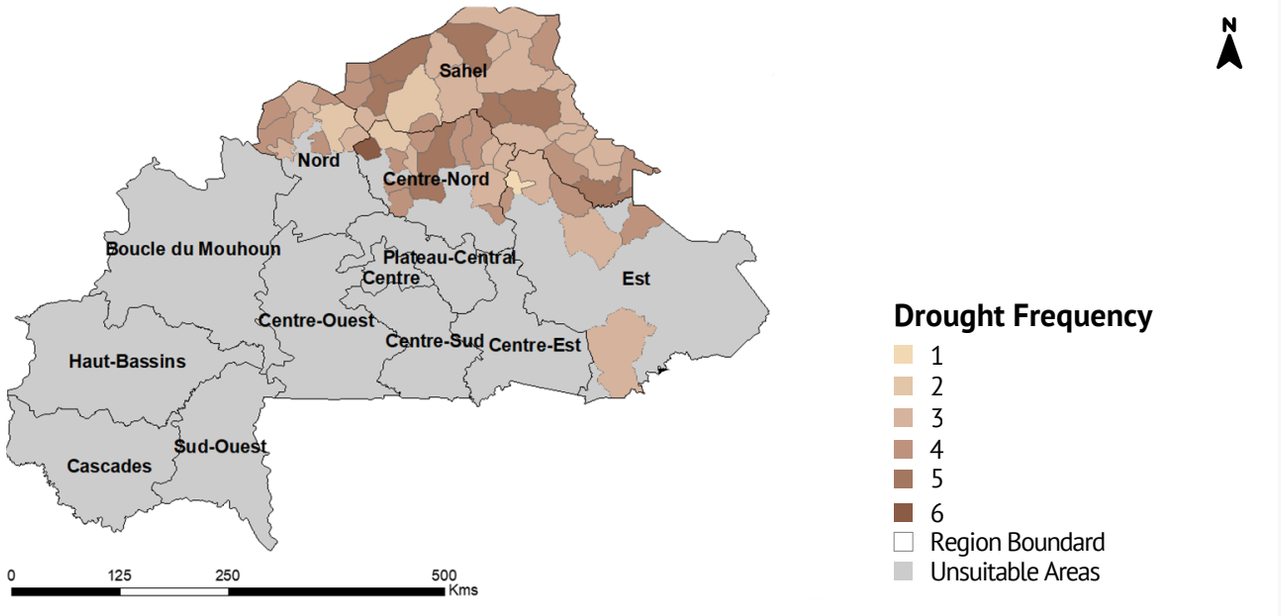


In the 18 years between 2003 to 2020 whose NDVI data are available for Burkina Faso, the country experienced three to five relevant drought episodes,[16] one every 4-6 years, on average (Figure 3.7). A certain degree of geographic variability in drought frequency seems to characterize these pastoral areas. However, this assessment is based on a subjective threshold of the index value (see methods in Appendix 2) and while it can provide a general overview of drought frequency, it should be interpreted with caution.

16. A 'relevant' drought episode is defined using a fixed threshold of the seasonal IBLI index of -0.84 (standard score). This is a subjective threshold and should, therefore, be used cautiously as an indicative estimate.

Photo credit: Noelie Sawadogo/MSF

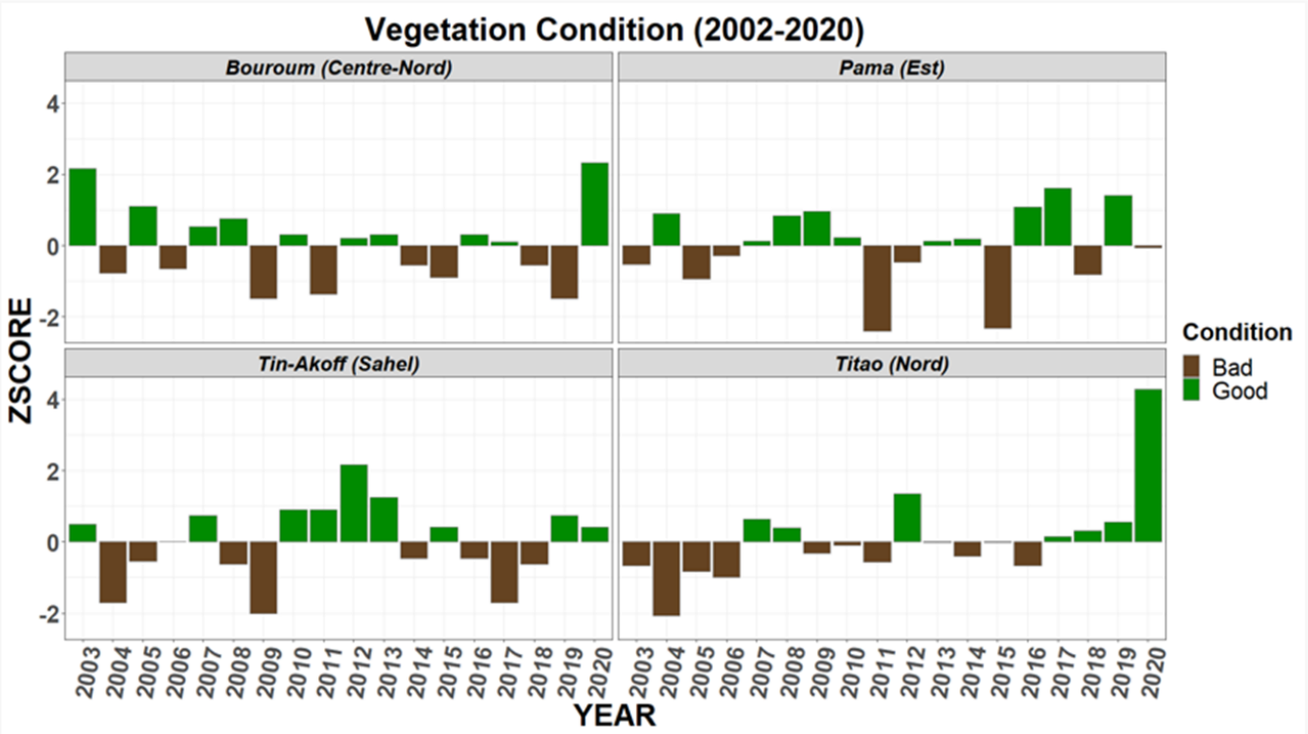
FIGURE 3.7 DROUGHT FREQUENCY IN BURKINA FASO PASTORAL AREAS FOR THE PERIOD 2002-19



Forage deficit conditions vary spatially across the country's pastoral lands and often persist for either two or three consecutive seasons (Figure 3.8). During some years, drought is more pronounced across the country, while in others, the affected areas are patchy, a situation that worsens further with climatic change.

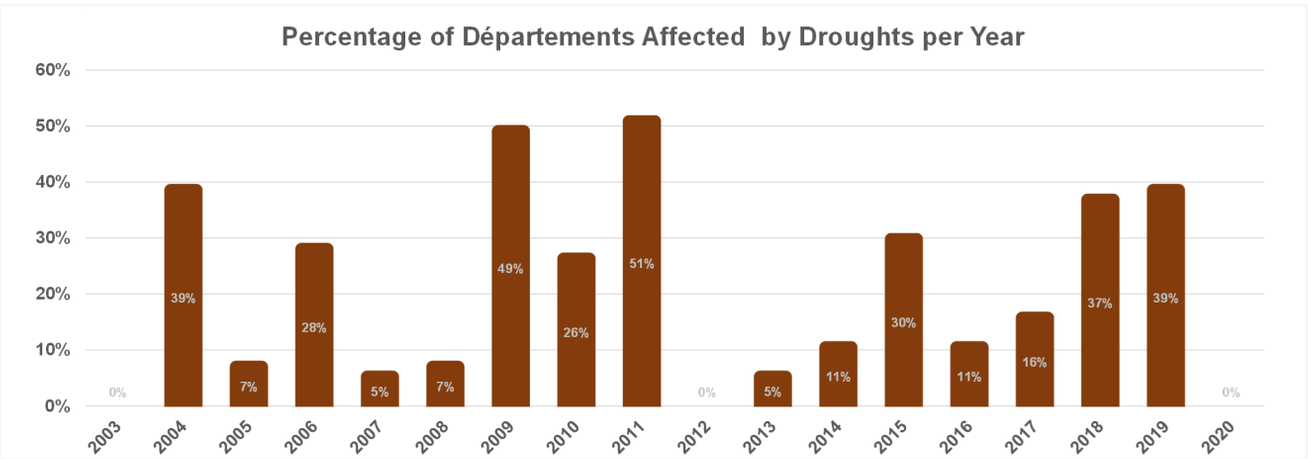
Photo credit: MSF/Caroline Frechard

FIGURE 3.8 VEGETATION PERFORMANCE ACROSS FOUR PASTORAL REGIONS IN BURKINA FASO BASED ON 18-YEAR EMODIS[17] NDVI OBSERVATIONS (2002-20)[18]



An assessment of forage deficits from 2003 to 2020, reveals that six major drought events occurred in 2004, 2009, 2011, 2015, 2018 2019 (Figure 3.9). In most cases, the deficit persists at least until the following season, suggesting either cyclic rainfall patterns, which may be caused by ENSO El Nino (La Nina) phenomena or limited resilience of rangeland systems to recover after major droughts.

FIGURE 3.9 DROUGHT FREQUENCY ACROSS THE VARIOUS PASTORAL DÉPARTEMENTS (N=57) IN BURKINA FASO BASED ON 18-YEAR EMODIS NDVI OBSERVATIONS (2003-20)



Based on the forage growing seasons that typically span from mid-May/June to October/November (Figure 3.10), a single risk period can be defined. Thus, a May to November risk period could be uniformly applied across the pastoral areas in the country to capture the early start and late end of the growing seasons. The risk period for the IBLI

17. Enhanced Moderate Resolution Imaging Spectroradiometer

18. Green and brown bars indicate above and below average vegetation production, respectively.

coverage is typically defined by the length of the vegetation growing season, as the IBLI index is built to estimate seasonal deficits in forage production (derived from NDVI estimates) due to limited rainfall.

FIGURE 3.10 GROWING SEASONS (SHADED IN LIGHT BLUE) FOR SUITABLE UNITS IN BURKINA FASO

Région	Départements	MAP	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Centre-Nor	Bouroum	560																																			
	Nagbingou	560																																			
	Yalgo	580																																			
	Barsalogho	590																																			
	Dablo	560																																			
	Pensa	550																																			
	Bourzanga	560																																			
Est	Pama	880																																			
Nord	Kaïn	600																																			
	Banh	570																																			
	Solle	550																																			
	Titao	590																																			
Sahel	Gorom-Gorom	420																																			
	Oursi	400																																			
	Deou	410																																			
	Bani	530																																			
	Gorgadji	490																																			
	Aribinda	470																																			
	Diguel	500																																			
	Nassoumbou	450																																			
	Tongomayel	500																																			
	Tankougounadie	560																																			
	Titabe	510																																			
	Kelbo	530																																			
	Boundore	560																																			
	Sebba	590																																			
	Markoye	370																																			
	Falagountou	440																																			
	Tin-Akoff	380																																			
	Koutougou	430																																			
	Baraboule	510																																			
	Djibo	490																																			
	Pobe-Mengao	520																																			

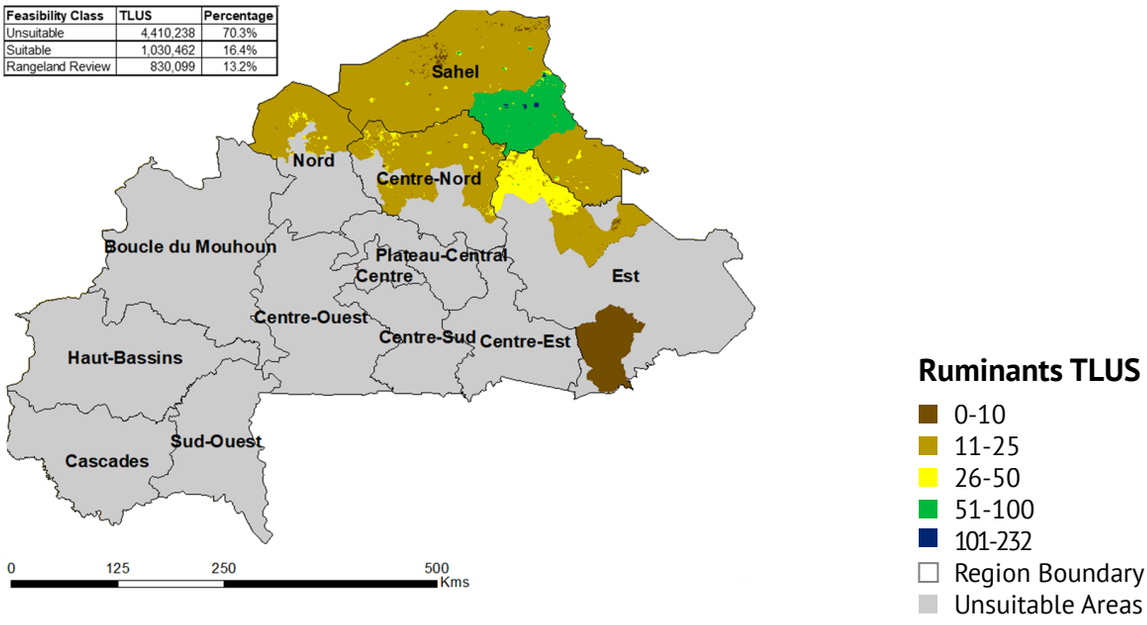
MAP = mean annual precipitation

Suitable pastoral regions host a significant number of the country's livestock population (Figure 3.11 and Table 3.1). These rangelands host ≈30% of the national livestock population, with the larger fraction (16.4%) located in suitable units while the rest (13.2%) are found within units that need review.

Photo credit: EAP Photo Collection/ World Bank

FIGURE 3.11 LIVESTOCK (EXCLUDING POULTRY) POPULATION DENSITY DISTRIBUTION (TLU/KM²) WITHIN PASTORAL AREAS THAT COULD BE CONSIDERED FOR DROUGHT INDEX IMPLEMENTATION IN BURKINA FASO

Feasibility Class	TLUS	Percentage
Unsuitable	4,410,238	70.3%
Suitable	1,030,462	16.4%
Rangeland Review	830,099	13.2%



The percentages in the Table are relative to the total livestock population.
Source: Modified from FAO 2015 ruminants tropical livestock units (TLUs19) data (Gilbert et al. 2018)

Livestock density is significantly high in the northern regions that have most of the units classified as suitable for IBLI. The Sahel has the largest livestock population (19%) followed by the Est region (11%) (Table 3.1). Kompienga département in the southern part of Est region is also classified as a feasible unit for IBLI design, however, it falls within the W-Arly-Pendjari transboundary biosphere, which explains the low livestock density (Figure 3.11). Since this unit forms part of a conservation area, it is important to ascertain its pastoral use before implementation is considered.

19. Tropical Livestock Units are livestock numbers converted to a common unit. An increased number of animals per adult available to support the household indicates improved food security and household resilience. Relative changes to the TLU provide a direct indicator of food security risk.

Photo credit: Imo Deen from Pixabay

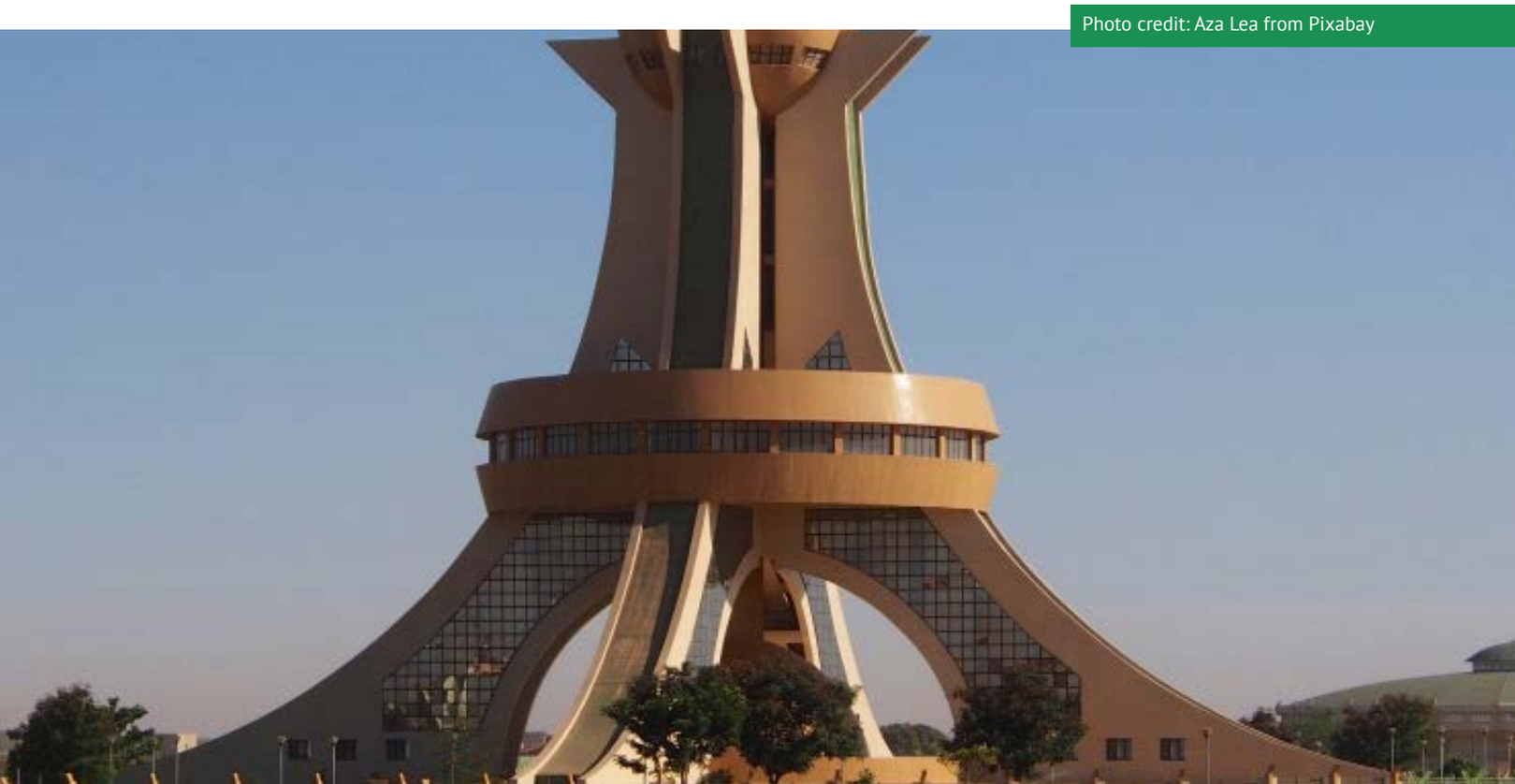
TABLE 3.1 DISTRIBUTION OF RUMINANT LIVESTOCK TROPICAL LIVESTOCK UNITS IN BURKINA FASO

	Regions	TLUS	Percentage
1	Boucle du Mouhoun	547,754	9%
2	Cascades	356,285	6%
3	Centre-Est	357,144	6%
4	Centre-Nord	440,932	7%
5	Centre-Ouest	566,330	9%
6	Centre-Sud	249,554	4%
7	Centre	120,914	2%
8	Est	693,103	11%
9	Haut-Bassins	843,349	13%
10	Nord	386,398	6%
11	Plateau-Central	277,155	4%
12	Sahel	1,194,658	19%
13	Sud-Ouest	237,222	4%
	Total	**6,270,799**	

The four main regions including feasible units are highlighted in green.

