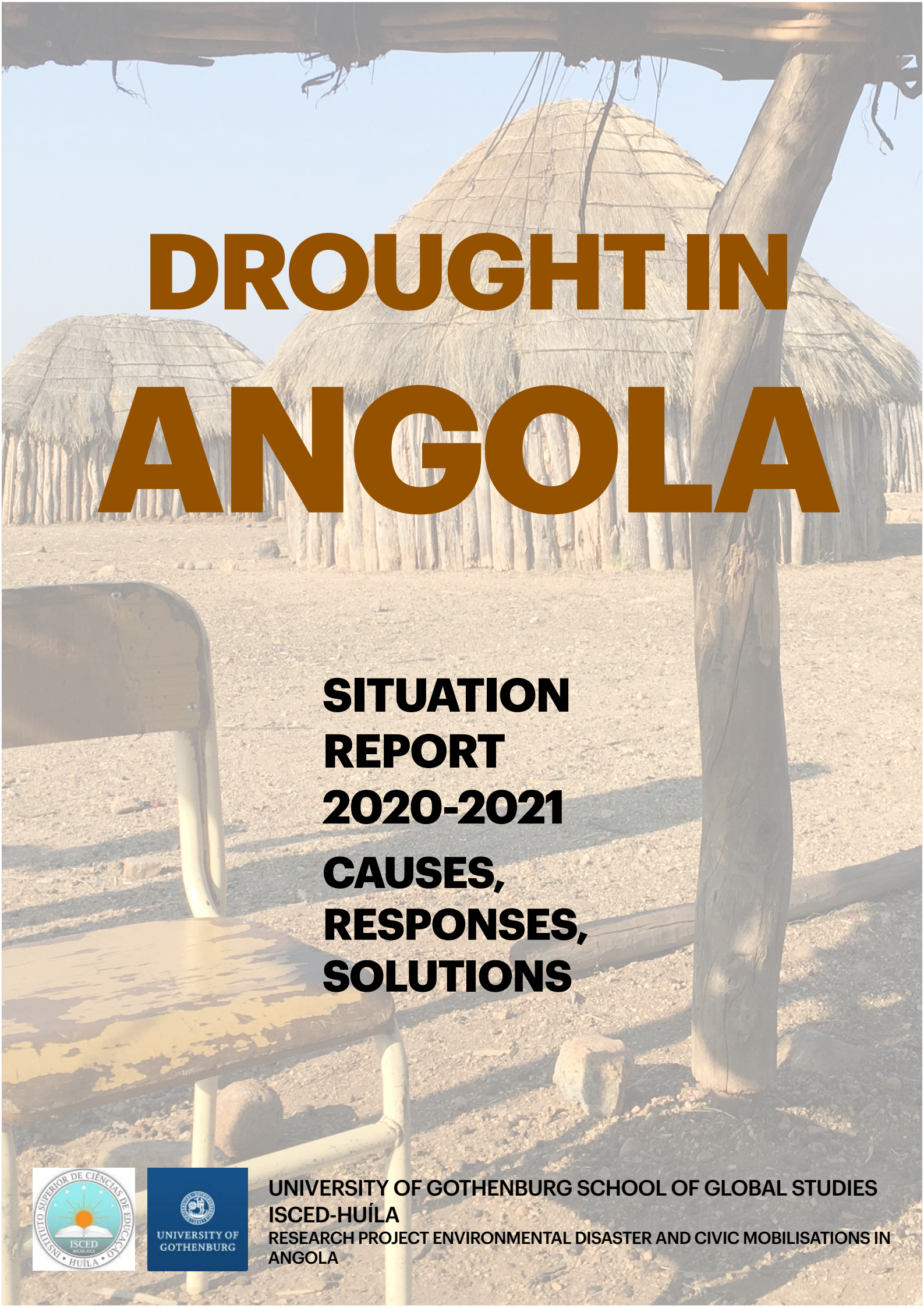

DROUGHT IN ANGOLA

SITUATION REPORT 2020-2021

CAUSES, RESPONSES, SOLUTIONS

UNIVERSITY OF GOTHENBURG SCHOOL OF GLOBAL STUDIES
ISCED-HUÍLA
RESEARCH PROJECT ENVIRONMENTAL DISASTER AND CIVIC MOBILISATIONS IN ANGOLA

REPORT PRODUCED IN THE FRAMEWORK OF THE RESEARCH PROJECT *ENVIRONMENTAL DISASTERS AND CIVIC MOBILISATIONS IN ANGOLA*, FUNDED BY FORMAS (2020-2021) AND HOSTED BY THE SCHOOL OF GLOBAL STUDIES OF THE UNIVERSITY OF GOTHENBURG. PARTNER INSTITUTION IN ANGOLA: ISCED-HUÍLA.

In 2019, the southwestern provinces of Angola found themselves on the brink of an unprecedented humanitarian crisis, due to a prolonged drought cycle that spanned nearly a decade. The research project "Environmental disaster and civic responses in Angola" carried out a local survey of the situation in southwestern Angola during 2020-2021, collecting testimonies from local communities and stakeholders related to this environmental catastrophe. At the same time, it mapped past and current responses to drought and analysed the case of Southwest Angola in the context of global environmental disasters.