Key takeaways from Chapter 3: Technical assessment	
Rangeland dominance	Rangelands are the main land cover in the north of the country, where steppes dominate. Further south, rangelands become very fragmented as croplands, human settlements and woody plant cover increases. This is a culmination of land cover changes over the last fifty years, where a high proportion of savannahs have been replaced by agricultural land.
Seasonality	Seasonality is well defined and homogeneous across the areas that are considered feasible for the implementation of IBLI products. In these areas, the growing season spans from late June to early November. The only exception is the Est unit in the south of the country, where the rainy season is significantly longer, spanning from late May to mid-November.
Overall feasibility	About 16.4% of Burkina Faso's land area is feasible for IBLI products, while 8.6% would be feasible but requires further review based on inputs from local stakeholders to ascertain pastoral use. The regions that are feasible for IBLI products host about 30% of the national herd.

Photo credit: Aza Lea from Pixabay



4. Operational Assessment

4.1 Drought risk management and financing institutional policies

4.1.1 Drought response mechanisms for the livestock sector

The government of Burkina Faso has established a number of institutions to coordinate response measures to the impacts of drought. The implementation of humanitarian response measures is coordinated by the 'Conseil national de secours d'urgence et de rehabilitation' (National Council for Emergency Relief and Rehabilitation, CONASUR). The council also manages disaster risk reduction measures in the country. To address climate change impacts, the government has also established the 'Conseil national de l'environnement et du développement durable' (National Council on Environment and Sustainable Development, ECONESS), which promotes environment and sustainable development policies and regulation (WBG 2011). The 'Conseil National de la Sécurité Alimentaire' (National Food Security Council/CNSA) is also an important monitoring and coordinating body for food security crises. CONASUR and the CNSA have decentralized structures at regional, provincial and departmental levels.

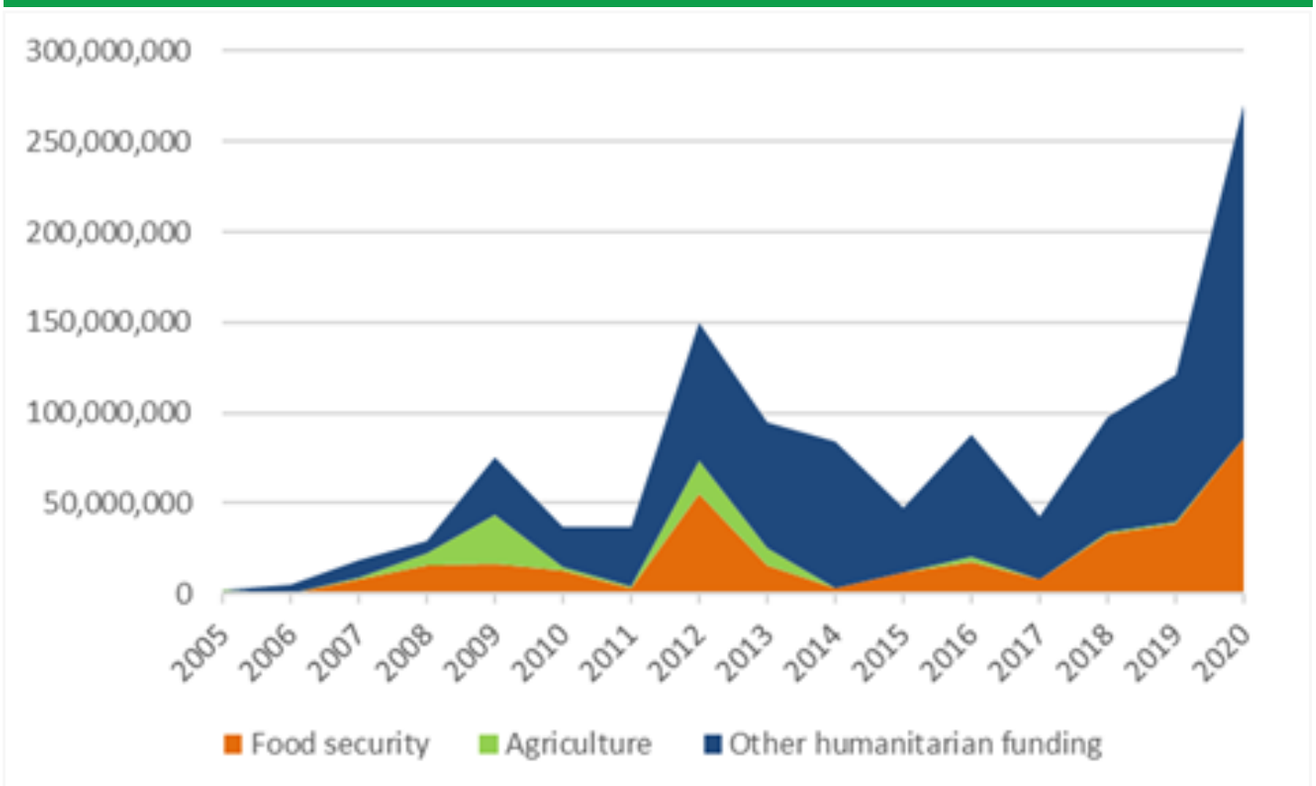
Presented below is an overview of key mechanisms employed when responding to disasters. These concentrate mainly on managing the broader impacts of drought in terms of food insecurity including in the livestock sector:

- **Early warning system:** The national early warning system focuses on relevant information relating to food security and is coordinated by the 'Système d'alerte précoce' (SAP), with inputs from partners such as FEWS NET, FAO and WFP. The department of meteorology monitors climatic factors such as precipitation and temperature and provides forecasts on the commencement and end of the rainy season, droughts and floods. Other relevant information systems include the National Environmental Information System (SNIE), the National Agricultural Forecasts and the West African Seasonal Forecast (PRESAO). The West African Seasonal Forecast is coordinated by various institutions such as the African Centre of Meteorological Applications for Development (ACMAD), AGRHYMET, the Niger Basin Authority , the University of Ouagadougou (departments of geography and sociology) and the Development Research Institute (IRD). These institutions carry out research on the linkages between climate change and human adaptation and the impacts of climate change, among others (WBG 2011).
- **Food distribution:** This is still the main national food security response modality and is managed and conducted by CONASUR. Food comes from the national food reserve, which is discussed below in section 4.1.2 (GoBF 2019).
- **Cash transfers:** As an alternative to food distribution, international partners also regularly implement emergency cash transfer programs to help populations affected by food insecurity. Key institutions include WFP, Action Contre la Faim and Oxford Committee for Famine Relief (Oxfam) (GoBF 2019).
- **Livestock feed sales:** The Ministry for Agriculture and Fishery resources sometimes supports the sale of livestock feed at subsidized prices to enable drought-affected livestock owners to keep their animals alive (GoBF 2019).
- **Scalable safety net:** The World Bank is supporting the government in setting up a national adaptive safety net program, the Social Safety Nets project. The base project is an unconditional cash transfer program targeting the poorest in the country. This was complemented by a scalable safety net pilot from 2017. A methodology was developed to identify and target food-insecure villages in the central Boulkiemdé province to whom shock-responsive cash transfers would be rolled out using the infrastructure of the cash transfer program. The pilot lasted from 2017 until 2019. During this period, each of the over 7,500 beneficiaries received three cash transfers (USD 40 per transfer) at the beginning, middle and end of the lean season via their mobile phones. The same beneficiaries participated in the program during this two-year period. Information is now being gathered to support the rolling out of shock-responsive cash transfers in a more systematic fashion and at a larger scale. In May 2020, the USD 56 million allocated to the Social Safety Net project was complemented by an additional financing of USD 110 million (WBG, 2021a).

4.1.2 Disaster risk financing framework

Burkina Faso mainly relies on external ad-hoc humanitarian assistance to fund response measures to natural disasters. The country has not yet adopted a national strategy in relation to the financing of shock-related costs. As presented below, although some shock-responsive financing arrangements are in place, they are not made based on an ex-ante analysis of contingent liabilities. The total amount of shock-responsive finance made available by the government is frequently insufficient to respond to overall needs, leading to ad-hoc budget reallocations and the intervention of international humanitarian donors. As shown in Figure 4.1, Burkina Faso received on average USD 75.1 million in external humanitarian funding per year from 2005 to 2020. Funding peaks in 2009 and 2012 correspond to the major droughts and associated food security crises experienced in 2008-09 and 2011-12. In recent years, the major increase in humanitarian assistance received by Burkina Faso is due to renewed conflict in the country.

FIGURE 4.1 TOTAL INTERNATIONAL HUMANITARIAN FUNDING (IN USD) RECEIVED BY BURKINA FASO



Source: U.N. OCHA Financial Tracking Service (https://fts.unocha.org/)

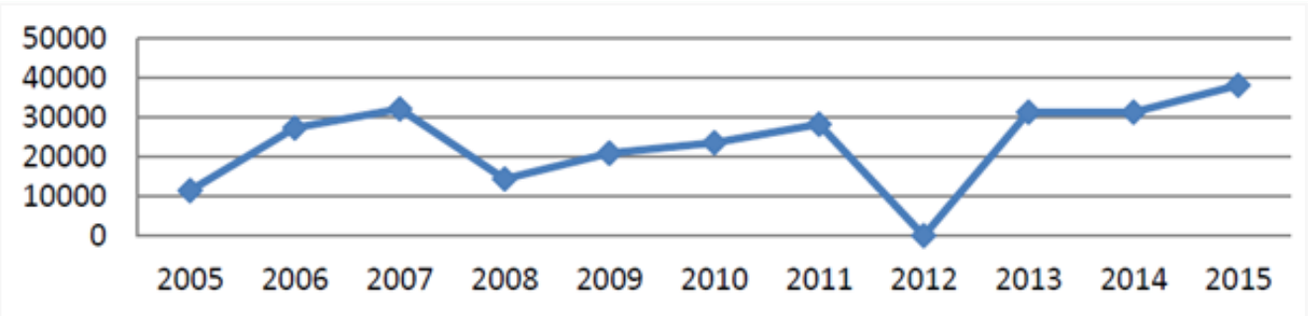
The government of Burkina Faso uses different financing instruments to fund disaster responses. These instruments are listed and briefly described below.

Solidarity Trust Fund: The Fonds National de Solidarité or National Solidarity Fund (FNS) is a social and humanitarian structure created in 2008. It was placed under the technical supervision of the Ministry for Social Action and National Solidarity and under the financial supervision of the Ministry of Finance. The mission of the FNS is to contribute to the care of individuals, creating employment opportunities for youth, disadvantaged groups and/or groups in difficulty as well as victims of natural disasters and humanitarian crises. The interventions provide support for the implementation of rehabilitation programs following natural disasters and humanitarian crises. Since 2016, it has operated on an annual budget of around XOF 400 million (XOF = USD 1.00 at day date and year) (Zongo 2019).

National food reserve: The Société Nationale de Gestion du Stock de Sécurité Alimentaire (SONAGESS) is the implementing body for Burkina Faso's strategic grain reserve that is used as the main food Source for emergency food distributions (Alpha and Pemou 2019).

- **The Stock National de Sécurité (SNS)** was created in 1994 and is managed jointly by SONAGESS and international donor partners (double signature). It is based on a physical reserve of 50,000 t of cereal (sorghum, millet, maize) and a financial reserve sufficient to purchase 25,000 t of cereals. The graph below (Figure 4.2) illustrates the changes in SNS storage levels from 2005 to 2015 in tonnes.

FIGURE 4.2 TIME-BOUND CHANGES IN GRAIN STORAGE LEVEL (TONNES) AT THE STOCK NATIONAL DE SÉCURITÉ, BURKINA FASO



Source: Alpha and Pemou 2019

- The **Stock d'Intervention** (SI) was founded in 2012 and is managed solely by SONAGESS, without donor involvement. The stock is kept at 25,000 t of local cereals (millet, maize, sorghum and rice). The entire stock was mobilized in 2012 while in January 2016, only about 3,600 t of cereals were in store. Unlike the SNS. which focuses solely on food security, the SI's mandate is broader with the following objectives:
    1. To promote local cereals through a quality policy and
    2. To improve the functioning of the market by purchasing cereals at harvest time, then selling cereals at social prices during the lean season, and/or supplying deficit areas to limit price increases.

4.2. Insurance market and regulations overview

The insurance sector in Burkina Faso operates under the jurisdiction and rules of the regional body, the Inter-African Conference on Insurance Markets (CIMA). The rules of the CIMA for micro-insurance extend to any form of livestock insurance. All bids and announcements of new/modified products related to general, crop and livestock insurance must be compliant with Article 300 of CIMA, which requires that all communication be directed through the relevant ministries before being made available in public domains. New CIMA regulations on e-commerce and electronic insurance that will boost insurance penetration in the CIMA zone are in the pipeline (Stoppa and Dick 2018; AXCO 2020).

The Ministry of Finance and Economy houses the general directorate of the Treasury and Public Accounts (DGTCP) that is responsible for ensuring sound management of public funds, guaranteeing cash flow for the state budget, local authorities and public institutions and ensuring the sustainability of the national financial system. In addition to supervising the banking sector, the DGTCP also oversees the insurance sector nationally.

Before applying their tariffs, insurance companies must obtain a letter of permission from the DGTCP and then from the minister responsible for the insurance sector in the state. Permission must also be sought for life insurance contracts including special clauses relating to risks of accidental death and disability. All insurance products, including agriculture insurance introduced by NGOs, international development organizations, private insurance companies and government programs, must pass through the approval process instituted by the insurance department (DA) in the DGCTP. All approvals are in accordance with Article 304 of the CIMA code.

The DGTCP/DA does not provide any funding, however, it can work with the Ministry of Finance and Economy in the event of requests for subsidies for insurance products. There are no fixed criteria for subsidies but the requester must justify the need for subsidies by explaining the benefits that will accrue to the population in question. In some cases, the DGTCP can consider playing the role of re-insurer for micro-insurance companies. Until recently there was no provision of Sharia compliance in the DA, however, a regulation on Takaful insurance operations in the member states of CIMA was adopted by the council of Minister of Insurance in October 2019 (Regulation No.003/CIMA/PCMA/PCE/2019).

Burkina Faso, like most of its neighbouring countries, is a member of the Organisation pour l'Harmonisation du Droit des Affaires en Afrique (OHADA). Non-admitted insurance companies are not permitted, except those that can provide specialized insurance services to one or more CIMA states, such as the ARC. However, these companies still need approval from the DGTCP/DA to operate in the country.

The penetration of insurance in Burkina Faso is low just like in its neighbours in the region (Stoppa and Dick 2018). This low penetration can be attributed to limited knowledge about insurance amongst most of the population, the bulk of whom work in the informal sector. There is little growth in the non-life insurance market, which has been dependent on foreign investment in infrastructure projects (AXCO 2020). The insurance landscape in Burkina Faso can be considered as moderately developed but still growing.

It is estimated that the non-life insurance market in 2018 generated about USD 88.3 million in premiums, inclusive of personal accident (motor vehicles contributed 47.9%) and healthcare (AXCO 2020). There are eight general insurance companies and nine life insurance companies in Burkina Faso. The three major ones are the Société Nationale d'Assurances et de Réassurances (SONAR), SAHAM and Allianz, which make up 61% of the market share, collectively. They offer products such as short-term vehicle insurance, long-term credit and life/pension insurance (Jefferis and Abdulai 2017; Stoppa and Dick 2018). The SONAR had a market share of 20.3% of all non-life insurance in 2018, with SAHAM behind at 18.3%. Another entity called Coris Assurance, an offshoot of the Coris Banque International, had a share of 12.2% (AXCO 2020). With the support of the Bill & Melinda Gates Foundation, UAB Vie offers micro-insurance products related to a contractual savings plan that includes life and disability coverage in case of accidents for the rural and low-income households (CGAP 2017).

In 2014, the Comité Technique Interministériel de Réflection (CTI) recommended the formation of two structures: i) an agricultural risk management agency, the Centrale de Gestion des Risques Agricoles et Alimentaires (CEGERA) and ii) the Société d'Assurance Agricole du Burkina Faso (SAABF), an insurance company under a public-private partnership framework. Efforts are underway to institutionalise these recommendations (Stoppa and Dick 2018).

All insurance companies that were operating in 2019 are members of the Association Professionnelle des Societes d'Assurances du Burkina (APSAB). The objective of this association is to collect statistics, lobby government on the industry's behalf and create awareness among the public on the general benefits of insurance. In addition, the insurers are also members of the Federation des Societes d'Assurances de Droit National Africaines (FANAF), which is responsible for defending the interest of the industry and encouraging regional cooperation (AXCO 2020).

It is estimated that 44% of non-life business products is handled directly by the insurance companies, 27% by agents and the remaining 29% by brokers. The largest insurance company works with 10 agencies that have company offices. Alternative methods of distribution such as e-commerce are not yet common in the industry. A very limited number of digital brokers such as Baloon, have recently started offering online services by leveraging on mobile phone usage. However, these online services are limited to premium payments and product quotes for motor insurance (AXCO 2020).

The informal sector, which is believed to contribute significantly to the country's GDP, remains a largely untapped market for insurance. Harnessing mobile and digital infrastructure for small and frequent premium payments could improve access to this market that has low bank penetration rates.

4.3. Agricultural insurance and services

In relation to agricultural insurance, crop-based schemes are being implemented by different insurance companies. Most of these insurance companies are mainly in the general insurance business, but have a few small portfolios related to crop insurance except for Inclusive Guarantee.

Coris Assurance, whose main focus is on automobile, fire, accidents and health insurance, has been working with Inclusive Guarantee and PAMEFA from Atlantic Bank with the support of the Swiss Cooperation to provide insurance products for cotton and potato. So far Coris Assurance does not provide livestock insurance directly but provides cover for livestock transportation in partnership with Swiss Coorporation and ECOWAS. Coris Assurance acts as a risk bearer and distributes insurance products through its bank networks located in all the regions of Burkina Faso.

Inclusive Guarantee (IG) has been working in Burkina Faso since 2010 targeting mainly low-income populations in the rural areas through their micro-insurance products. In collaboration with Allianz, the schemes offered are weather index insurance (WII) drought coverage products. The products are based on evapo-transpiration and rainfall data derived from weather stations and area yield. The relative evapo-transpiration index is used for maize, sesame and multi-cereals; the rainfall for maize, groundnut, millet and rain-fed rice, and the yield index is for the cotton insurance product. Inclusive Guarantee and Allianz have also partnered to introduce a Sahel harvest agricultural insurance product (Fonta et al. 2018). By December 2020, IG had collected XOF 42,282,529 in premiums and paid out XOF 3,422,870 (XOF = USD 1.00 at day date month) to about 407 farmers.

Inclusive Guarantee's main regions of operation are in the west, the Centre-North, Boucle du Mouhoun and the east of the country. Though IG has been keen on expanding to the greater Sahel, high incidents of conflicts have prevented them from entering the area. Inclusive Guarantee is working in partnership with the University of Namur and Devwis University to model and analyse data. The company also works with the Global Index Insurance Facility, Globus, Agence Française de Développement (AFD), USAID, World Bank, International Fertilizer Development Centre (IFDC) and the WFP for product development, feasibility studies for new areas, training and awareness creation.

Inclusive Guarantee has been using a unique model to distribute its product by working with rural financial institutions and micro-finance institutions (MFIs). The schemes are implemented as part of a multi-stakeholder partnership. IG first offers its products to the MFIs and gives them a choice to either bundle the insurance product with their existing financial services (credit and savings) or provide the insurance product on a standalone basis. The financial institutions and agents identified from local implementation partners collect the premium on behalf of IG. Inclusive Guarantee has also been partnering with Yelen Assurance and the MoAFR to provide training, extension and support services. For cotton, some of the partners are the Union Nationale des Producteurs de Cotton , Ecobank Burkina Faso, Réseau des Caisses Populaires du Burkina, a leading MFI in the country and AGRODIA, a network of input suppliers.

Inclusive Guarantee's operational mechanism is group-based, where insurance policies are issued through the MFIs at a group level (Stoeffler et al. 2018). Since the pay-outs are made via the credit agency or the MFI, payments meant for individuals that default on their loan payments can be withheld. To date, 8 000 cotton producers have been registered by mobile agents (CGAP 2017). In addition to the implementing partners, the main re-insurers are Swiss RE, Hannover Re, Africa RE and CICA RE (Adegoke et al. 2017).

Yelen Insurance is a micro-insurance company focused on health, property and life insurance and WII for crops. So far, the WII is only for crops with no livestock products available. For crops, the focus is on cereals, onions and a few pulses that are insured against drought for smallholder farmers. The insurance company collected a total of USD 133,800 in premiums in 2020 and paid out USD 6,500 in January 2021. Since 2018, the company has insured about 11,000 farmers. The company has a technical team for product design and a digital platform for registering, distributing and making payments. Orange Money is used for making payments. Yelen Insurance uses cooperatives and micro-finance institutions for the distribution of its products. Yelen has been working with the National Chamber of Agriculture (CAN) to register farmers and the general directorate of Rural Promotion and the Support Fund for Women's Remunerative Activities (FAARF) for inclusion and possible bundling of services.

Yelen Insurance is currently in talks with Cultivating New Frontier for Agriculture (CNFA) to develop suitable livestock insurance cover. If a livestock insurance product were to be introduced, Yelen Insurance has shown considerable interest in being part of the process as it feels it can contribute to (i) the technical design of the program, because of its implementation experience and (ii) the distribution of the product, including the risk coverage.

The Ministry of Animal and Fisheries resources launched a crop insurance initiative in 2020 in partnership with the National Insurance Company of Burkina and the Ministry of Economy, Finance and Development. Currently, the program is at the pilot stage covering three regions: Boucle du Mouhoun, le Centre-Ouest and l'Est and three main crops: maize, sorghum and rain-fed rice. As per the decision made at the council of ministers in July 2020, the pilot will provide a 50% premium subsidy. The first campaign in 2020 focused on maize only with 369 producers insured in the three regions for 492 ha of land. The premium collected was XOF 6,094,404 (XOF = USD 1.00 at day date and month) and the program paid XOF 4,761,450 (XOF = USD 1.00 at day date and month) to 107 farmers. This pilot involved Mutuelle Agricole Marocaine d'Assurance and ANAM. The initiative is currently targeted towards cereals at a national level. Moreover, through the emergency COVID-19 support program, BMZ is providing the government of Burkina Faso with EUR 19.5 million (XOF = EUR 1.00 at day date and month) to finance insurance premiums for protection against climate risks (Relief Web 2020).

Burkina Faso joined the ARC in 2016/17 and in 2019, the WFP purchased USD 7 million coverage under the 'replica' climate insurance policies from ARC. Known as the ARC 'replica', the objective of the initiative is to allow governments and humanitarian organizations to access and channel financing to vulnerable communities in the event of extreme droughts. The financing is supposed to protect livestock assets and crops, while facilitating feeding programs for undernourished children (WFP 2019).

To benefit from the ARC replica, countries are expected to develop an emergency plan before taking out the policy, outlining how the funds will be used in case of a pay-out (Relief Web 2020). To date no pay-out has been triggered in Burkina Faso through ARC, though its neighbours, Senegal and Niger have benefited from the pay-outs (ARC 2017). Burkina Faso has also signalled its interest to be involved in the AfDB's Africa Disaster Risk Financing Program (ADRiFi) program and to access ARC premium subsidies (AfDB 2018).

There are additional index-insurance initiatives being developed by UNDP and IFAD. The former is working on introducing index-insurance products in areas where a network of automatic weather stations has been installed for wider climate monitoring purposes, with financing from the Global Environment Fund (GEF). The objective is to link agriculture insurance to value chain projects being funded by GEF, with IFAD subsidizing the insurance premiums (Stoppa and Dick 2018).

Besides the formal insurance schemes (both current and anticipated), the practice of Habbanaye has been adopted in Burkina Faso through the Catholic Relief Services (CRS), particularly in the largely pastoral Est region. As part of the Habbanayé system, wealthier households loan a few female ruminants (such as cows, sheep or goats) to a poorer friend, community member or family member. The loanee gets to keep the offspring of the borrowed animals to build their own stock for the purposes of sustaining their families through difficult times such as drought and conflict. Over the years the basic nature of the system has evolved with the Habbanayé participants incorporating fattening and selling males into their processes, as they keep and use the females in accordance with Habbanayé practice (Bevins 2016). Table 4.1 below presents a summary of the different insurance companies and the crop insurance products they offer.

TABLE 4.1 CROP INSURANCE PROVIDERS IN BURKINA FASO AND THEIR DISTRIBUTION CHANNELS

Insurance Provider	Type	Product	Partners	Distribution Channels	Interest in IBDRF
Coris Assurance	Private entity	• Life insurance • Motor • Fire • Accidents • Health • Crop transportation	• Inclusive Guarantee • Atlantic Bank • Swiss Corporation	• Own bank branches	• No indication but a feasible link because it has bank branches in rural areas
Inclusive Guarantee	Private entity	• Crop insurance	• GIFF • USAID • Allianz • WFP • World Bank • Coris Banque • Eco Bank • Yelen Insurance • Ministry of Agriculture and Fishery resources	• Bank branches • Farmers associations • Cooperatives • Micro-finance institutions	• No indication but a feasible link for IBRDF due to links with MFI and capacity of developing index products
Yelen Insurance	Private entity	• Crop • Health • Property • Life insurance	• Orange • National Chamber of Agriculture • General directorate of Rural Promotion • FAARF • Inclusive Guarantee	• Micro-finance Institutions • Cooperatives	• Considerable interest in IBDRF for product design and distribution

Insurance Provider	Type	Product	Partners	Distribution Channels	Interest in IBDRF
African Risk Capacity	International Public -private entity International Public -private entity	• Sovereign level • Crop and livestock	• WFP	• Not mentioned	• Feasible link
Ministry of Agriculture and Fishery resources	Government institutions	• Crop insurance	• SONAR- IARD • BMZ • MAAH • Orange Money	• Branches of SONAR-IARD • Extension workers at community level	• Feasible link as they have just launched a crop insurance product • Secured funding from donors for insurance premiums against climate risks
UNDP and IFAD	International development organization	• Crop insurance	• Global Environment Fund	• Not mentioned	• Feasible link

4.4. Agromet Services

Climate services in Burkina Faso fall under the Direction Nationale de la Météorologie (DNM), which is a government institution under the directorate general of civil aviation. Information related to weather forecasts is provided by Agency for Air Navigation Safety in Africa and Madagascar, the country's aviation agency, with inputs from Météo Burkina (Harvey and Singh 2017). In addition to weather forecasts, the DNM also carries out monitoring, preparation and dissemination and development of agro-meteorological databases during the cropping season. The dissemination of information is done through 10-day bulletins. The activities mentioned are carried out in collaboration with regional and international institutions in meteorology, agriculture and food security (Kadi et al. 2011). Within the DNM, the Direction Générale de la Météorologie also known as l'Agence Nationale de la Météorologie (ANAM), established in 2016, is an autonomous agency whose role is to establish additional public-private partnerships, such as telephone operators to enable better collection as well as dissemination of agro-meteorological information (Harvey and Singh 2017).

Through a collaboration with FAO, the DNM sends weekly radio messages providing weather forecasting and agronomic advice to more than 200 000 agro-pastoralists to increase their resilience to climate change. Topics covered have included natural reSource management, soil fertility, pesticide use and prevention and eradication of animal diseases (Frost and Sango 2018).

In 2016, the German-funded West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) signed a memorandum of understanding with the national meteorological service of Burkina Faso. The objective of this collaboration is for WASCAL to communicate the analyses with research centres, farmers' organisations and NGOs through various fora (Harvey and Singh 2017). The Groupe de Travail Pluridisciplinaire, of which the DNM is a member, also provides seasonal summary bulletins on the rainfall, water supplies, pastures and livestock along with maps and graphs of rainfall and reservoir levels (WAMIS undated).

Investments to strengthen the technical capacities of Météo Burkina and DNM have been made through partnerships and collaborations with development institutions such as UNDP Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED), the World Bank and technical organizations such as AGHRYMET, IRI, French and UK meteorological agencies among others (Harvey and Singh 2017). As part of these efforts, there has been a steady increase in the number of automated weather stations and rain gauges, resulting in less reliance on volunteers and manual measurements. Recent reports suggest that there are about 200 automated stations across the country (Diasso 2017).

ANAM collects climatic data from the pastoral, agro-pastoral and crop areas. The agency collects data on temperature, humidity, rainfall, vegetation (using NDVI), productivity of dry matter and availability of water from water points every 10 days. From automated stations, rainfall data is collected daily. The rest of the data are collected by extension workers and community representatives and forwarded to the agency headquarters for compilation.

For the satellite data, the agency uses the MESA platform, the Vegetation for Africa or FEWSNET. The ANAM partners with AGRHYMET, African Centre for Meteorological Applications for Development (ACMAD), the Ministry of Environment and Green Economy, Ministry of Agriculture, the Ministry of Livestock and Fisheries resources and CONASUR, among others. ANAM is also the technical support partner for the ARC.

Through the directorate general for the Promotion of Rural Economy, ANAM has been involved in the implementation of the crop index insurance by the Ministry of Agriculture and Fishery resources since 2020. ANAM has been providing climate indices on drought, rainfall and other climate data as necessary. It also contributes to early warning systems by providing seasonal forecasts.

In the pastoral areas, ANAM facilitates extension activities by training supervisors, environmental officers and animal reSource agents from the regions while supporting crop and animal producers in the use of climate data. The dissemination of data is done through local and community radio stations in the form of advisory messages and forecasts. The advisories are not only meant to ensure drought preparedness, but also used to mitigate conflicts between breeders and farmers. ANAM has expressed interest in being part of a livestock index insurance initiative in a capacity development and awareness creation role on climatic data.

It is generally acknowledged that there have been limited efforts to link weather data to livestock production resulting in a shortage of information and data on climate risks for this sector. This can be attributed to a small number of weather stations in pastoral areas compared to cropping areas. The other contributing factor is the lack of sufficient training of livestock staff on the use of meteorological data.

A Climate Risk Early Warning System (CREWS) is being implemented in Burkina Faso by the World Meteorological Organization (WMO), in partnership with Météo-France, AGRHYMET, AEMET/BSC and ANAM. CREWS' objectives are to, i) build the capacity of the National Meteorological and Hydrological Services; ii) strengthen the cooperation with key users and risk management, food security, civil protection and humanitarian stakeholders; iii) test warning systems that deliver relevant information to end-users and iv) improve the operational capabilities to produce and deliver hydrological, meteorological and climate services with respect to early warning. In addition, emphasis is being put on developing capabilities on data management, observation network monitoring and control, implementation of analysis, monitoring and forecast tools for weather and climate early warning and strengthening the interface with information users in specific pilot sites (WMO undated; Migraine 2019).

The NGO Action Contre la Faim (ACF) has established a pastoral surveillance system in the region, combining satellite data with ground surveys to monitor pasture biomass and surface water resources. The information is integrated to generate early warning and food security bulletins (currently adapted to track the ongoing COVID -19 pandemic). This could be another interesting dataset and network to facilitate the design and a basis for risk assessment of insurance solutions. A summary of the agro-meteorological services is provided below in Table 4.2:

TABLE 4.2 AGROMET INSTITUTIONS AND SERVICES PROVIDED

Agromet Institution	Service	Activities	Partners
DNM	◆ Rainfall ◆ Temperature ◆ Database on cropping season	◆ Forecasts, monitoring and dissemination of information ◆ Radio messaging for pastoral areas	◆ FAO ◆ Regional institutions
WASCAL	◆ Rainfall ◆ Water supplies ◆ Pasture conditions ◆ Livestock movement	◆ Seasonal summary bulletins	◆ DNM

Agromet Institution	Service	Activities	Partners
Meteo Burkina	◆ Rainfall ◆ Temperature ◆ Water Sources ◆ Pasture availability	◆ Capacity development	◆ UNDP ◆ World Bank ◆ AGHRYMET ◆ IRI
ANAM	◆ Temperature ◆ Rainfall ◆ Humidity ◆ Vegetation (NDVI)	◆ Early warning, seasonal forecasts ◆ Calculating agent extension services in pastoral areas	◆ Ministry of Agriculture and Fishery resources ◆ AGRHYMET ◆ ACMAD ◆ Ministry of Environment and Green Economy
CREWS	◆ Rainfall ◆ Temperature ◆ Water Sources ◆ Pasture availability	◆ Capacity development of national institutions	◆ Météo-France ◆ AGRHYMET ◆ ANAM
ACF	◆ Pasture ◆ Biomass ◆ Surface water	◆ Pastoral surveillance system	◆ DNM ◆ ANAM ◆ Private companies

4.5. Telecommunications and Digital Financial Service Infrastructure

4.5.1. Telecommunication and mobile services

The telecommunications sector seems relatively strong in Burkina Faso as at least 83% of the adult population own or have access to telephone (mobile or fixed line) services. Although two-thirds of the country has access to 3G connection, the performance remains a challenge because of poor network coverage and low purchasing power of the population in the rural and sparsely populated areas of the country.