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ACRONYMS

ACC: Associação Construindo Comunidades

AECID: Agencia Española de Cooperación Internacional para el Desarrollo

ADPP: Ajuda de Desenvolvimento de Povo para Povo

ADRA: Associação para o Desenvolvimento Rural e Ambiente

ANGOP: Angola Press

CEAST: Conferência Episcopal de Angola e São Tomé

FAO: Food and Agriculture Organization of the United Nations

FAS: Fundo de Apoio Social

FRESAN: Fortalecimento da Resiliência e Segurança Alimentar e Nutricional em Angola

INAMET: Instituto Angolano de Meteorologia

INHR: Instituto Nacional de Recursos Hídricos

IPCC: Painel Intergovernamental para as Alterações Climáticas

MINAMB: Ministério do Ambiente

MINEA: Ministério da Energia e Águas

PIDLCP: Programa Integrado de Desenvolvimento Local e Combate à Pobreza

PDNA: Post Disaster Needs Assessment

PIIM: Plano Integrado de Intervenção nos Municípios

PNUD (UNDP): Programa das Nações Unidas para o Desenvolvimento

PRODESI: Programa de Apoio à Produção, Diversificação das Exportações e Substituição das Importações

UN-CERF: United Nations Central Emergency Relief Fund

UNICEF: United Nations Children's Fund

UN-OCHA: United Nations Office for the Coordination of Humanitarian Affairs

USAID: United States Agency for International Development

EXECUTIVE SUMMARY

AGRO-INDUSTRIAL PROJECT IN HUMPATA (HUÍLA)

CONTEXT AND RESEARCH

- The Southwest of Angola has been undergoing a period of severe to extreme drought in the last decade, which has caused a humanitarian and environmental disaster, with an increase in food insecurity, disease, forced migration and massive death of livestock. Drought is a transversal phenomenon, which produces environmental, humanitarian, economic and political problems.
- The research carried out sought to diagnose the situation in 2020-2021, after the general alert launched in 2019, in order to assess the degree of mobilisation and response of the different actors to the drought. We visited local communities in Huíla, Cunene and Namibe provinces, and interviewed members of local communities, civil society, and local government, both in those provinces and in Luanda.

SITUATION IN 2020-2021

- After the peak of the crisis in 2019, in 2020 and 2021, despite the cooling down of the media agenda around the issue, the situation has not changed substantially.
- Farm cycles in the fields of rural communities continue to fail, due to lack of rain and the absence of alternative irrigation mechanisms. The same does not happen with agro-industrial projects, who have their own water supply and irrigation mechanisms.
- Transhumance is increasingly practiced over greater distances in search of water and pasture. Valleys and *tundas* are increasingly disputed, giving rise to intra-community conflicts.
- In border areas, there is an increase in forced migration movements to Namibia in search of food and work, challenging the current mobility restrictions in the country.
- The COVID-19 pandemic and its restrictions contributed to increasing the severity of the humanitarian disaster, preventing the use of seasonal mobility or trade as alternative strategies to agro-pastoralism.

IDENTIFIED PROBLEMS

- In addition to the general situation of meteorological drought, there is an infrastructural dimension that is causing localised drought situations, either due to the lack of infrastructure or the insufficiency and degradation of the currently existing infrastructure: roads, energy, communication, water channels, etc.
- Likewise, the growing focus on agro-industrial projects in recent years is intensifying the pressure on the soil and its water resources, and preventing or hampering the traditional routes of pastoralist circulation (transhumance).
- The government response, through its various programs and initiatives, has focused on immediate assistance and long-term infrastructure projects. However, the response is fragmented, partial and in some cases redundant, causing shortcomings in the approach.
- Likewise, the excessive centralisation of the financial and material operationalisation of the response makes its execution difficult, making it time-consuming and subject to political agendas in Luanda, instead of being designed and proposed based on local needs. Local administrations do not have sufficient financial and legal autonomy to be able to respond in due time.
- At the infrastructural level, the government response has focused on new macro-projects,

namely around the Cunene River. This answer promises to solve several supply problems. However, these are long-term projects with unpredictable conclusion. At the same time, they focus on new construction instead of taking advantage of the existing infrastructure (dams, canals), many of which date back to colonial times, and around which populations have organised themselves for decades.

- The response by NGOs and aid and development organisations has solved several local problems, but there is a lack of dialogue and knowledge sharing between the different organisations and institutions in the field, in particular with regard to the reuse of well-developed, successful responses. There is a lack of a general framework that makes it possible to take advantage of good practices and avoid redundancy.
- In many cases, there is insufficient consultation and involvement of local communities, particularly in relation to the design of practical solutions, particularly considering the socio-cultural and ethnic diversity existing in this region.
- The scientific community (from meteorology to geography, social anthropology) is ready to contribute, however there is no systematisation and cross-referencing of scientific data with projects developed in the field. There is therefore an under-utilisation of these resources.