There are four active mobile operators with the following market share: Onatel (45%), Orange (30 %), Telecel (18%) and Airtel (7%) as at 2016 year-end (CGAP 2017; World Bank 2018). There are three mobile money services currently offered through Orange Money, Airtel Money and Mobicash in Burkina Faso. Mobicash is provided through a bank led subsidiary. All three mobile money services are being used by NGOs for bulk payments and cash transfer programs. The other services offered are related to agribusiness and loan disbursements (USAID 2019; World Bank 2019).

Since its launch in 2011, Orange Money has been the dominant player with an estimated 80% of all the mobile money account holders in the country (Jefferis and Abdulai 2017; CGAP 2017). Besides national mobile money services, MTN and Orange in Côte d'Ivoire have partnered with Airtel in Burkina Faso to offer cross-border mobile money transfer services between the two countries (CGAP 2017).

The use of mobile money is high, with 33% of the adult population having a registered mobile money account and 39% having either made or received some form of digital payment. It is estimated that a higher percentage of the Burkinabés use mobile money accounts as opposed to bank accounts (USAID 2019; World Bank 2019). This can be attributed to the fact that mobile money agents are the most accessible financial services outlets, far exceeding both banks and micro-finance institutions in the country (Jefferies and Abdulai 2017). Since 2013, OnaTel has been providing mobile money services called m-Payment, which allow mobile money account holders to transfer funds both domestically and internationally, receive payments, conduct withdrawals and pay for goods and services. OnaTel was created in 1987, after it split from the Office des Postes et Télécommunications (OPT) of Burkina Faso. OnaTel operates across different segments, including fixed, mobile internet, data and mobile money. It has about 40 branches across the country with 13 in the large cities and 18 in medium-sized towns.

It is estimated that OnaTel provides coverage to about 90% of the country and 80% of the pastoral areas. The registration for mobile money accounts is done at the branches, which are commercial agencies. In the Sahel area of Burkina Faso, OnaTel has been working with international and local development organizations such as Christian Aid,

Save the Children, OXFAM and SOS Sahelto facilitate cash transfers to the vulnerable populations and in some of the conflict prone areas of the East and the Centre-East regions.

During the COVID-19 pandemic, OnaTel's platform was used by the permanent secretariat of the National Council for Social Protection (PS-CNPS) project and the AFnet Project to facilitate cash transfers in the East and the Centre-West regions. As part of its expansion strategy into the pastoral areas, OnaTel has partnered with Moov Africa, which has the widest coverage in Burkina Faso, including all the pastoral areas. It also has branches in most of the rural areas.

Besides the telecom operators, there are a couple of private-sector companies that offer digital financial services. One such company is Inova, established in Burkina Faso in 2007. Inova offers digital financial services such as deposits, withdrawals and transfers and payments through simple mobile phone technology. Providing services across west Africa, the objective of Inova is to make financial services easily accessible to low-income groups in both urban and rural areas. Inova creates virtual accounts, which can be linked to a mobile number on any type of mobile phone and on any of the telecom networks operating in the country. Some of the specific services provided by Inova, besides deposits and withdrawals, are the payment of life insurance and accident premiums through a partnership with the SONAR Insurance company. In addition, the Union des Assurances du Burkina, is in talks with Inova to develop micro-insurance products, whose premiums could be paid through the Inova virtual wallet (Kamara undated).

4.5.2. Banking and digital financial services

As far as the financial services sector is concerned, the main regulator is the regional central bank known as the La Banque Centrale des États de l'Afrique de l'Ouest (BCEAO). At the national level, the regulatory bodies for banks, MFIs and other financial institutions fall under the Ministry of Economy and Finance. The MFIs are regulated by the Department of Supervision and Control of Decentralised Financial Systems (DSC-SFD) and the regulator of all banks in the country is the Direction des Affaires Monétaires et Financieres (DAMOF). Both the DSC-SFD and DAMOF fall under the Ministry of Economy, Finance and Development (Jefferis and Abdulai 2017).

There are 13 licensed commercial banks in Burkina Faso, with Ecobank, Bank of Africa and Coris Bank being the three largest banks with a sizeable market share. Of the remaining banks, the government has a majority stake in the housing bank, Banque de l'Habitat and the Banque Commerciale du Burkina, which also provide loans to the cotton sector (World Bank 2019).

The National Financial Inclusion Strategy of 2019 spearheaded by the Burkina Faso ministry of finance has recognized and included savings groups as a key pillar of financial inclusion and access. There is significant presence of MFIs in the country, estimated at a total of 134 with 82 active ones and more than 371 service points serving about 1.5 million Burkinabé across the country. Some of the main financial institutions providing savings and credit facilities in the rural areas are General de Micro-finance (GMF), Agence de Financement et de Promotion of SMEs (AFPPME) and FAARF.

The FAARF provides credit to women and women's groups at an annual interest rate of 10%. A compulsory savings deposit of 10% of the loan amount is also required, which serves as a guarantee fund. FAARF also supports beneficiaries of the Ministry of Women's social safety net program by training them on basic financial education. The FAARF does not work directly with savings groups but recognizes them as a potential entry point to achieve the objectives of the Fund and works in collaboration with the GMF and the AFPPME among others. FAARF was established in 1990, with the objective of reducing poverty and supporting the growth of women-led income-generating activities by the ministry of finance.

As part of expanding and streamlining digital capability, a government agency called the Agence Nationale de Promotion des Technologies de l'Information et de la Communication (ANTPIC) was created in 2014 to manage all digital developments in Burkina Faso. At the beginning of 2017, ANTPIC, with the support of the World Bank, launched the eBurkina project with the aim of, i) fostering the development of a digital platform for collecting, storing, utilising and sharing data by different players in the digital space (includes information sharing not only with the government but also with the public) and ii) improving the public service delivery in the rural areas with a focus on the agriculture sector. This would be done using sms–based applications, radio programs and digitization of already collected paper-based data to improve decision-making among the farmers at the local level (USAID 2019; World Bank 2019).

Furthermore, the ministry of agriculture has been involved in several initiatives, such as developing and managing multiple digitally enabled agriculture services applications related to market prices, extension and inputs. One such example is the use of interactive voice response (IVR) services through Viamo, a global service provider working with the ministry of agriculture and Orange to provide the 3-2-1 service, part of the government's e-extension service, where the user can call for information at no cost. The Ministry of Health in collaboration with the Ministry of Agriculture has developed disease surveillance systems for a few specified zoonotic diseases (transmitted between humans and animals) (USAID 2019; World Bank 2019).

The Professional Association of Micro-finance Institutions in Burkina Faso is the founder organization that brings together micro-finance institutions (Jefferis and Abdulai 2017). Of all the MFIs in the country, the Network of the Caisses Populaires du Burkina (RCPB) is the largest MFI, with 70% of the market share for both its savings and lending portfolios (CGAP 2017). Set up in 1985, the RCPB works as a cooperative and has members that reside mainly in rural and urban areas who have challenges in accessing financial services from conventional institutions. With presence in 43 out of the 45 provinces in Burkina Faso, it provides financing for agricultural inputs, in addition to savings and general lending (Pierre Stephane 2017).

The Première Agence de Micro-finance Burkina Faso, part of the Aga Khan Agency for Micro-finance (AKAM) extends credit to agricultural producers against collateral such as land, equipment and production outputs. Having traditionally been a strong player in the agricultural sector, 86% of its clients are in rural areas and use crops and livestock related loans. The loans are given to specific groups of people (cooperatives) who in turn pay for input materials and repay these facilities at the end of the harvest or sales period. Based on a social rather than a financial guarantee, each group member is jointly responsible for the loan repayment to avoid defaults (World Bank 2019; AKDM undated). To improve the availability of market information to smallholder farmers, a digital platform called the SIMAgri has been providing real-time price and sales information for crop and livestock products. The users can use the platform to register themselves as members not only to access prices but also sales opportunities through their mobile phones (Murphy et al. 2017). From interactions with stakeholders and literature, it appears that there is a growing DFS market that IBDRFI programs could leverage for administering and distributing products. However, the extent of the DFS in the pastoral areas may need further investigation.

Table 4.3 below presents a snapshot of the main digital and financial service providers.

TABLE 4.3 DIGITAL AND FINANCIAL SERVICES OFFERED BY PROVIDERS IN BURKINA FASO

Institution	Service provider	Service	Activities	Partners	Interest in IBDRF
Orange	Orange Money	Mobile Money	◆ Cash transfer ◆ Agribusiness loan disbursements	◆ NGOs ◆ Development organizations	◆ Feasible link as used by NGOs for cash transfers
Airtel	Mobile Money	Mobile money Remittance	◆ National and international remittances	◆ MTN and ◆ Orange Côte d'Ivoire	◆ Not a feasible link as they deal mainly with remittances
OnaTel	Mobile money	m-Payment	◆ Cash transfers	◆ International and ◆ Local development organizations ◆ Government	◆ Feasible links as partners with NGOs for cash transfers in vulnerable and conflict prone areas ◆ Has intentions of expanding into pastoral areas
Inova	Digital financial services	Digital payments	◆ Deposits ◆ Withdrawals ◆ Transfer ◆ Premium payments	◆ SONAR ◆ Orange ◆ Airtel ◆ OnaTel	◆ Feasible link as they intend to develop micro-insurance products
SimAgri	Extension	Market information	◆ Crop and livestock products	◆ Farmers' associations ◆ Breeder associations	◆ Feasible link for potential bundling of services

Institution	Service provider	Service	Activities	Partners	Interest in IBDRF
Ministry of Agriculture and Fishery resources	Extension	Market information and surveillance	• Livestock disease surveillance and IVR	• Ministry of Health • Orange	• Feasible link for potential bundling of services and extension services
FAARF	Financial	Micro-finance	• Credit and savings to women and youth	• Ministry of Women • GMF • AFPPME	• Feasible link for possible distribution channel and bundling services targeted at women
FCPB	MFI	Savings and credit	• Financing SACCOs and MFIs	• Farmers associations • Breeders' associations	• Not enough information to establish if a feasible link
RCPB	MFI	Savings and credit	• Crop inputs	• Cooperatives	• Feasible link as distribution channel due to heavy rural presence
AKAM	MFI	Group savings and credit	• Crop and livestock input materials	• Cooperatives • Farmers associations • Breeders' associations	• Feasible link for potential bundling of services

4.6. NGOs and pastoral association networks

Burkina Faso, like its neighbouring countries of Niger and Mali, has several associations, development organizations, NGOs and funding organizations working in different cross–cutting development areas and activities.

Burkina Faso has several national associations operating in the livestock sector. The National Federation of Livestock Producers (FEB) is a national-level producer association, which has sub-associations dedicated towards cattle, sheep/goats, pigs, poultry and milk production. The National Coordination Cadre for the Promotion of Livestock resources , which was created in 1995, works to ensure collaboration between producer associations and government agencies for harmonious and sustainable development strategies. The National Coordination Cadre for Partners in Decentralized Rural Development (CNCPDR), created in accordance with the Paris Declaration in 2004, works as an integration body for all interventions undertaken by ministries, NGOs, civil societies, private sector and donors in rural Burkina Faso (Gning 2005; MRA 2010).

NGOs play a critical role not only in the field of climate services, but also in credit provision and service delivery (Harvey and Singh 2017). One such example is the Mobile Data for Moving Herds Management and Better Incomes (MODHEM) led by the SNV Netherlands Development Organisation (SNV). The MODHEM project aims to enhance household level food security in the agro-pastoralist areas by improving access and use of geo-satellite data. Launched in 2016, it intends to reach 100 000 pastoral households and 200,000 farming households in the Boucle du Mouhoun, Cascades, Hauts-Bassins, East, Central-West, North and Sahel regions. Since this is a public-private partnership, there are multiple stakeholders responsible for different aspects of the project. The service provision is managed by Orange Mobile while satellite data is processed and stored by Satelligence and the CILSS. The agro-meteorological data is provided by AGRYMET and the content creation and dissemination is carried out jointly by SNV and the MoAFR (Zidouemba and Bacye 2019). The SNV, in partnership with the MoAFR and Orange Mobile launched the GARBAL in 2019 to facilitate access to information for pastoral herd migration mobility, agro-meteorological data, agricultural commodities and livestock prices for decision-making (SNV 2019).

To increase pastoral resilience, SNV has also been providing technical support and financial assistance to a forum called the Voice for Change Partnership Program (V4CP). This has brought together the Association for the Promotion of Animal Husbandry in the Sahelian and Savannah Regions and the Platform for Actions to Secure Pastoral Households (PASMEP), to jointly advocate for increased pastoral resilience. The formation of the V4CP has led to collaboration between civil society organizations, pastoral associations and the MoAFR through the establishment of multiple focal points in departments in charge of design, development, implementation and monitoring and evaluation of sustainable development livestock policies.

One of the significant outputs of this collaboration is the review of the Framework Law on Pastoralism ('loi d'orientation relative au pastoralisme') to include climate change, gender and decentralization into the existing framework (SNV 2019). In addition to the V4CP, the Réseau de Communication sur le Pastoralisme (RECOPA) is a civil society organization whose objectives are to, i) increase the organizational and negotiating capacities of pastoralists; ii) raise public awareness on sectoral development plans and iii) facilitate better access and management of natural resources such as water points and grazing areas at the national and regional levels (FAO undated). Similarly, ACORD, an advocacy organization defends rights and promotes peace building initiatives to prevent conflicts over resources between pastoral and agro-pastoral communities in Burkina Faso (ACORD undated).

RECOPA also has a training component, which seeks to integrate young men and women into the agro-pastoral environments by building their skills in fodder production and cattle and sheep fattening. In addition, a local animal health provision system has been set up in the eastern region, which is one of the main routes for transhumance. Currently, RECOPA has 2,000 members spread across the country and partners with institutions such as RBM, Acting for Life (French NGO) and the Entente pour la Coopération pastorale dans la région de l'Est (ECOPARE).

RECOPA has been part of the BRACED project, whose key deliverables were the provision of livestock feed at subsidized rates, creation of water points along the transhumance corridors and distribution of live animals to households affected by the 2014-15 drought. Through the BRACED project, it was able to secure 2,668 km of livestock corridors, carry out construction of water points, rehabilitate fodder banks and provide 3,000 t of fodder supplements along transhumance routes. RECOPA also installed community rainfall gauges to support agriculture decision-making and enhance the access to and use of climate information in Burkina Faso. Regarding the livestock index insurance, RECOPA seems to be interested in the implementation process as a participant in awareness creation and capacity development of breeders to facilitate better understanding of the product.

Veterinaires Sans Frontieres (VSF), active since 2005 in Burkina Faso, has been leading in the development and implementation of various emergency response programs in collaboration with various local and national bodies, particularly in the pastoral areas. Veterinaires Sans Frontieres covers the Central-North, North and the Sahel regions. Some of the main activities of the VSF include, i) maintaining refugees' animals by facilitating feed/fodder production and providing animal health services; ii) providing access to feeds purchased from herders, who can also diversify their income Sources and iii) providing emergency services and relief in response to adverse climatic conditions or conflict. The organization partners with the United Nations High Commissioner for Refugees (UNHCR), the International Organization for Migration and the WFP. The beneficiaries are mainly registered using the UNHCR method[20] but because of the growing insecurity in the areas were VSF works, village groups have been formed to physically conduct checks, record information and list the beneficiaries according to vulnerability status.

Veterinaires Sans Frontieres is interested in a livestock index insurance initiative and could participate as part of the distribution channel and provider of animal health bundling options since they have an extensive network of local primary animal health care providers. In addition, VSF also provides individuals as well as groups of breeders with access to feed/fodder while supporting the suppliers at the same time.[21] There are few private producers that have been contracted for provision of feed and fodder. However, growing cases of insecurity have made access to credit difficult for these private producers and sometimes they are unable to meet the demands. As a result, VSF has partnered with micro-finance institutions in these areas to link these private producers, thus enabling them to have access to credit services.

The Catholic Relief Services in collaboration with a large consortium of institutional partners and NGOs, is working to reduce the vulnerability and food insecurity in pastoral areas of Boulsa-North, Manni and Gayéri in the northern-central and eastern parts of Burkina Faso. The consortium focuses on good governance and effective integration of

20. Information regarding the travel route, recording of photo IDs and reason for seeking asylum are recorded digitally.

21. There is a process of competitive bidding that takes place, where the selected bidders provide the fodder or the services for which they have won the bid to VSF, who in turn work with the local community organizations to distribute the feed and fodder.

crop and livestock production in the pastoral areas. This is being done through product diversification, transportation and conservation of fodder and encouraging pastoralists to vaccinate their animals by using a voucher system. To increase access of pastoral communities to MFIs, capacity building is carried out by agro-pastoral groups in the stock warrantage process (Murphy et al 2017).

The focus of OXFAM in Burkina Faso is mainly emergency response and preparedness by working with farmer organizations to build relief infrastructure, provision of cash for work, capacity building on risk reduction and provision of information on rainfall, floods and droughts in the form of seasonal forecasts in collaboration with the DNM (Kadi et al. 2011). Similarly, two IFAD-led projects have been working with communities prone to droughts and erratic rainfall to increase their resilience by promoting soil fertility management and water conservation techniques (Pierre Stephane 2017).

The WFP has been working in Burkina Faso for several years in emergency response, particularly with the internally displaced people (IDPs). Using the beneficiary and transfer management platform called SCOPE, it has been registering and providing humanitarian assistance to the IDPs. In the second quarter of 2020, despite COVID restrictions, WFP assisted 604,704 IDPs in kind and through mobile money cash-based transfers in Centre-Nord, Sahel, Est, Nord, Centre-Est and Boucle du Mouhoun regions (WFP 2020).

Several NGOs are working on capacity development of farmers by offering good governance training to improve financial management of co-operatives, thus increasing their access to financial services. One such project, Freedom from Hunger (Grameen Foundation), has been promoting value-added and integrated micro-finance programs since 1998. The project designs services that meet the needs of rural smallholder farmers (at least 80,000 savings group members, with a special focus on women, have been targeted) to enable them to manage their resources during lean seasons (Grameen Foundation undated).

In the rural and sparsely populated areas of the country, there are several informal savings and loan groups and associations mostly organized and run by women, in addition to formally registered micro-finance institutions. Though informal, they play an important role in rural areas when it comes to access to finance. Usually, these savings groups are well-organized and supervised by service providers supported by NGOs such as CRS. One such supported scheme called PLAN has more than 325,000 members and provides short-term credit for productive assets such as small and large ruminants along with savings products (Jefferies and Abdulai 2017).

Finally, the government has been carrying out efforts to reduce the incidence of conflict by creating bodies such as the Centre for Citizen Monitoring and Analysis of Public Policies (CDCAP) to foster inclusion and participation among the rural populations and youth to bring about a collective and multi-dimensional management of the security threat in Burkina Faso. This is being done by working with vulnerable communities through the creation of mechanisms to gather perspectives from people in remote areas and sharing them with the relevant authorities (IPSS 2020). Civil society organizations are also working with communities to prevent socio-political conflicts and foster coordination between the government and local institutions in the conflict areas. One such organization is the West African Network for Peace Building (WANEP) Burkina Faso, which has been conducting consultations with the aim of reinforcing social cohesion.

This section highlights the presence of several organizations, which are involved in emergency response, value chain enhancement and service provision (information, financial access, feed and fodder for livestock etc. This provides an opportunity for potential IBDRFI initiatives to leverage on the networks and activities of these organizations in the pastoral areas. A summary of the main activities of the development organizations is provided in Table 4.4 below.

TABLE 4.4 INITIATIVES BY LOCAL AND INTERNATIONAL DEVELOPMENT ORGANIZATIONS

Organization	Type	Initiative	Partners	Activity
FEB CNCPDR CNC	National Associations	Focus on milk, cattle, pigs, poultry, sheep and goat	◆ Ministries ◆ NGOs ◆ Donors ◆ Civil societies	◆ Integration of livestock interventions by private ◆ Public and international development organizations

Organization	Type	Initiative	Partners	Activity
SNV	International development	MODHEM	◆ Orange ◆ CLISS ◆ AGRYMET ◆ Ministry of Agriculture and Fisheries resources	◆ Improve HH food security in agro-pastoral areas through access and use of geo-satellite data
		GARBAL	◆ Ministry of Agriculture and Fisheries resources ◆ Orange ◆ RBM	◆ Information on pastoral herd migration and mobility ◆ Market prices (crop and livestock)
V4CP	Civil society	PASMEP	◆ SNV ◆ ACORD ◆ Ministry of Agriculture and Fishery resources	◆ Designing of sustainable livestock policies ◆ Access and management of natural resources ◆ Conflict management
VSF	International development	Emergency response	◆ RBM	◆ Facilitate veterinarian services ◆ Access to markets ◆ Supporting women dairy groups ◆ Access to feed and fodder ◆ Emergency and relief
Catholic Relief Services	International development	Increase food security	◆ Consortium of international organizations ◆ MFIs ◆ Agro-pastoral groups	◆ Fodder conservation ◆ Animal vaccination ◆ Capacity development of MFIs
OXFAM	International development	Emergency response	◆ DNM ◆ Farmer organizations	◆ Relief infrastructure ◆ Cash for work ◆ Capacity development on risk reduction
WFP	International development	SCOPE	◆ Ministries ◆ Local associations	◆ Beneficiary and transfer management of IDPs ◆ Cash transfers
RECOPA	Local federation	No particular named initiative	◆ Livestock associations and traders ◆ BRACED ◆ RBM ◆ Acting for Life ECOPARE	◆ Advocacy on livestock policies ◆ Access and management of natural resources ◆ management ◆ Emergency response
RBM	Local network	No particular named initiative	◆ International development organizations ◆ Local NGOs ◆ SNV ◆ ECOPARE	◆ Pasture and water Source monitoring ◆ Disease surveillance ◆ Livestock markets ◆ Conflicts management

Key takeaways from Chapter 4: Operational assessment	
Government's response measures to droughts	◆ The government has set up good institutional frameworks for managing drought responses and disaster risk reduction interventions, coordinated by CONASUR. Operational emergency response mechanisms include early warning systems, food distribution, cash transfers and social safety net programs. Most of the mechanisms are designed to manage the impact of droughts on food insecurity. There is growing government interest in risk transfer solutions to manage droughts. To this end, a pilot cereal crop insurance scheme that covers drought and climate-related losses while offering a 50% premium subsidy is in operation. This scheme has expressed interest in being part of the ADRiFi program, enabling receipt of premium subsidies from the ARC.
Insurance market and regulations	◆ The insurance market is generally under-developed and offers general non-life insurance mainly. There is a limited number of private sector actors that venture into agricultural insurance. However, some of the insurance companies such as Yelen Insurance and Inclusive Guarantee have some index-based crop insurance products. The former has expressed interest in livestock insurance and can offer an entry point for an IBDRFI scheme targeting livestock
Agromet Services	◆ Within the Direction Nationale de la Météorologie (DNM), the l'Agence Nationale de la Météorologie (ANAM) collects climatic data from pastoral and cropping areas. ANAM has been involved with the government in the implementation of crop insurance. However, it is generally acknowledged that there is shortage of information and data regarding climate risks in the livestock sector. These institutions could serve as potential calculating agents for IBDRFI products, but there is need to strengthen their capacity. This could be done in collaboration with regional centres or international NGOs such as AGHRYMET or ACF.
Telecommunications and digital financial services	◆ The mobile sector seems relatively strong in the country with four active mobile operators that are all involved in various humanitarian and development organizations' cash transfer initiatives as well as the government's social protection program. Most of the insurance product distribution is done through bank branches and cooperatives, though some of the insurance companies such as Orange Money, are introducing digital platforms for paying premiums. Concerning digital financial services, the FAARF is working with the Ministry of Finance, Ministry of Women's social safety net program and various micro-finance institutions to provide financial education and loans to women and youth. This can be seen as a potential channel for distribution of IBDRFI products to target beneficiaries.
NGOs and pastoral association networks	◆ Organizations such as the SNV are working with multiple stakeholders to implement projects that improve access to early warning and markets information in the pastoral and agro-pastoral regions. They are partnering with local organizations such as RECOPA to enhance access and management of natural resources. In addition, organizations like VSF and WFP are involved in the provision of emergency response services for IDPs. The VSF has also promoted feed accessibility by contracting dealers and traders. These organizations could be considered potential partners through leveraging their networks for distribution of IBDRFI products and linking financial protection with their resilience building interventions.

Key takeaways from Chapter 4: Operational assessment	
Governance and security situation	◆ There is limited presence of state institutions outside of the capital city of Ouagadougou, thus creating a challenge for efficient extension and service provision. This has caused unrest and growing discontent among the population in the country's northern region leading to extremist-led violence and ethnic conflicts. The northern region, being largely pastoral, falls under possible areas of implementation. In spite of the strong presence and networks of NGOs and pastoral associations, increasing insecurity in some target areas could deter organizations from investing in the launch and implementation of IBDRFI solutions. However, there are opportunities to partner with some of the civil society organizations and peace building advocacy groups (working with the government) to explore possible mechanisms by which IBDRFI solutions could be introduced and implemented effectively and sustainably in these areas.

Photo credit: MSF/Mohamed El-Habib Cisse

5. Scenario Analysis

5.1 Background and objectives

This scenario analysis provides a broad overview of how a product might work and illustrates indicative costings for two alternative IBDRFI programmatic options: (i) a micro-level retail insurance scheme and (ii) a fully funded macro-level social livelihood protection program. This is not a product or program design study, thus the analysis is simplified and based only on previous implementation experiences in east Africa.

The two programmatic options, built based on experiences from existing programs, should be seen as two extremes of a broader range of potential IBDRFI programs that could be designed based on Burkina Faso's priorities. Indeed, they should be seen as complementary (not alternative) approaches in a harmonized IBDRFI framework at country level. Both options rely on the private sector for product distribution and management, provide pay-outs directly to pastoralists and are derived from the same index-based model. The two options fundamentally differ in their main goals, targeting approach and the level of participation of public sector actors in terms of subsidies and direct support to complementary activities. Table 5.1 summarizes the key similarities and differences between the two options.

The micro-level retail insurance scheme protects pastoral households from poverty during drought periods by improving access to inputs and credit, which further stimulates investments in the value chain and ultimately increases livestock production and marketing. Clients of the scheme are expected to afford the premiums charged, therefore, public sector participation, mainly through partial subsidies, needs to be modulated to facilitate uptake and ensure financial viability for the private sector.

The macro-level social livelihood protection program provides a social safety net for the most vulnerable pastoral households and complements humanitarian responses by providing support during the early stages of drought to protect key livestock assets and livelihoods. In this case, the program targets beneficiaries that own a small number of livestock assets, who would not be able to pay a premium. Targeting and registration is, therefore, a critical step. The required level of public sector support through full or substantial subsidies and awareness creation is high. In addition to social protection, subsidies could be linked to practices that improve the resilience of pastoral households such as good rangeland management.

TABLE 5.1 SUMMARY OF THE SIMILARITIES AND DIFFERENCES BETWEEN THE TWO PROGRAMMATIC SCENARIOS

Description	Micro-level commercial retail insurance	Macro-level social livelihood protection
Main goal	◆ Improve access to inputs and credit for pastoral households. ◆ Protect from sliding into poverty trap.	◆ Provide a social safety net to the most vulnerable pastoral households and complement humanitarian response.
Insurable interest	◆ Herders' interest to protect their livestock assets during extended periods of deficit of forage resources.	◆ Public interest in anticipatory response to drought and reduction of humanitarian support needs.
Satellite data Source	◆ Same. e.g. NDVI, an indicator of green vegetation	◆ Same. e.g. NDVI, an indicator of green vegetation
Index design	◆ Same. Proxy for forage availability	◆ Same. Proxy for forage availability
Sum insured	◆ Same. It is based on the estimated additional costs of livestock maintenance during seasons with forage deficit but could increase for larger commercial herders.	◆ Same. It is based on the estimated additional costs of livestock maintenance during seasons with forage deficit.
Commercial premium rates	◆ Same underlying pure loss costs, but commercial premium rates may need to be considerably higher to reflect much higher operational costs associated with voluntary sales to individual pastoralists (insured policyholders).	◆ Same underlying pure loss costs with the potential to minimise operational loadings as automatic cover for large numbers of beneficiaries.

Description	Micro-level commercial retail insurance	Macro-level social livelihood protection
Pay-outs	◆ Same, assuming similar sum insured and triggers adopted (direct to policyholder/ insured).	◆ Same, assuming similar sum insured and triggers adopted (direct to beneficiary).
Target audience	◆ More affluent small/medium and large pastoralists who can afford to pay either the full commercial premium rate or a partly subsidized premium rate.	◆ Vulnerable pastoralists who depend largely on livestock herding for their livelihoods, but who cannot afford to pay commercial premium rates. ◆ These pastoralists should have the specified minimum herd size.
Distribution approach	◆ Voluntary purchase by the individual pastoralist or group.	◆ Automatic enrolment of selected pastoralist by government entity/agency.
Policyholder (Insured)	◆ The individual pastoralist is the policyholder and insured as named in the policy certificate.	◆ The insured policyholder is the government entity/agency on behalf of the pre-selected pastoralists (beneficiaries) listed in the policy issued to the government entity/agency.
Insurance awareness creation and sensitisation	◆ Not essential if marketing, promotion and sales functions are correctly performed by the insurer or its appointed agents/ distribution channels.	◆ Essential as pastoral communities and their members must be made aware of the scheme and why some pastoralists are being identified as beneficiaries and will be automatically enrolled, while others will not be selected.
Targeting (and sales) and selection	◆ Insurers will be responsible for their own marketing, promotion and sales programs including own sales agents and their distributers.	◆ The government entity/agency will need to work closely with country-level authorities, community and pastoral leaders to identify the selection criteria and the beneficiaries of the program in each insured unit (IU)
Registration	◆ All insured pastoralists must be electronically registered.	◆ All beneficiaries must be electronically registered.
Premium subsidies	◆ Variable. It could also change in time depending on the product uptake.	◆ Full subsidy (100% or close to). It is, however, recommended that pastoralists contribute with a token or some other modalities.

Source: Authors

Even though the two proposed options have been implemented in east Africa, there are no available examples for the pastoral areas of the Sahel region. A detailed review of the lessons learned in Kenya and Ethiopia is provided by Lung et al. (2021). In general, the micro-level commercial retail scheme is more suitable when the country's insurance market is relatively well-developed and pastoralists have already been exposed to some form of financial protection mechanisms and expressed demand for insurance. This makes it easier for the private sector to engage in the commercialization and marketing of the drought insurance product. However, uptake has been proven to be slow for this scheme such that in the absence of public support through long-term subsidies and incentives, the private sector has experienced difficulties keeping the scheme operational. The social livelihood protection scheme is more suitable when the financial service infrastructure and financial literacy in pastoral areas are limited and when there are many vulnerable pastoralists requiring humanitarian assistance during drought shocks. The main drawbacks of this scheme are associated with the availability and continuity of government funding and the difficulty in effectively incentivizing the private sector to co-invest in the scheme, complementing public sector efforts. The two options can be also seen as complementary rather than alternatives to each other.

The scenario analysis takes into consideration a 'standard' IBLI product type, which has been designed, customized and widely tested in Kenya and Ethiopia (Appendix 1). As already described in Section 1.2, the 'standard' IBLI product design adopted in existing programs relies on, (1) an index calculated from time series of NDVI imagery acquired from satellite sensors and (2) a pay-out function to convert the index values in pay-outs for policyholders/beneficiaries. The analysis is limited to the areas that are considered suitable or partially suitable for the standard product implementation (Chapter 3, Figure 3.6).

I**t should be noted that the index calculation and the pay-out function of the standard product should be customized during the early implementation stages of any initiative aimed at launching IBDRFI solutions in close collaboration with local stakeholders.** The cost of any IBDRFI product is largely determined by calculating historical pay-outs i.e.

pure loss rates, according to the chosen set of parameters and customization options of the standard product. This allows tailoring the IBDRFI solution to the local context and to the specific goal of the IBDRFI initiative.

The scenario analysis is divided in two steps. Firstly, a simulation analysis on historical data is conducted to illustrate the product performance in the country (i.e. independently by the implementation modality) and secondly, financial analysis is conducted to illustrate hypothetical costings of implementing an IBDRFI program in the country. The costings are generated for the two programmatic options illustrated above, a micro-level purely retail insurance program and a macro-level fully subsidized social protection initiative.

5.2 Simulation of historical pay-outs in Burkina Faso

Three historical pay-out scenarios are presented to illustrate how a standard IBDRFI product would have worked in Burkina Faso pastoral areas over the last two decades. The reference scenario is a 'standard' IBLI product with a trigger attachment threshold[22] set to one pay-out in 5 years (S2). The two alternative scenarios are built to illustrate the implications of changing the attachment threshold to increase the frequency of pay-outs (i.e. one pay-out in 2.5 years, S1) or decrease it (i.e. one pay-out in 7.5 years, S3). All the other parameters are constant across the scenarios. All scenarios are built on reasonable parameters assessed through early engagement with local stakeholders or, when this is not possible, using an ongoing program in east Africa as a reference. Table A5.1 provides a summary of the parameters and their Sources.

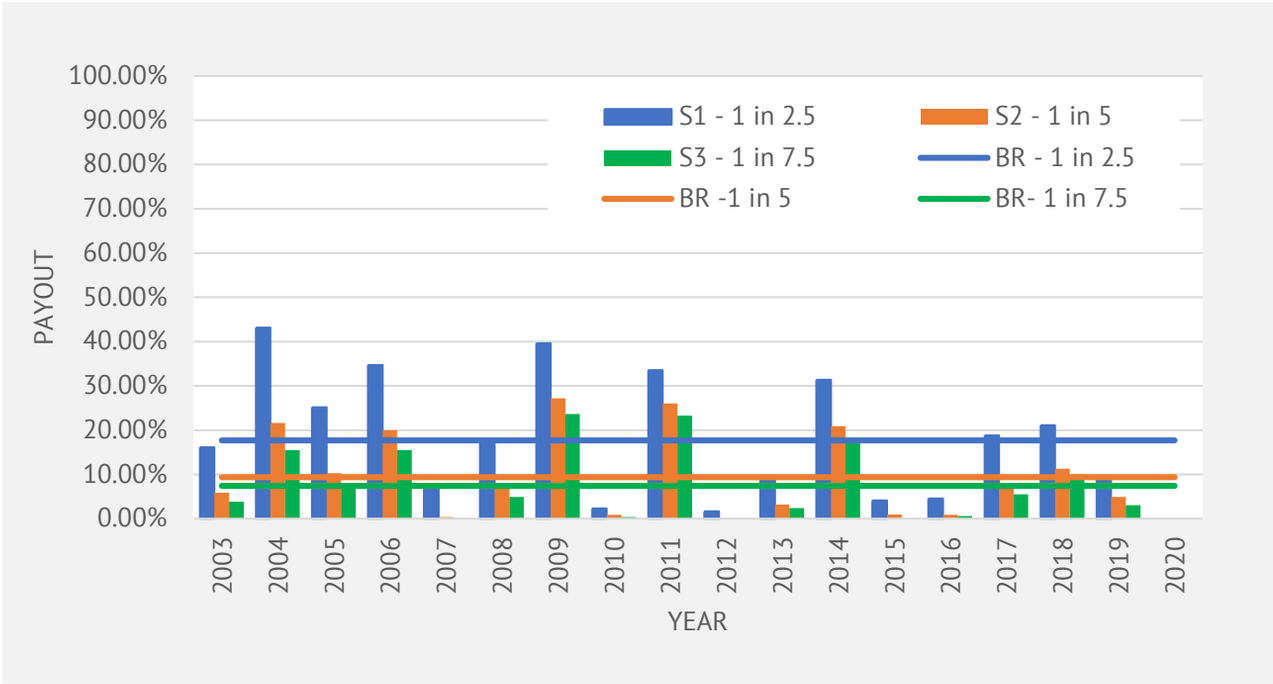
In each of these scenarios, four main pay-outs in 2004, 2006, 2009 and 2011 would have been triggered in Burkina Faso while four moderate drought events would have occurred in the regions considered suitable for IBLI design in 2014, 2017 and 2018. The scenario S1 also captures mild drought events, which are not captured by scenarios S2 and S3. Interestingly, 12/18 seasons would have triggered at least a small pay-out for all three scenarios (Figure 5.1). This suggests that the product, as designed, also captures relatively mild and localized droughts. It is worth noting that even during the main droughts, total pay-outs do not exceed 43% of the total sum insured. This is because the pay-outs shown in Figure 5.1 are averaged across all units in the country, thus, some units may have pay-outs close to the maximum, while others might have much lower pay-outs.