RECOMMENDATIONS

- Decentralisation in decision-making, and attribution of greater autonomy of execution to local authorities.
- Greater dialogue and synergy between the agents involved, through a common framework of actions.
- An integrated approach to the issue of land and use of environmental resources, both in terms of compliance with existing legislation and respect for the practices and strategies of local communities - in particular with regard to transhumance.
- Greater emphasis on local knowledge, not only in terms of traditional practices and socio-environmental knowledge, but also on the co-authorship of solutions, in a participatory fashion, based on the recognition of the socio-historical, cultural and environmental particularities of each affected area.
- More circulation of knowledge between the different actors on the ground, in particular with regard to good practices that effectively solved problems at the local level.
- Incorporation of good practices in drought response, both nationally and internationally.
- Emphasis on investment in road, energy and communication infrastructure, both in terms of taking advantage of existing infrastructure and building new infrastructure in more remote areas.
- Incorporation of a logic of environmental justice, designing and developing projects primarily based on respect for the dignity of human life and concern for environmental diversity.

INTRODUCTION AND CONTEXT

CATTLE CROSSING SAND RIVER IN IMPULO, QUILENGUES (HUÍLA)

The Southwest of Angola, which generically comprises the provinces of Namibe, Huíla and Cunene, has been experiencing a period of prolonged drought since approximately 2010, when irregular and below-average rainfall began. If significant adverse effects were already identified by the mid-2010s (UN-CERF 2016; PDNA 2016; MINAMB 2017), in 2018/9, according to the Angolan Institute of Meteorology (INAMET), the region entered an anomaly situation in terms of of precipitation that placed it in a situation of "extreme drought" (Mateus and António 2020). This situation caused an environmental and humanitarian crisis of unprecedented scale, which reached its highest point in 2019, when several agencies denounced the situation of emergency that local communities were experiencing. According to data published by UNICEF in June 2019, around 2.3 million people were food insecure as a result of the drought. This motivated the development of several urgent aid and development programs, both by the Angolan government and the national and international civil community.

Within this framework, the El Niño climatic phenomenon has often been pointed out as the main cause for the situation, causing a climatic disturbance reflected both in terms of extreme drought and floods (MINAMB 2017). In any case, this region of Angola is known for being traditionally arid and in some places desert and semi-desert. Meteorological studies refer drought cycles in 1992/1993, 1998/1999, 2012/2013, 2015/2016 and 2018/2019 (Mateus and António 2020). From this perspective, indigenous communities, traditionally dedicated to agro-pastoral livelihoods, developed over time several survival and resilience strategies to face water scarcity. Therefore, the question that emerged within the scope of this research project was: why are these communities falling, since 2018/9, into a situation of increasing vulnerability? Can the situation be attributed exclusively to El Niño? In addition to climate factors, what are the human factors that are creating the situation of calamity from a humanitarian point of view? Furthermore, in a region crossed by a river with an abundant flow such as the Cunene River, why is there still difficulty in accessing water?

In this report we propose a description and analysis of the "drought problem" in Southwestern Angola, as well as a description of the institutional and civic mobilisation that was generated in response to it. We point out that it will be necessary to take into account several aspects - environmental, cultural, political and economic - in order to have a more comprehensive view of the phenomenon. Following the distinction made by Wilhite and Glantz (1987), we work with the distinction between **meteorological drought** (derived from lack of precipitation), **agricultural drought** (resulting from the inability to

meet the water needs of crops), **hydrological drought** (scarcity of water resources in the soil and subsoil) and finally **socio-economic drought** (water insufficiency for human activities), in order to distinguish the environmental dimension from its social, economic and political effects. After a presentation of the research project and its methodology, we will begin with a historical, cultural and landscape characterisation of the Southwest region of Angola, which will serve as a necessary context for a better understanding of the drought phenomenon and its consequences on the human and environmental landscape. In the following section we will offer a description of case studies that we have covered in the course of our research. In the third section of this report, we will offer a description and analysis of the different technical, economic and other solutions that have been developed on the ground. Finally, we will present a list of "best practices" in response to drought, and make our diagnosis of the situation and recommendations.

General map of the areas affected by the drought in Southwestern Angola

RESEARCH PROJECT APPROACH AND METHODOLOGY

This research project, funded by the Swedish agency FORMAS under the "Urgent Grants" program (2019), was designed in response to the extreme drought situation as it emerged in 2018-2019. The objective was to take stock of the state and civic mobilisation that arose, both at a national and international level, in response to this recognition of crisis. As social and cultural anthropologists, our concern was to make an on site assessment, in contact with local communities, to understand what worked and what failed in the response to the drought, and above all to grasp the point of view of local communities. We sought to combine an anthropological perspective concerned with socio-historical, cultural and political contexts, and a more applied analysis of technical mobilisation to develop short, medium and long term solutions.

This field approach had the advantage of being able to gather very different experiences and perspectives in relation to the drought, its causes and consequences. On the other hand, given its urgent nature, it was not an exhaustive collection in geographic terms - many other localities and regions could also have been addressed -, nor a longue durée approach. In addition, the drought has increasingly been transcending the territorial limits of the three provinces normally associated with the phenomenon (Cunene, Huíla, Namibe). As reported last year, news of the effects of the drought are accumulating, for example in the provinces of Benguela, Cuando-Cubango and Malanje. From this perspective, in addition to the buzzword "drought in the south of Angola", it is necessary to continue to monitor the scope and complexity of the drought throughout the entire territory of Angola.