The observed temporal patterns of drought in pastoral areas are generally well-aligned with existing national datasets on main drought events in the region. Drought events in 2004, 2009, 2011, 2018 are relatively well-documented. For localized events, it is difficult to retrieve information on the extent and severity to confirm the observed patterns.

22. The index threshold below which a pay-out is made.

Photo credit: RobertoVi from Pixabay

FIGURE 5.1 HISTORICAL (2003 TO 2020) ANNUAL PAY-OUTS AS A PERCENTAGE OF TOTAL LIABILITY IN SUITABLE REGIONS OF BURKINA FASO (ASSUMING JUNE TO NOVEMBER INSURANCE COVER PERIOD)



The average pay-out (pure loss cost rate or pure risk premium rate) would be 16.8% for scenario S1, 10.0% for S2 and 7.2% for S3, illustrating how more frequent pay-outs would result in significantly higher costs for the IBDRFI product. This shows how decisions made during the customization of the product with local stakeholders on their desired frequency of pay-outs has important implications on the premium cost (of which the pure loss rate is a key component) and that the product can be tailored to the objectives of the IBDRFI program and the ability and willingness of pastoralists' and/or government to pay the premium.

Photo credit: RobertoVi from Pixabay

5.3 Costing scenarios for future initiatives in Burkina Faso

Indicative costings for the two programmatic scenario (PS) options described in Section 5.2 are presented to illustrate the financial implications for the government or donors of implementing an IBDRFI solution in Burkina Faso. The two PS costings are built on the existing implementation experiences in Kenya and Ethiopia and include a micro-level commercial insurance implementation scenario (PS1) and a macro-level social livelihood protection coverage implementation scenario (PS2). Both scenarios are built using a standard product and the trigger attachment threshold of 1 in 5 years (S2 in Section 5.2). The scenarios have been modelled for a 5 year program.

The two programmatic scenarios differ fundamentally on the expected contribution from the government or development partners. The assumed subsidies are 50 and 100% for PS1 and PS2, respectively. Another important difference is the level of contribution of the public sector to complementary investments such as the registration infrastructure, awareness creation and monitoring and evaluation. Finally, the two scenarios (PS) differ in the level of expected uptake, as it is assumed from previous experiences that commercial insurance uptake rates are generally low. A detailed summary of assumptions is provided in Appendix 5. It should be noted that the assumptions made for this analysis are an over-simplification of the reality and should be seen as purely illustrative.

Indicative costs of complementary activities, including registration, awareness creation, monitoring and evaluation are provided to illustrate the importance of including these components at the design stage of any IBDRFI initiative. However, the costs are estimated based on a per-person flat rate, which is an over-simplification. In a more realistic scenario, these components often require an initial larger investment for setting up the infrastructure. The costs then increase over time proportionally with the level of program expansion until a certain critical level, where increasing cost-efficiencies should in principle reduce costs.

PS1. Micro-level commercial implementation with partial subsidies

The PS1 micro-level commercial insurance implementation scenario indicates the costing of supporting a relatively large implementation program in the pastoral areas of Burkina Faso of an IBDRFI micro-insurance product with partial subsidies (i.e. 50% of the premium). Under commercial implementation, the uptake is expected to be gradual such that a reasonable target for the program could be to reach 25,000 pastoral households and approximately 125,000 TLUs in 5-years (i.e. on average 5 TLUs per pastoral household, 0.3% of the national livestock and 1% of livestock in extensive pastoral areas).

TABLE 5.2 CUMULATIVE COSTS (IN USD) FOR IMPLEMENTING PS1 OVER A 5-YEAR PERIOD. YEARLY COSTS ARE PRESENTED IN APPENDIX 5 (TABLE A5.2)

Item	Total (5 year) cost (USD)
Policyholders	75,000
TLUs covered	375,000
Total sum insured	56,250,000
Indicative premium (total)	9,548,869
Premium subsidy (50%)	4,774,435
1. Electronic registration of livestock producers (USD/Livestock Unit)	0
2. Herder awareness, education and training	350,000
3. Monitoring and evaluation	375,000
Total Cost	5,524,435

The global fiscal cost of supporting a micro-level insurance program with 50% subsidies is estimated to be USD 5.5 million over 5 years of implementation, including USD 4.8 million subsidies and USD 0.75 million for program support activities (Table 5.2). In year 5, the fiscal cost for the program would be USD 1.68 million per year and a decision could be made on a more appropriate modality to support further expansion.

The insurance premium to be paid by a pastoral household would be approximately USD 10/TLU per year with a maximum pay-out of USD 150/TLU. There is no indication of the pastoral communities' willingness to pay, therefore, the product design would need to be adjusted based on a realistic assessment of the capacity and willingness to pay the premium. It is worth mentioning that the commercial loadings on pure loss premiums might be under-estimated, especially if the insurer needs to undertake significant investments for marketing and distribution channels development.

In this scenario, there is high uncertainty regarding the uptake Figures and levels of actual investment in complementary activities by the private sector. The uptake of agricultural micro-insurance solutions has often been below expectations due to a variety of factors, including poor product design, poor investment in marketing and awareness creation and high transaction costs for implementation leading to shaky commitment from the private sector. Partial subsidies are deemed important to support the initial market uptake. Therefore, smart use of subsidies needs to be planned to incentivize the private sector investing in critical financial and knowledge infrastructures. In this scenario, a fixed 50% premium subsidy is used, but a gradual reduction of subsidy could also be planned over the medium term.

PS2. Macro-level social livelihood protection coverage implementation

The PS2 macro-level social livelihood protection coverage scenario indicates the costing of supporting a relatively large implementation program in the pastoral areas of Burkina Faso of an IBDRF social protection coverage targeting the most vulnerable pastoralists who cannot afford to pay a premium for insurance (i.e. 100% premium subsidy). Under social protection implementation, the expansion of the program is expected to be more rapid and in 5 years' time, the program could target reaching 50,000 pastoral households per year and approximately 250 ,00 TLUs (i.e. about 0.6% of the national livestock and 2% of livestock in extensive pastoral areas).

TABLE 5.3 CUMULATIVE COSTS (IN USD) FOR IMPLEMENTING PS2 OVER A PERIOD OF 5 YEARS

Item	Total (5 year) cost (USD)
Beneficiaries	150,000
TLUs covered	750,000
Total sum insured	1,12,500,000
Indicative premium (total)	16,850,946
Premium subsidy (100%)	16,850,946
1. Electronic registration of livestock producers (USD/Livestock Unit)	250,000
2. Herder awareness, education and training	750,000
3. Monitoring and Evaluation	750,000
Total Cost	18,600,946

Note: Yearly costs are presented in Appendix 5 (Table A5.3)

The global fiscal cost of fully supporting the program is estimated to be USD 18.6 million over 5 years of implementation, including USD 16.8 million premium subsidies and USD 0.75 million for program support activities (Table 5.3). A total of 150,000 pastoralists and 750,000 TLUs would be covered over 5 years of the program. At the end of the 5 year program, 250,000 TLUs would be protected from drought effects at an annual cost of USD 5.6 million for premiums and a further USD 0.55 million for costs of registration and awareness creation etc. or a total of USD 6.2 million (Table A.5.3).

The premium cost per TLU to be covered through subsidies would be USD 25/TLU. No premium is expected to be paid by pastoral households. However, a token or an alternative contribution is recommended to support awareness of the product. This is an important lesson learnt from ongoing initiatives in Kenya and Ethiopia.

In this scenario, there are concerns regarding the long-term fiscal sustainability of the initiative, as medium-term budget allocation commitments need to be guaranteed. Depending on the social protection goals of the IBDRFI program, a gradual exit strategy should be planned from the beginning. For example, a system incentivizing graduation of pastoral households to partially subsidized commercial coverage could be implemented, allowing for gradual reduction of fiscal costs over the medium to long term.

Hybrid approach: Combining commercial micro-insurance with a social protection program

Experience from operational programs in Kenya and Ethiopia suggests that a hybrid approach could be adopted to address sustainability issues in the two programmatic options illustrated. A macro-level social livelihood protection program could target the most vulnerable up to a certain number of TLUs e.g. five with a highly subsidized product. At the same time, partially subsidized commercial insurance could be sold to those that are not beneficiaries of the social protection program and/or to top-up the coverage with additional TLUs. Subsidies could also be modulated over time between the two programs and used as incentives to the private sectors and clients to promote uptake and financial sustainability.

This could bring multiple potential benefits including:

- Cost sharing for financial service infrastructure development and complementary activities, as the public sector/ donors could support the initial investments under the social livelihood protection scheme, while the private sector guarantees maintenance and invests mainly in market expansion.
- The macro-level coverage could be planned to scale relatively rapidly in the medium term and create confidence in the private sector of the short-term profitability of the scheme.
- In the meanwhile, subsidies can be used as an incentive to the private sector to invest in the commercial scheme and expand the retail market.

Photo credit: RobertoVi from Pixabay

6. Summary of findings and Recommendations

The feasibility assessment indicates that Burkina Faso has a moderate level of readiness for the implementation of an IBDRFI initiative targeting livestock keepers in extensive pastoral systems in terms of socio-economic, technical and operational conditions. Table 6.1 illustrates the key findings of this study with respect to the feasibility criteria considered.

The socio-economic assessment (Table 6.1, green) emphasizes the key role of the livestock sector for the Burkinabé economy, as it accounts for approximately 10% of the national GDP and more than 80% of the country's households rear livestock. Most of the livestock-rearing households are sedentary while only a limited proportion is nomadic or practice long range transhumance. However, short range mobility and extensive herding is common in the north of the country. Though drought shocks are one of the biggest causes of vulnerability and food insecurity for pastoralists, there is little data on the impact of droughts and the cost of drought shocks on households and the community. Discussions conducted with pastoral communities and pastoral associations suggest that there is a general interest and potential demand for drought insurance products and given the poverty levels and inequalities among pastoralists, social protection initiatives that protect the most vulnerable seem a priority.

The technical assessment (Table 6.1, yellow) indicates that the geographic areas that were deemed feasible (green), or feasible but needing review (orange) for the implementation of an IBDRFI product tailored to extensive pastoral systems, cover approximately 25% of Burkina Faso and are largely located in the northern Sahelian region. The area hosts about 30% of the national livestock herd. For the areas requiring review, it would be important to engage with local stakeholders to confirm the suitability of these areas for extensive herding and enable customization of the product design. On the fringe between rangeland and crop-dominated regions, it would be important to assess possible impacts of land use changes on the risk profiling.

The operational assessment (Table 6.1, grey) shows that:

- **There is a conducive regulatory environment, a growing private sector interest in agricultural index-insurance targeting crops, a good telecommunication and DFS network, and a dense presence of NGOs, international organizations, and pastoral associations in the pastoral regions.** Experience from Kenya and Ethiopia have highlighted the challenges of identifying cost effective and efficient distribution channels, which has led to the private sector to constantly rely on external and donor funding. Though an initial funding support will be required, identification of different distribution models and carrying out a cost benefit analysis of the same would be important. The presence of both telecom companies involved in development/ humanitarian work, along with banks and microfinance institutions, suggest the strong potential for implementing effective IBDRFI distribution channels in the country.
- **The overall institutional and private sector capacity seems, however, still weak to support large commercial insurance initiatives and, in general, the pastoral regions have been only marginally touched by investments on financial resilience.** Financial literacy is expected to be minimal, and this could be a strong barrier toward demand for insurance.
- **The insecurity situation in vast portions of the pastoral region represents a material risk factor for the operational implementation of IBDRFI programs and needs to be taken in careful consideration during planning phases.** The activity of armed groups, especially in the northern and eastern parts of the country, have contributed to the rise of intercommunal violence and to growing insecurity conditions. Whilst private sector actors and NGOs are still present in the pastoral regions, there are currently operational constraints due to security concerns.

Table 6.1. Summarizes the main critical areas that would require targeted investments for IBDRFI implementation (red dots). These include:

- Awareness creation about financial protection mechanisms and insurance among pastoral communities. This is a pre-requisite to stimulate informed demand and to support the creation of a local market. This goal can be achieved by sensitizations campaigns but also through capacity building of insurance or extension agents operating in pastoral regions.
- Technical capacity development of local institutions on index-insurance design and calculation. Though there are multiple national institutions providing extension services for agriculture, they have little or no experience index-based instruments. Capacity development could be supported by regional institutions such as AGHRYMET, ACF, ARC already involved in IBDRFI programs.
- Development of an electronic registration system. This is fundamental for targeting beneficiaries and for the effective management of the initiative. Since in the framework of the national shock-responsive social protection program there are plans to setup an household registration system, synergies should be explored.

TABLE 6.1 FEASIBILITY ASSESSMENT OF COUNTRY READINESS FOR IBDRFI PRODUCTS TARGETING PASTORALISTS

			Justification
Socio-economic Feasibility	Importance of pastoral livestock to the local economy		The livestock sector is relevant to Burkina Faso's economy, contributing around 10% to the national GDP and an important Source of export revenue. More than 80% of households rear livestock.
	Impact of drought on the livestock sector		Areas, especially in the Sahelian north including the Sahel, Nord and Centre regions are more prone to frequent droughts than the wetter southern regions. However, very little data is available on the actual losses due to drought and the impact from recent droughts is more anecdotal than quantifiable evidence. The 2004-05 drought seems to be by far the worst experienced in Burkina Faso. More than 70% of the households reduced food consumption and sold property and more than 50% received external aid.
	Vulnerability of pastoralists to drought		The pastoral regions in the north are not only the most arid parts of the country but also the most exposed to recurrent droughts. Livestock-rich regions in Burkina Faso are generally correlated with lower poverty levels. However, there is substantial inequality among households in these regions, with the poorest being particularly poor and vulnerable. There are also frequent accounts of conflict between the nomadic pastoral and agro-pastoralist communities.
	Production systems		Most livestock-rearing households are sedentary agro-pastoralists that are also engaged in crop farming. They engage in moderate transhumance. Only a small minority of households, concentrated in the northern Sahel region, are nomadic pastoralists in Burkina Faso. Around 80% of livestock is kept in sedentary agro-pastoralist systems and 17% by nomadic pastoralists. Only 3% of livestock is kept in semi-intensive livestock systems. This would require some caution in product customization, especially in the definition of insurance units, considering the limited herd mobility ranges.
	Pastoralist demand for livestock insurance		Initial engagements with pastoral communities and associations suggest interest and potential demand. However, the information gathered in this study is not sufficient for accurate evaluation of the potential demand.
	Pastoralist financial literacy		Pastoralist communities have very little understanding of the livestock insurance including crop insurance and their introduction would require significant investments in awareness creation.
Technical Feasibility	Rangeland dominance		Rangelands are the main land cover only in the north of the country, where steppes dominate. Toward the south, rangelands become fragmented with the increase in croplands, human settlements and woody plant covers. This is a culmination of land cover changes over the last fifty years, where a high proportion of savannahs have been replaced by agricultural land.
	Seasonality and signal intensity		The seasonality is well-defined and homogeneous across the areas that are considered feasible for the implementation of IBLI product design, with the growing season spanning from late June to early November. The only exception is for the Est unit in the south of the country, where the rainy season is significantly longer (i.e. from late May to mid-November).
	Overall feasibility of product design		The areas that would be suitable for IBLI product design cover 16.4% of Burkina Faso. An additional 8.6% is also suitable but requires confirmation from local stakeholders on the extent and use of rangelands during the product customization to eventually customize the product design. These regions host about 30% of the national livestock herd.

			Justification
Operational Feasibility	Technical capacity on index calculation and quality assessment		There are multiple institutions supporting agro-meteorological and extension services (e.g. ANAM and DNM), but national-level institutional capacity in handling the data component of index-insurance initiative seems limited. There is little or no availability of livestock data or information for linking weather data related to livestock production. Regional institutions such as AGHRYMET, ACF or the ARC could support data management tasks and capacity building at a national level.
	Legal and regulatory insurance environment		Burkina Faso is a member of CIMA, which already has regulations in place for IBDRFI. CIMA recently introduced regulations for Sharia-compliant products, although the demand for them has not been expressed.
	Insurance market development		Burkina Faso has a relatively less developed insurance market compared to its neighbours like Mali and Senegal. There are, however, several private general insurance companies and banks, which have now introduced some crop insurance products, including index-insurance. Furthermore, the Ministry of Animal and Fisheries resources has recently launched a cereal crop insurance covering droughts and climate related losses. This indicates growing interest and capacity in the agricultural insurance sector. However, no initiatives have been conducted in the pastoral regions.
	Interest from insurers in IBDRFI		Several insurance companies, such as Yelen Insurance, Coris Assurance and Inclusive Guarantee have expressed interest in solutions targeting pastoral areas, which include product design and distribution. The ARC is also operating in the country and has interest in expanding drought cover to rangelands.
	Effective distribution channels		The insurers' presence in pastoral areas is limited or absent. However, the good DFS network, which is currently used for cash transfer programs and providing micro-savings and credit services might offer the opportunity to support effective distribution channels if targeted investments are made.
	Existing pastoralist beneficiary registries		Currently there is no registration system in place. So far, most of the registration processes have been done through international development organizations. However, in the framework of the national shock-responsive social protection program, there are plans to establish a household registration system. This could be an asset for an IBDRFI initiative in the country.
	Finance available for premiums		While this study could not assess the potential for premium subsidy support for IBDRFI in the pastoral regions, ongoing government initiatives on cereal crop insurance supported by BMZ indicate that there is interest and it may be possible to introduce premium financing in the country.
	Interest from Government		The government of Burkina Faso has established a drought risk management framework, including early warning systems, food distribution and cash transfer programs. The government has also indicated a general interest in IBDRFI initiatives targeting pastoral systems. A possible entry point for a pastoral initiative could be the scalability mechanism of the social safety net system that has been recently rolled out.

Recommendations

Considering the limited scope of a feasibility study, the next steps toward implementing an IBDRFI initiative in Burkina Faso would require an in-depth engagement with country stakeholders and the planning of analytical studies to address knowledge gaps identified in this assessment.

Next steps

Stakeholders' engagement and policy support

R1: There seems to be willingness from the government of Burkina Faso to consider an IBDRFI initiative. Policy dialogue should be established between the following ministries: Agriculture, Animal and Fishery resources, Finance and Economy and the DGPER, to review the priority objectives and implementation modalities. Based on this feasibility study and indications from national stakeholders, one option to be considered is the linkage of a macro-level social livelihood protection IBDRFI initiative targeting pastoralists with the ongoing efforts to develop a shock responsive scalability mechanism of the social safety net system. This might guarantee that important investments on the DFS infrastructure, registration systems and awareness creation are made and that the most vulnerable households are protected.

R2: In support of the policy dialogue, a technical working group (TWG) should also be established to provide technical backstop and support decision-making. The TWG should ideally include representatives of the relevant ministries, national/regional agro-meteorological institutions, NGOs and development organizations active in the pastoral regions, pastoral associations, peace building and conflict resolution coalitions and private sector actors with interest and/or experience in IBDRFI. The terms of reference for the TWG should be designed to support decision-making by providing technical backstop mechanisms during the program design stage, scheme implementation structures, product design customization, quality assurance, monitoring and evaluation frameworks, awareness creation efforts and evaluation of suitability to specific target areas.

Follow-up actions

R3: Cost-benefit analysis

- **A comparative technical approach is recommended where multiple IBDRFI products can be identified and a cost-benefit analysis carried out prior to implementation.** This will require linking weather data with livestock production data. Regional institutions such as AGHRYMET, ACF or the ARC could support data management tasks and capacity building at the national level.

R4: Conflict mitigation

- **In-depth analysis of the security situation and the potential operational implications for IBDRFI initiatives.** Though IBDFRI schemes have been implemented in highly insecure areas before, the complexity of issues surrounding conflict and insecurity vary from one area to another. Extremist-led violence, ethnic conflicts and the clashes between farmers and pastoralists driven by competition over land resources have different implications on IBDFI implementation. The former two pose operational challenges while the latter can be potentially mitigated with an IBDRFI initiative, for example by designing pay-out structures, which could limit transhumance toward cropping areas before harvest. Hence, it would be critical to carry out detailed engagements with stakeholders who have been working in these areas to understand the inter and intra-community dynamics to help design an effective solution.
- **Analysis of potential complementary interventions to enhance IBDRFI pay-out effectiveness, facilitate uptake and mitigate conflicts between pastoral and farming communities**. Complementary interventions targeting feed/fodder, veterinary services and livestock production are important to ensure that the pay-outs are effective in protecting livestock assets and livelihoods. As such, a review of existing programs in the pastoral areas could be conducted to assess locations where such investments have already been made or are planned, thus presenting ideal conditions for rolling out the scheme.
- **Analysis of potential impacts of IBDRFI pay-outs on conflicts between farmers and pastoralists and consideration for pay-out distribution approaches that would potentially mitigate these conflicts.** It would be critical to address the process of pastoralist dry season migration to the southern agro-pastoral and farming areas, which is a major cause of conflicts. IBDRFI wet season pay-outs in the event of drought can contribute to this goal, for example, by reducing the need for early transhumance toward cropping areas (i.e. before crop harvest). These mechanisms should be accompanied by broad sensibilization of communities to the mutual benefits of the migration process and more efficient use of resources through exchange (e.g. crop residue), in partnership with pastoral associations and relevant ministerial departments to institutionalize this within the Framework Law on Pastoralism.

Next steps

R5: Product Design

- Once insurance products have been identified for specific agro-ecological zones, and assuming there is government buy-in, the index spatial aggregation units should be defined considering the limited mobility of the large majority of livestock keepers in the country. The design needs to be carried out consultatively with local stakeholders during the preparatory phases of IBDRFI schemes. One important element is the definition on the insurance unit, which should reflect areas typically used by pastoralists for grazing during the wet season, including their mobility patterns. Considering the limited mobility of pastoralists in Burkina Faso, particular attention should be dedicated to this step, as the size of insurance units might be smaller than in existing IBDRFI programs. In addition, alternative design options (e.g. pay-out schedules) could also be considered.

R6: Public Policy

- **Government must consider investing in building blocks such as data infrastructure, herd registries, weather stations, furthering the reach of the DFS services in pastoral areas, etc.** Depending on the type of product/s chosen (either micro, meso and macro or possible combinations), further investigation into premium financing options for both micro-level retail IBDRFI and meso/macro-level covers should be conducted, while identifying ways of aligning different drought risk financing insurance mechanisms and programs for pastoralists.

R7: Distribution and delivery

- **Review of alternative distribution models (including meso-level), with the goal of identifying models that could maximize social cohesion and inclusiveness**. Pastoral communities rely strongly on social capital and various traditional practices reinforce this social cohesion. However, there is a growing inequality among pastoral households, with richer households owning disproportionately more livestock than poorer ones. Bearing this in mind, a possible meso-level (i.e. group-based) distribution might be a better alternative than micro-level distribution for IBDRFI in the country. This also addresses elements of social cohesion and inclusion within pastoral communities. Further engagements with service providers active in pastoral areas would be useful not only to explore such models but to also understand their viability.
- **Study of the potential distribution channels and ongoing DFS initiatives in the country from public, private and international development actors.**Findings and engagements with stakeholders indicated that local banks, micro-finance institutions and cooperatives are better placed to distribute the product, while complementing this with digital platforms to reduce the cost of transactions for implementing a livestock insurance product. The use of digital platforms could also be a possible solution to reach areas with higher insecurity. One aspect deserving special consideration is support for the development of a household registration system, currently under consideration by the government. Furthermore, a better understanding of the demand for services and level of financial access in the pastoral areas is required.

Next steps

R8: Capacity building and learning

- **Public and private sector capacity needs' assessment. Capacity building in these sectors has been identified as a priority area of intervention.** This would apply primarily to the public institutions that are mandated to undertake agro-meteorological and extension services, but also to institutions tasked with emergency response. For the private sector, capacity assessment would be mainly in the areas of IBDRFI technical design and operational implementation capacity in the pastoral regions.
- **Consideration by the government to invest in building blocks.** Since there is interest from the government in insurance products related to drought risk mitigation, logically it would be important for the GoBF to consider investments in the building blocks for effective IBDRFI solutions such as data infrastructure, herd registry, weather stations, furthering the reach of DFS services in pastoral areas, among others.
- **The issue of financial illiteracy could be a considerable challenge in implementing IBDRFI solutions.** The involvement of local institutions in developing and conducting financial literacy campaigns could be a possible solution to address this challenge. Extension workers who are part of the national producers' association could be engaged for this purpose.
- **Monitoring and evaluation strategy, as part of a broader learning framework to ensure that appropriate mechanisms for quality assurance and impact evaluation are in place.** Considering the lack of experience in IBDRFI and the limited financial literacy, it would be essential to establish effective monitoring mechanisms that ensure not only the verification of the project implementation but also the actual engagement with the communities. Their active participation in product reviews through feedback and recommendations on what works and what does not work is vital. In addition, a proper impact assessment study (multi-annual surveys) is recommended to demonstrate, in a rigorous way, the benefits of the proposed initiative on pastoralist resilience and welfare, and ensuring that unwanted secondary impacts (unintended consequences) would not be stimulated by the intervention e.g. pasture degradation and conflicts.

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Appendix

Appendix 1. Key differences between micro-level retail IBLI and modified macro-level social livelihoods protection programs

TABLE A1.1 DIFFERENCES BETWEEN MICRO AND MACRO-LEVEL PROGRAMS IN KENYA AND ETHIOPIA

Description	IBLI micro-level commercial retail insurance	KLIP Social Livelihoods Protection Program
Product design and rating:		
Index: Satellite NDVI (MODIS)	Same	Same
Contract design (triggers) and pay-outs (loss cost rates)	Same	Same
Sum insured	Same but could increase for larger commercial herders according to the feed requirements of their herds	Same but as livelihoods protection, based on minimum nutritional requirements of livestock
Commercial premium rates	Same underlying pure loss costs, but commercial premium rates may need to be considerably higher to reflect much higher operational costs associated with sales to individual pastoralists (insured policyholders	Same underlying pure loss costs, but potential to minimise operational loadings as automatic cover for large numbers of beneficiaries and the potential to achieve economies of scale in operational costs.
Pay-outs	Same assuming same sum insured and triggers adopted (direct to policy holder/insured)	Same assuming same sum insured and triggers adopted (direct to beneficiary)
Target audience	More affluent small/medium and large pastoralists who can afford to pay either the full commercial premium rate or a partly subsidised premium rate	Vulnerable pastoralists who depend largely on livestock herding for their livelihoods, but who cannot afford to pay commercial premium rates. These pastoralists should have a minimum herd size of no less than 5 TLUs (or tba)
Compulsion of IBLI insurance:	Purely voluntary decision by the individual pastoralist or group	Automatic enrolment of selected pastoralist by project management / government entity
Policy holder (insured)	The individual pastoralist is the policyholder and Insured as named in the policy certificate	The insured policyholder is the government entity/agency on behalf of the pre-selected pastoralists who will be listed in the schedule (or annex) attached to the policy issued to the government entity/agency
Pre-conditions of insurability:	Insured pastoralist household must: ◆ Be able to pay their share of premium ◆ Have a smartphone to receive sms messages ◆ Have a bank account (fixed or mobile money) into which pay-outs can be directly made	Beneficiary pastoralist household must: ◆ Own a minimum of 5 TLUs and be a livestock herder ◆ Have a SMART phone to receive sms messages ◆ Have a bank account (fixed or mobile money) into which pay-outs can be directly made
IBLI insurance awareness creation and sensitization	Not essential if marketing and promotion and sales functions are correctly performed by the insurer or its appointed agents/ distribution channels	Essential as pastoral communities and their members must be made aware of the government livelihoods' protection program and why some pastoralists are being identified as beneficiaries and will be automatically enrolled, while others will not be selected.

Description	IBLI micro-level commercial retail insurance	KLIP Social Livelihoods Protection Program
Targeting (and sales) and selection	Insurers will be responsible for their own marketing and promotion and sales programs including: ◆ Own sales agents ◆ Other distributers	The government agency will need to work closely with national authorities, community and pastoral leaders to identify the selection criteria and the beneficiaries of the program in each insured unit (IU)
Registration	All insured pastoralists must be electronically registered along with their livestock holding and details of their address, phone number and bank/mobile money account details and name of the insured unit in which their livestock are normally grazed and which they have selected to be their trigger IU. IBLI details must also be recorded including uninsured TLU, sum insured, premium rate for that IU and premium paid by the pastoralist	All beneficiaries must be electronically registered along with their livestock holdings and details of their address, phone number and bank/mobile money account details and name of the IU in which their livestock are normally grazed and which they have selected to be their trigger IU. IBLI details must also be recorded including uninsured TLU, sum insured, premium rate for that IU and premium paid by the government
Premium payment and policy issuance	On the payment of their share of premium, each insured policyholder should receive a unique numbered certificate of insurance (local language), policy wording and schedule of cover (as necessary)	Beneficiaries do not pay any premium (at least in initial year(s). A single master policy will be issued to the government entity that purchases cover. Each beneficiary must receive a certificate detailing the protection they are receiving (no TLU, sum insured and maximum pay-outs per season and IU)
End of season notification (and settlement of pay-outs)	Ideally sms texting will be used to advise each insured during the coverage period if drought conditions are developing in their IU and at end of the cover period whether a drought pay-out has been triggered or not and the pay-out due. Electronic money transfers should be carefully tracked to each insured's bank or mobile money account	Ideally sms texting will be used to advise each beneficiary during the coverage period if drought conditions are developing in their IU and at end of the cover period whether a drought pay-out has been triggered or not and the pay-out due. Electronic money transfers should be carefully tracked to each beneficiary's bank or mobile money account
Government support: premium subsidies	Currently none under IBLI micro-level programs in Kenya and Ethiopia	Kenya: 100% subsidised and financed by GOK (out of the SDL-MALF budget) Ethiopia: WFP finances 100%, but pastoralists are expected to contribute towards premium costs through insurance for assets, in-kind labour on PSNP public works programs
Costs of implementing program to insurers	The administration, operating requirements and expenses for insurers to market micro-level IBLI policies to individual pastoralists in the ASAL regions are extremely high including awareness creation and policy promotion/sales, policy issuance, premium collection and claims pay-outs.	The administration and operating requirements and expenses for insurers to underwrite a single modified macro-level policy with government are much lower than for a micro-level IBLI program. Main costs include registering pastoralists (beneficiaries) and insurance awareness creation.
IGAD country experience to date	◆ IBLI ASAL countries of Kenya since 2010-11 ◆ IBLI Borena, Oromia region, Ethiopia since 2012-13	◆ KLIP, ASAL Counties of Kenya since 2015-16 ◆ SIIPE, Somali region, Ethiopia since 2017-18

Source: ILRI 2021

Appendix 2. IBLI product design and overview of customization options

This section describes the standard IBLI product used for the scenario analysis in this study while providing a brief, non-exhaustive, overview of alternative customization options that can be considered during the product design customization at the early stages of implementation.

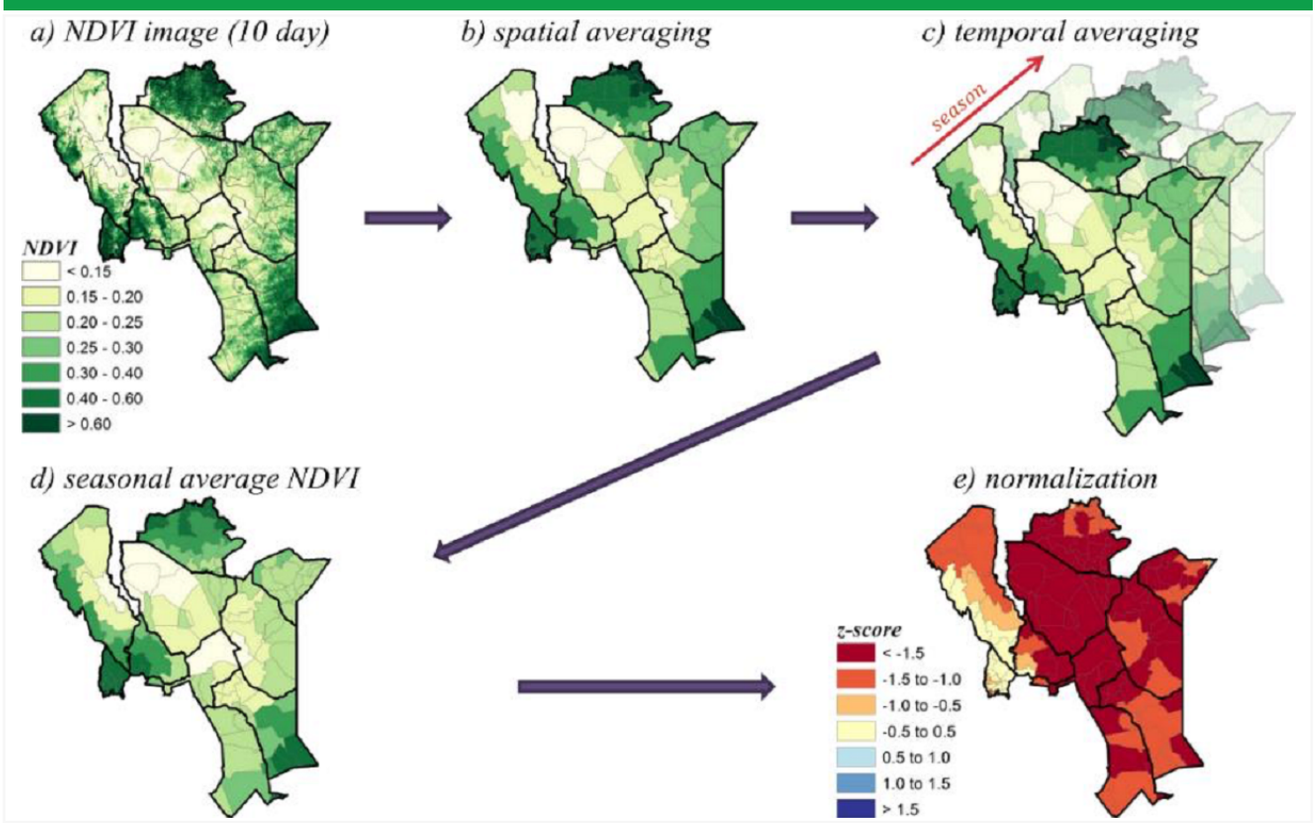
Index design

The IBLI product relies on NDVI time series data acquired from the MODIS satellite sensors (eMODIS product). The use of alternative satellite indicators, such as rainfall estimates or soil moisture is not considered in this study, as currently there are no products designed for African pastoral regions based on these alternative indicators (Fava and Vrieling 2021). While in principle, they could offer a valuable alternative, rigorous research and quality assessment would need to be performed before considering their use.