Fieldwork was carried out at different times between October 2020 and June 2021. A total of 11 locations were visited in the provinces of Cunene, Huíla and Namibe. Namely:

- Cunene: Curoca (Oncocua, Erola).
- Huíla: Gambos (Tyipeyo, Tyitongotongo, Tyihepepe, Taka, Tunda), Humpata (Neves, Bata-Bata), Matala, Quilengues (Impulo).
- Namibe: Virei (Tyitundo-Hulo), Tômbwa (Curoca, Lagoa do Carvalhão, Arco) Bibala (Quilemba Velha).

During these visits, we talked to *sobas* (village chiefs) and their families, shepherds and farmers. We also carried

out interviews with municipal and communal administrators and their technical and administrative teams, who often accompanied us. Outside this field research, we conducted interviews with members of civil society organisations (ADRA, NCA, ACC, ADPP, FRESAN and others) and government institutions, both in Lubango and Luanda (INAMET, INRH). In all, 28 interviews and focus groups were carried out. A bibliographic and documentary survey was also carried out, as well as a collection of news and reports on the drought, and a comparative study with other regions of the African continent that suffered similar experiences. With regard to constraints, the main problem found was the mobility and circulation limitations related to the COVID-19 pandemic, which imposed several extra procedures, such as quarantines and multiplication of security measures. This, in turn, limited the time available for the stay in each of the locations visited.

Map of places visited in the framework of the project.

A "BREADBASKET LAND" HISTORICAL-CULTURAL-ENVIRONMENTAL NOTES ON SOUTHWEST ANGOLA

Covering an area of 213,086 square kilometres, Southwest Angola is, as John and Sophie Mendelsohn (2018) recently described, a very diverse region from a socio-environmental point of view, comprising desert and extreme arid areas to the West (Namibe) , ridge and mountain areas (reaching 2100 kilometres in height) with abundant water resources (Chela), areas of woodland and dense forest (*miombo*), and the ecosystem of the Cunene River, one of the few permanent rivers in this region with a flow annual average is 174 m^3/s at the mouth. In this sense, in this space it is possible to find extremely diverse ecologies and environments.

At the same time, it is a region with vast potential in terms of mineral, agricultural and, above all, livestock farming, often disputing the title of "Angola's breadbasket" with the plateau further north. For this reason, historically it has integrated several trade routes from north to south, and is populated today with several agricultural or resource exploration projects in these areas. Given the unique conditions for livestock, this region is also referred to as incorporating the "milk complex" or "milking complex". These ecological potentialities explain the socio-historical development of the region, marked by the intersection of groups and communities of different origins. Historically, southern Angola was populated by movements of people from both the north, south and east, who organised around the various types of natural resources existing around the Cunene and Caculuvar rivers, for example.

In this context, archaeological research in the region refers to the millenary existence of several civilisations of Bushman and Bantu origin, sometimes in conflict with each other (Ervedosa 1980; Serdoura 2018), or of civilisations such as the kingdom of Féti - one of the oldest kingdoms in the Sub-Saharan region, precursor of the Ovimbundu kingdom and which had settled on the banks of the Cunene (see for example Moura 1958; Childs 1970; Vansina 2004; Malumbo 2005).

These different trajectories make up a very diverse ethnic landscape in Southwest Angola, mainly of Bantu origin (structured around the Nyanheca-Humbi, Ovimbundo, Nganguela, Quioco and Herero or Kuvale (Mucubal) ethno-linguistic groups) and also a non-Bantu minority (descendants of of Bushmen

and Khoisan).[1] The coexistence between these groups was not always peaceful, with longstanding memories of clashes between the different chiefs that composed them.

From this diversity, the main traditional socio-economic activities also varied across the different groups, alternating between trading activities, a transhumant pastoralism (such as that practiced today among the Mucubal/ Kuvale, Ovanyaneka, Mwacahonas, Muchimbas, Nkhumbi and others), family farming or livestock farming, or hunting and gathering (as is the case among the Vátua). In this context, transhumance

Kuvale with cattle grazing in the Namibe desert, 1930s. Photo by Elmano Cunha (Source: ACTD Archive)

was a common practice among several communities, in response to the scarcity of pasture and water, constituting itself as a rational and cyclical system for the use of resources in the territory, from the plains and valleys to the mountains, which at the same time incorporated circulation and commercial exchange routes (Gonçalves 2016; Castelo 2018). Here, it is important to emphasise that this autochthonous livestock economy, despite the abundance of cattle that it manages to accumulate, was never industrially cut, and reveals a complex relationship between local communities and their sheep and goats, used more for the consumption of milk and for the affirmation of political status and matrimonial alliances. Within this framework, we recall the distinction made by Ruy Duarte de Carvalho (2000), who described how, for the Kuvale, the animal was an 'ecological ox' and not so much an 'economic ox'.