To transform NDVI into a useful index for pastoral IBDRFI schemes, three steps are required (Figure A2.1):

1. Spatial aggregation**:** Geographic units are normally larger than grid cells, both for operational reasons and to reflect that herds are mobile. Aggregation within units generally incorporates a mask of where rangelands occur.
2. Temporal aggregation: Most schemes aim to assess seasonal forage scarcity, requiring expert or EO-derived [32] knowledge on rainfall/vegetation seasonality.
3. Normalization to compare the current index value against historic index realizations in past years.

FIGURE A2.1 IBLI PRODUCT DESIGN



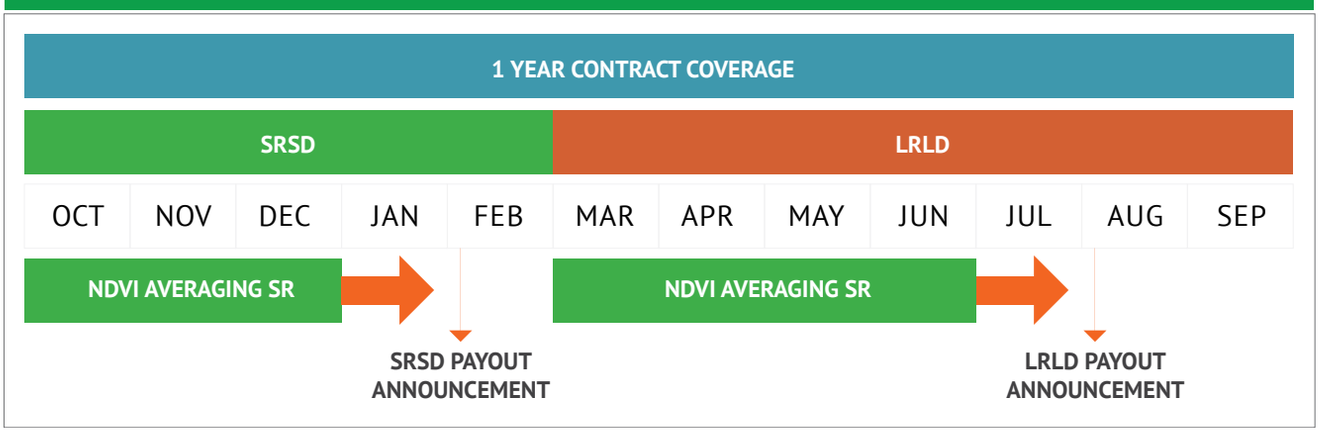
Source: Vrieling et al. 2016

Spatial aggregation units are administrative level two units. Insurance units are generally defined in collaboration with local stakeholders according to a set of criteria (Chelanga et al. 2017), but this would be out of scope for a feasibility study. However, it should be noted that this is a very important step to be planned for in the early implementation steps.

Temporal aggregation is set to seasonally aggregated data. To define the pasture growing season temporal boundaries, unit-level start of season (SOS) and end of season (EOS) dates are estimated using the Joint Research Centre (JRC) phenology maps (available from https://mars.jrc.ec.europa.eu/asap). When the spatial variability of SOS and EOS is limited, fixed dates can be used. For Burkina Faso, the SOS was fixed to June and the EOS to November. Figure A2.2 shows an example of the temporal aggregation in the KLIP program.

Depending on the type of IBDRFI instrument used, the temporal aggregation can be customized. For example, running averages (e.g. monthly and quarterly) have been proposed and utilized as an alternative (i.e. in the Hunger Safety Net Program in Kenya).

FIGURE A2.2 IBLI KLIP CONTRACT COVERAGE PERIOD, INDEX CALCULATION PERIOD AND TIMING OF PAY-OUTS (KENYA)



Source: (Fava et al. 2021)

The normalization approach is based on the use of standard scores. However, multiple options exist, such as linear scaling between minimum and maximum historic values (i.e. the vegetation condition index), percentile calculation and per cent deviation from the average. It is unlikely that major implications on the pay-outs related to the normalization metric used would occur.

Pay-out function

The formulation of the pay-out function is a linear function of the index value between an index attachment and an index exit threshold. Pay-outs range from zero, below the attachment value, to a pre-defined maximum value below the exit. In the standard model, the attachment threshold is calculated at unit level in terms of expected pay-out frequency (i.e. 1 out of 5 seasons) on the historical dataset. The exit threshold is commonly fixed or set to the minimum historical index value. The maximum pay-out is calculated as the cost of maintaining the livestock alive during a severe drought shock.[23] These parameters are not constant across IBDRFI programs and need to be individually customized.

The standard pay-out function is applied to end of season index values (as per the temporal aggregation step described in the previous section). However, options for multiple seasonal pay-outs (e.g. one early and one EOS) have also been proposed and utilized. The early pay-out is an anticipation of the main pay-out, not a fully independent pay-out.

Alternative formulations of the pay-out function have also been proposed but not yet applied in operational programs in Africa. For example, an alternative formulation of the pay-out function is based on the persistency of forage deficit conditions rather than the seasonally aggregated values. In this case, when index values fall below a pre-defined attachment threshold for a given number of consecutive time periods, e.g. 2 or 3 decads, pay-outs are triggered. The pay-outs increase proportionally to the length of the forage-deficit period till a maximum pay-out is reached.

23. In Kenya the monthly sum insured is currently KES 1,167 per TLU/month (KES = USD 1.00 at day date month) to cover the costs of purchased fodder and feed supplements. The Kenya IBLI programs provide pay-outs to enable pastoralists to purchase supplementary feeds for their animals over the 5-month short rains, short dry season (October to February) and for the 7-month long rains, long dry season (March to September). Therefore the sum insured to feed 1 TLU over 12 months is KES 14,000 (KES = USD 1.00 at day date and month).

Appendix 3. Technical Feasibility Assessment - Methods

The technical feasibility analysis is based on the standard IBLI product. This product has been specifically designed and tested for extensive pastoral systems of east Africa, therefore, few conditions need to be met for its use in different geographic contexts, as discussed below. In addition to these requirements, the product can be refined, customized and improved to reflect conditions within a specific country.

For successful implementation, three major premises should be satisfied, including:

1. **Dominance of extensive rangelands to provide a clear linkage between satellite NDVI values and ground forage conditions.** The estimation of forage indices is built on spatial aggregation of predefined units, referred to as unit areas of insurance . Thus, heterogeneous landscapes, such as agro-pastoral systems, mixed crops, agro-forest areas, non-forage production areas etc. pose a challenge when designing a drought index.
2. **Sufficient forage production that can be easily detected by clear satellite NDVI signals.** Since NDVI is used as an indicator of forage availability for determining insurance index and pay-outs, rangelands that have little or no forage resources, such as barren lands, must be identified and eliminated.
3. **Clear seasonal patterns for both wet and dry seasons to allow identification of the risk period and related insurance parameters, i.e. coverage period, sales windows and time of pay-out.** Other factors, such as drought history[24] and migration patterns, are also important elements to be considered when designing the index.

To determine rangeland dominance, forage availability and seasonality, the analysis was based on various satellite products (Table A3.1), including the following:

- 10 day eMODIS[25] NDVI time series at 250 m spatial resolution
- Decadal rainfall estimates from the Climate Hazards Group Infra-red Precipitation with Station (CHIRPS)(Funk et al. 2015) data available at a spatial resolution of 0.05° for the period 2002 to 2019
- Land cover characteristics defining cropland/rangeland extent and phenological metrics for the NGS
- Start of season (SOS) and EOS data from the JRC
- NGS, SOS and EOS are derived from the long-term average of eMODIS NDVI data at 1 km resolution for the period 2003 to 2016 (Klisch et al. 2016).

To delineate homogenous zones and identify community groupings for the pragmatic implementation of drought risk financing (Chelanga et al. 2017), the level three administration (arrondissment) boundary units were used. The analysis was done by spatial aggregation of the satellite products at these arrodissment levels. To determine the rangeland extent and dominance, average fractional covers of human landscape (croplands and built-up areas), savannah (shrubs and grass) and tree cover were used. Using stepwise conditional thresholding, the rangeland dominance areas were determined. If the ratio of rangelands to human landscapes was ⩾3 and tree cover ⩽25%, then the unit was classified as fully meeting the rangeland requirement. However, if the ratio was ⩾1.5 but <3 , then rangeland requirements were partially met.

24. The drought frequency is determined by computing the z-scores for aggregate department's NDVI for years 2002-20 and assuming a normal distribution. Thus an area experienced drought if the NDVI fell below the 20th percentile for a normal distribution curve, i.e. if the values were less than the z-score -0.842.

25. Earth resources Observation and Science (EROS) moderate resolution imaging spectroradiometer.

Photo credit: Riccardo Mayer from Shutterstock

TABLE A3.1 SATELLITE DATA PRODUCTS USED IN THE STUDY

Data	Product	Description and Source
NDVI	Normalized Difference Vegetation Index (NDVI)	A 10 day temporary smoothed NDVI product at 250 m spatial resolution covering the period July 2002 to July 2020 from eMODIS from the United States Geological Survey
Land Cover	Copernicus Global Land Service: land cover 100 m Collection 3: Epoch 2019: Globe	A global near real time annual product for the 2019 Epoch Collection 3 land cover maps at 100 m spatial resolution. These are produced by the global component of the Copernicus Land Service, derived from PROBA-V satellite observations and ancillary datasets. The global map includes a discrete classification with 23 classes aligned with UN-FAO's Land Cover Classification System (Meroni 2018)
	Copernicus Global Land Service: Fractional Covers for grass, shrubs, trees, bare, built-up and croplands	Global land cover fractions, i.e. percentage (%) of ground cover for the four main classes used in the analysis, centred around 2019
Phenology	Phenological timings ◆ Number of growing seasons/year ◆ Start of season ◆ End of season	Three products were used: Number of growing seasons per year, Start of season and End of Season The IGAD region has both unimodal and bimodal precipitation regimes thus each season has a start and end product. These metrics were derived from long term average of the 10 day MODIS NDVI data produced by BOKU university at 1 km resolution for the era 2013 to 2016 (Klisch et al. 2016), produced by the European JRC.
Precipitation	CHIRPS	Computed decadal averages using the 10 day product for Kenya for the years 2002 to May 2018, available at 0.05° (Funk et al. 2015)

Once the rangeland condition was met, the forage availability units were determined. To eliminate areas considered unsuitable for the product implementation, NDVI and bare land fractional cover product were used to define the extent of productive lands in Burkina Faso.

To aid in identification of productive land areas with high NDVI intensity, the NDVI's amplitude was computed from the difference between the 95th and 5th percentiles of NDVI, restricted to >0.1 (Vrieling et al. 2016). The non-land areas were disregarded if the NDVI time series comprised <60% of land valid NDVI values. Combining the bare land fractional cover and NDVI metrics, if the non-productive land areas were <60%, then the forage availability condition was satisfied, otherwise it would require forage review. The seasonality conditions were assessed by extracting the majority phenological metric for NGS, SOS and EOS per arrondissment, with further refinement using average precipitation condition and NDVI profiles.

Appendix 4. Stakeholder engagement

Based on the literature review done for the scoping mission, key stakeholders were identified for further information and fact finding to assess the socio-economic and operational feasibility of a drought risk financing product. The stakeholders were representatives from the insurance markets, private and public sector, regulators, members of government bodies, financial organizations, international development organization and local pastoral groups. A list of key stakeholders is provided in Table A4.1.

TABLE A4.1 LIST OF STAKEHOLDERS

No.	Type	Stakeholder
1.	Insurance providers	Yelen Assurance
		Corris Assurance
		Inclusive Guarantee
2.	Agro-meteorological and research organizations	National Meteorological Agency
3.	Telecommunication companies	OnaTel
4.	Government bodies	General directorate of the Treasury and Public Accounts
		National Council for Emergency Relief and Rehabilitation
		Ministry of Animal Fisheries resources
5.	International development organizations	Veterinaires Sans Frontieres
6.	Pastoral organizations	RECOPA
		RBM

Appendix 5. Scenario Analysis

The assumptions made for scenario PS1 (commercial micro-insurance) and PS2 (social livelihood protection) are illustrated in Table A5.1. These assumptions are based on very general and simplified considerations, therefore, the presented costs should be deemed purely illustrative.

TABLE A5.1 SUMMARY OF THE ASSUMPTIONS MADE IN THE COSTING ANALYSIS

Description	Micro-level commercial insurance (PS1)	Macro-level social protection coverage (PS2)	Justification
Uptake in 5 years	2,5% of total herd, 0.5%/year increase rate	5% of total herd, 1%/year increase rate	Uptake levels are generally lower in PS1, while they can be pre-defined in PS2*
TLU per policyholder/ beneficiary	5	5	Aligned with existing programs[26]*
Total sum insured/TLU	USD 150	USD 150	Indicative average value provided by stakeholder during interviews
Trigger frequency	1 in 5	1 in 5	Realistic frequency in the country*
Premium rate	Pure loss rate × 1.5	Pure loss rate × 1.3	Higher commercial loadings are expected for PS1. These loadings are at the lower side of the typical loadings applied internationally by the insurance sector and should be carefully reviewed for the local markets*

26. Five TLUs has been selected on the KLIP and SIIPE macro-level social safety-net protection insurance programs as this is considered to be the minimum number of 'breeding' stock/TLUs to maintain a viable herd through times of severe drought. However, this value is country specific.

Description	Micro-level commercial insurance (PS1)	Macro-level social protection coverage (PS2)	Justification
Subsidies (government or donors)	50%	100%	PS1 is partially subsidized. PS2 needs to be fully subsidized. However, any intermediate subsidy option is also possible*
Registration costs (government or donors)	N/A	USD 5/ beneficiary	For PS1 the cost is covered by the private sectors. The amount is purely illustrative*
Awareness creation	USD 5/ policyholder	USD 5/ beneficiary	This is an important component to support markets and informed demand*
Monitoring and evaluation	USD 5/ policyholder	USD 5/ beneficiary	This is an important component to demonstrate the value of the initiative. The amount is purely illustrative*

* Authors' assumption

The yearly and total indicative costs for the two scenarios are presented in Tables A5.2 and A5.3. The premium paid by each policyholder for each TLU in the S1 scenario can be obtained by the formula:, *(premium-subsidy)/TLUs*.

TABLE A5.2 YEARLY AND TOTAL COSTS (IN USD) FOR 5 YEARS OF IMPLEMENTATION OF PS1

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Beneficiaries	5,000	10,000	15,000	20,000	25,000	75,000
TLUs	25,000	50,000	75,000	10,000	125,000	375,000
TSI	3,750,000	7,500,000	11,250,000	15,000,000	18,750,000	56,250,000
Premium	636,591	1,273,183	1,909,774	2,546,365	3,182,956	9,548,869
Subsidy	318,296	636,591	954,887	1,273,183	1,591,478	4,774,435
1. Electronic Registration of Livestock Producers	0	0	0	0	0	0
2. Farmer awareness, education and training	25,000	50,000	75,000	100,000	125,000	375,000
3. Monitoring & Evaluation	25,000	50,000	75,000	100,000	125,000	375,000
Total	368,296	736,591	1,104,887	1,473,183	1,841,478	5,524,435

TLU: Tropical Livestock Unit
TSI: Total Sun Insured

TABLE A5.3 YEARLY AND TOTAL COSTS (IN USD) FOR 5 YEARS OF IMPLEMENTATION OF PS2

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Beneficiaries	10,000	20,000	30,000	40,000	50,000	150,000
TLUs	50,000	100,000	150,000	200,000	250,000	750,000
TSI	7,500,000	15,000,000	22,500,000	30,000,000	37,500,000	1,12,500,000
Premium	1,123,396	2,246,793	3,370,189	4,493,586	5,616,982	16,850,946
Subsidy	1,123,396	2,246,793	3,370,189	4,493,586	5,616,982	16,850,946
1. Electronic Registration of Livestock Producers	50,000	50,000	50,000	50,000	50,000	250,000

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
2. Farmer awareness, education and training	50,000	100,000	150,000	200,000	250,000	750,000
3. Monitoring & Evaluation	50,000	100,000	150,000	200,000	250,000	750,000
Total	1,273,396	2,496,793	3,720,189	4,943,586	6,166,982	18,600,946

TLU: Tropical Livestock Unit
TSI: Total Sum Insured

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