From a socio-political perspective, these different groups were structured around kingdoms and chiefdoms structured around clans and are found today territorially structured around *kimbos* and *ehumbos*, based on a usually polygamous and patriarchal organisation from the political point of view but matrilineal when it comes to transmission and inheritance. Southern Angola was also the scenery of several trade routes, both in cattle and in rubber, sugar cane, cotton and ivory, supported for decades by slave or *serviçal* labor (Clarence-Smith 1976). In this framework, for example, material remains of Mbari

[1] At this point it is important to mention that these classificatory concepts embody a historical trajectory subject to processes of domination and control, particularly in the context of Portuguese colonialism, which often conceal more complex realities (Carvalho 1995). This is the case, for example, of the Nyanheca-Humbi category (Melo 2007). In this framework, it is necessary to take a critical look at the use of these terms.

communities - descendants of slaves from the plateau and eventually "urbanised" throughout the twentieth century - can still be found in Namibe (Blanes 2019).

However, from the second half of the 19th century onwards, there was a progressive process of colonisation by occupation on the part of the Portuguese kingdom, increasingly organised around the exploitation of its natural resources. Gerald Bender (1978) describes how the planned settlement process in this region began with the forced exile of convicts to Moçâmedes, albeit in negligible numbers. And for example through the books by Ruy Duarte Carvalho, such as *Os Papéis do Inglês* (2000), we learn about the historical presence of various types of commercial "entrepreneurs" in the field, the so-called "bush entrepreneurs", successors of the *funante*, who, in addition to trading with local communities, were also engaged in agriculture, cattle raising and/or hunting (Silva 2003). Some residences and warehouses of former merchants are still visible throughout this territory today.

In any case, the first systematic European colonisation of the region took place in the mid-19th century (Clarence-Smith 1976; Bender 1978; Castelo 2007; Azevedo 2008), with the installation in Moçâmedes of a first group of traders, followed by a colony of 300 Madeirans from Pernambuco, Brazil, who developed the cultivation of sugar cane and later cotton. In 1884-5, a second group of Madeirans, this time from the metropolis, headed inland to found what would become Lubango (Bastos 2011; Azevedo 2014).

At the same time (1881), after an agreement with the then governor Sebastião da Matta, a colony of approximately 400 Boer trekkers (travellers) from the Transvaal settled in the Humpata area, where they installed farms, roads, dams and irrigation canals (Guerreiro 1958; Stassen 2012). The presence of the Boers in the region lasted roughly until 1928, when most of these settlers decided to make their way back to the south. But their legacy remains marked in the local landscape, especially through the paths and roads they pioneered, and the then innovative use of transport technologies such as the famous "Boer wagons" (Guerreiro 1958).

It was, therefore, a gradual process of colonisation through the usurpation, occupation and redistribution of the land. As described by the French historian René Pélissier (1997, 1997b) and others (Cerviño-Padrão 1998), in the framework of the establishment of the

Boers crossing the River Cunene on their way to Pereira d'Eça, circa 1915 (Source: Wikimedia Commons)

cities of Moçâmedes and Sá da Bandeira, the Portuguese "conquest" of this region was marked by the unfolding of military campaigns against local communities. Portuguese military historiography points out, for example, the campaigns of Humbe (1898), Cuamato (1907), Cuanhama (1915), and so on. Here, the famous War of the Mucubal (1940-1) stands out, where, under the pretext of an alleged cattle theft in the Pocolo region, several members of this "rebel" ethnic group were the object of a "final solution", murdered and imprisoned or deported, and their cattle "confiscated" to colonial farms - thus eliminating one of the main foci of resistance against the colonial occupation of the Southwest Angolan territory (Pélissier 1997b; Campos 2017). This episode illustrates how, in addition to this Euro-centric triumphal historiography, there is another history of revolt and autochthonous resistance against the 'engineering' and exploitation of the Portuguese colonial project (Carvalho 2003). For example, the Humbe revolts (1885-1898), the Ovambo resistance and the Cuamato victory (1904). In any case, after the 'pacification' of the territory, we witnessed a period of increasing infrastructural investment by the Portuguese colony, through the development of a network of transport and exploration infrastructures, such as the Moçâmedes Railway, whose main

Map of the three provinces, including transport, hydroelectric and extractive infrastructure.

function was the transport of ore from the hinterland to the port of Moçâmedes. Until 1970, the mining region explored by the colony (for example by Companhia Mineira do Lobito) reached the city of Serpa Pinto (today Menongue) to the east and Nova Lisboa (Huambo) to the north, having as main sites the extraction of iron, aggregates and other local minerals in places such as Jamba Mineira, Cassinga, or granite in Chibia (Bahu 2019) or Xangongo, for example.

Likewise, several hydrological and energy management projects were being developed, such as dams and canals - some of which are still active today. This is the case, for example, of the Neves dam in Humpata, or the Matala hydroelectric plant, integrated (along with the Biópio and Lomaúm dams further north) in the so-called Cunene Plan, proposed and developed in the 1950s with the objective of supplying electricity to Sá da Bandeira and at the same time creating around 3000 ha. of irrigation. These large-scale projects were in turn complemented with networks and structures to capture groundwater, for use by both colonial companies and agro-pastoralists (Silva 2003). At the same time, through the Junta Provincial de Povoamento de Angola, agrarian development projects were being tested, in the Matala, Caconda and Chitado settlements, populated by both European settlers and indigenous *assimilados* (Bender 1973; Castelo 2007).

These agrarian colonisation projects were at the same time complemented by several other private farming projects by white settlers, facilitated by the colonial government, and which were often the site of conflicts with local communities (Castelo 2018). A notorious example was the so-called Rancho Montemor, owned by Rui Mendonça Torres, who among other projects was involved in the famous Karakul sheep project (Saraiva 2016). Here, as described by historian Cláudia Castelo (2018), conflicts with local communities were frequent, in particular transhumant groups, since the establishment of farms implied the closing, with barbed wire, of the exploited territory. It should be noted that it was also during this period that the first natural reserves were created, which also served as hunting grounds for decades. This was the case, for example, of the Bicuar National Park, constituted as a reserve in 1938 and classified as a National Park in 1964. Likewise, the Iona National Park was established in the same year.

After independence in 1975, several of these agricultural, livestock and mining projects were interrupted or abandoned, namely due to the war situation in the region, with battle fronts between the UNITA armed forces and the MPLA, at least until 1993 (Gonçalves 2016), and at the same time episodes of military activity with South African forces, both in support of UNITA and in its combat against the SWAPO bases. Another reason for abandonment was the so-called Confiscation Law, enacted in 1975 by Agostinho Neto, with which the State confiscated most of the land formerly exploited by farmers under the colonial

regime and redistributed it to the population, mainly for housing (in the form of rents to the State), however maintaining its ownership through the Land Law.

Gradually, especially after the structural reforms of 1992, which allowed for private initiative, some farms and mining and aggregates exploration projects were resumed. A notable example in Huíla was the Borges family project - Fazenda Jamba - which maintains several agricultural and livestock projects in Humpata to this day. Finally, after the armistice of 2002, and especially after João Lourenço came to power in 2017 - who instigated a policy of national production and reduction of imports through the PRODESI program (Program to Support Production, Diversification of Exports and Substitution of Imports) -, investment in national production increased and the landscapes of Southwest Angola were irrevocably marked by the multiplication of agricultural, livestock and industrial mining projects. While large agro-industrial projects were being developed on their traditional lands, rural communities had to adapt, developing multiple survival strategies. One of these strategies was mobility, trade and cross-border work with Namibia, based on previously existing family and group relationships, particularly among the Kuanhama (Rodrigues 2017; Sampaio 2017; Silva 2020). As stated by Cristina Udelsmann Rodrigues (2007), this was due to the difficulties in accessing commercial products in Angola, during and after the different wars that ravaged the country. It was through this cross-border trade that localities such as Santa Clara in Cunene grew demographically (Rodrigues 2010).

In the same context, demographic movements created new situations, namely the migratory movement towards cities, urban centres or main roads, creating a situation of depopulation and infrastructural abandonment, particularly in areas of difficult access, only inhabited by transhumant communities. (see Aço 2016). The urban development developed in this period resulted in a governance process focused on areas undergoing urbanisation, investing in the integration of populations in the production process. This situation has placed local populations, in particular agro-pastoral and transhumant communities, in a context of increasing vulnerability and subjection with regard to their traditional economic activities, both because they suffer expropriation of their traditional lands and because they see access to pasture and reduced or limited water supply, and at the same time find themselves limited by infrastructural absences.

THE PROBLEM
CAUSES AND CONSEQUENCES OF THE DROUGHT, CHRONOLOGY, ACTORS IN THE FIELD, REACTIONS FROM CIVIL SOCIETY

As mentioned above, the Southwest of Angola is, from a bio-climatological point of view, a diversified region, composed of traditionally arid and semi-arid areas, as well as mountainous and humid areas and woodland and forest areas. In this context, local communities are not unaware of the drought phenomenon. Throughout the three provinces mentioned, the elders recall other historical episodes of drought, such as the drought felt in the Quilengues area in 1972, the so-called "Xangongo drought" of 1979 or the "Chitambula drought" (1989-1992). From this perspective, local populations have developed strategies for accessing and collecting water, either through knowledge of the local geography and landscape (locating groundwater points), or through rainwater collection techniques or river water retention. We refer, for example, to *cacimbas* (artisanal water holes) and *chimpacas* (reservoirs), dams and other techniques for using water, based on an ancient knowledge of the territory and its fauna and flora.

However, from the 2000s onwards, signs began to emerge that indicated an increase in intensity with regard to drought cycles, which in turn made it increasingly difficult for ecosystems to recover between one drought cycle and another. There were also signs that these processes were affecting the agricultural calendar and subsequently the survival of communities. According to the media and bibliographic survey, after some brief references in 2008, the first recurring alerts began to appear in 2012, warning of the accumulation of years of irregular or insufficient rain. But it is in 2019 when we start talking about a generalised emergency situation. Several international reports already describe the situation as "the worst drought in 40 years" (IPCC 2019; Amnesty International 2021; Reliefweb 2021). What, then, is at issue?

METEOROLOGICAL NOTES

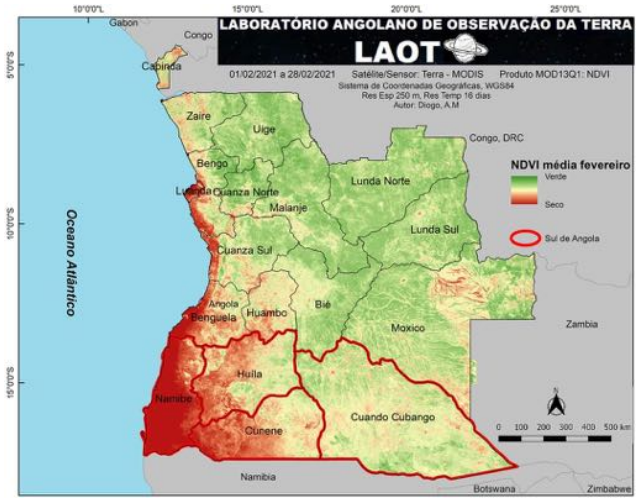
According to studies supported by INAMET, from an agrometeorological point of view, the Southwest of Angola is in a situation of "extreme drought episode", derived from irregularities in precipitation caused by an anomalous high pressure system that inhibited the formation of clouds in the 2018-2019 period, with a tendency of prolongation (Mateus and António 2020). It is, therefore, a meteorological drought, which in turn causes agricultural and hydrological drought. In this context, there is a 40 year framework of increases

in drought cycles that indicates an increasing process, reflected in a constant decline in precipitation (ibid.). At the same time, it is necessary to frame this drought within broader climatic processes affecting Sub-Saharan Africa in the last decade. In this particular context, the drought episodes that are occurring in the southern corridor of the African continent have been widely reported, affecting, for example, South Africa, Mozambique and Madagascar. According to a 2020 World Food Program announcement, a record 45 million people in the 16 countries of the Southern African Development Community are suffering severe food insecurity after repeated droughts and widespread floods.

In any case, an increase in episodes of extreme drought is expected in the region, as, by the end of 2021, the climate situation has not changed significantly. According to numbers published by the Intergovernmental Panel on Climate Change (IPCC), and according to its projections, "the frequency and intensity of droughts are expected to increase, particularly in the Mediterranean region and Southern Africa" (Amnesty International 2021). The same projections also point to a likely increase in average annual temperature of between 1.2 and 3.2°C by 2060, with faster warming in the inland and eastern areas of Angola (ibid.).

According to data released by the Reliefweb portal (UN-OCHA), this will result in a situation of acute food insecurity in the provinces of Cunene, Huila and Namibe in southwest Angola.

An analysis of IPC Acute Food Insecurity in 17 municipalities in southern Angola revealed that, between July and September 2021, around 1.32 million people (49% of the analysed population) experienced high levels of acute food insecurity (IPC Phase 3 or higher). Between October 2021 and March 2022, the number of people in this situation is expected to increase to around 1.58 million people..



Map of the situation of drought in February 2021, produced by the Laboratório Angolano de Observação da Seca.

In this context, there are frequent references to El Niño as the main cause of drought (PDNA 2016). However, the causal relationship is not demonstrated from the meteorological analyses, which nevertheless refer to irregular rainfall cycles (INAMET 2021). In other words, as we will explain later in this report, despite the evident arid cycle, not all drought processes are due exclusively to El Niño.

SCIENTIFIC COMMUNITY ALERTS

From the early stages, the scientific community has been debating the causes and consequences of the drought. This, however, did not have a significant impact on the policies and strategies promoted by the Angolan government.

One of the pioneering projects to raise awareness of the vulnerability of communities in southern Angola was the interdisciplinary center Centro de Estudos do Deserto, led by anthropologist Samuel Aço. The center, located in Curoca (Namibe), developed the Transhumance Project, that mapped the particular situation of vulnerability that herding communities in Southwest Angola were experiencing, in the context of increasing drought episodes (Aço 2016).

In 2012, a scientific meeting entitled "The contribution of science to the prevention and mitigation of the Cunene floods" was held in Ondjiva, in which the importance of the study and permanent monitoring of watersheds was defended, in order to know their different conditions and reactions to the evolution of rainfall.

In 2019, with the outbreak of the drought crisis, the Angolan Government promoted the involvement of some sectors of the scientific community, through the "Project to Quantify the Drought Problem in Southern Angola", launched by the National Space Program Management Office (GGPEN) of the Ministry of Telecommunications and Information Technologies. The project aimed to monitor the drought using satellite data, and support the implementation of satellite data systems for water management and drought monitoring (see Tartari 2021).

Likewise, in September 2020, the meeting "Cunene: from droughts to floods. A National Scientific Program" was held, with the participation of scientists in the fields of meteorology and climate science, geology, space science and hydrology. At this meeting, it was possible to verify that, despite the healthy mobilisation of the scientific community for this purpose, the lack of active collaboration between decision-makers and researchers was evident, namely in the circulation and application of quantitative data, and in the development and maintenance of a systematic and long-term climate measurement network.

At the same time, local academic forces also mobilised to offer their know-how for drought responses. This was the case, for example, of ISCED-Huíla, which carried out field research for data collection within the scope of the UNICEF Emergency Response Fund (CIDE/ISCED-Huíla 2020).

VICTIMS, AFFECTED COMMUNITIES AND OTHER CONSEQUENCES. SOME NUMBERS

There are no systematic statistics of drought, in particular with regard to

victims and those affected by the drought. However, several journalistic sources and national and international organisations point to dramatics numbers. For example, in 2016 the UNDP carried out a technical assessment, requested by the Government of Angola, of the situation in the three provinces, after a cycle of four years of drought, and detected 1,139,064 people affected by the drought in the three provinces: 755,930 in Cunene, 205,507 in Huíla and 177,627 in Namibe.

Since 2019, several reports from national and international agencies pointed to the following consequences of the drought:

- By 2020, an estimated 810,000 head of cattle and one million goats and pigs affected.
- 1.3 million people suffering from acute food insecurity (FRESAN 2021).
- 2.3 million people directly affected by drought (UNICEF 2019).
- 1.2 million children in urgent need of humanitarian assistance (UNICEF 2019b).

These figures contributed to a general mobilisation regarding the "drought problem" – often referred to as "drought in Cunene", but in reality affecting the three Southwestern provinces.

In any case, in addition to these quantitative elements, there are other consequences of drought whose quantification is more complex. We refer, for example, to:

- School dropout, especially among transhumant communities. These communities are forced to travel further and further in search of pasture and water, which takes children and young people out of schools for long periods of time.
- Migration: rural exodus to urban centres (Ondjiva, Lubango, Moçâmedes) or seasonal migration to Namibia (Amnesty International 2021). Many members of rural communities, especially younger ones, were forced to emigrate to cities in search of alternative sources of income. Many ended up turning to illegal trafficking or prostitution as a means of survival.
- Conflict: due to the reduction of aquifer resources and land available for grazing, and the subsequent death of livestock, disputes over animals and cases of livestock theft have increased among pastoralist communities, or between these and agro-industrial farms (Amnesty International 2019, 2021).
- Food and nutrition insecurity - or, in other words: hunger. Despite food donation and seed distribution campaigns, the crops do not cover the dry season, and do not solve the problem in the medium/long term.
- Environmental destruction: resorting to survival practices with a negative impact on ecosystems, such as the burning and sale of coal, or the degradation of groundwater resources.

In addition to this diagnosis, from 2020 onwards another factor began to affect local communities even more: the restrictions caused by the COVID-19 pandemic crisis, which, as we were able to observe in situ, implied:

- Border closures, specifically with Namibia, which significantly affected cross-border trade and reduced sources of income for many families. Many were forced to cross the border illegally, in areas of obvious danger.
- Restrictions on movement and trade, which made it difficult to use trade and barter as a survival mechanism.
- Closing, limiting or relocating local markets, which made it difficult to sell products sold by citizens and at the same time increased the price of available food products.

In addition to COVID-19 and the drought cycle, there were also the effects of the locust plague that spread across the continent and affected several municipalities in Southwest Angola, causing damage to crops in the municipalities of Cuanhama, Namacunde, Ombadja and Oncocua. (Cunene), Humpata (Huíla) and in Virei and Moçâmedes (Namibe).

The combination of these situations implied an increase in limiting factors with regard to the life and work of local communities.

THE MOBILISATION OF CIVIC SOCIETY

Angolan and international civil society have been warning of the consequences of the drought in Southwest Angola long before the aforementioned 2019 crisis. For example, members linked to local Catholic dioceses have long denounced the progressive worsening of the situation. For example, as early as 2010, the Bishop of Namibe, D. Mateus Tomás, made a public alert of the drought situation (VOA, 18 October 2010). In 2012, the Bishop of Lubango Jonas Pacheco, and Father Pio Wacussanga, also a member of the Associação Construindo Comunidades (ACC), raised awareness of the food crisis in the Gambos (DW, 5 October 2012). The following year, several religious authorities started the "Mão na Mão" (Hand in Hand) solidarity campaign, to help vulnerable families in the Gambos.

Beyond the religious sphere, the portal *Maka Angola* published, in March 2013, the report "Hunger and Disease in Gambos", where it warned of the increase of cases of death directly related to drought and hunger, in particular due to disease (cholera, dysentery, diarrhoea and vomiting) through ingestion of contaminated water or roots.

There is, therefore, a history of complaints and denunciations that places the 'drought problem' in a longer temporal continuum.

In any case, throughout 2019, several national and international organisations asked the Angolan government to declare a state of calamity in the region. This was the case, for example, of the Bishop of Ondjiva, Bishop Pio Hipunhati (DW, 16 April 2019). The Angolan

government did not accept the suggestion, but launched several combat mechanisms, initially framed in the so-called "Emergency Program to Combat Drought in Southern Angola". Of these, the most impacting one was the Program for Strengthening Resilience and Nutritional and Food Security in Angola (FRESAN), set up from a loan advanced by the World Bank and managed by the Portuguese Camões Institute. This program provided a line of financing so that various entities on the ground could propose and develop various short, medium and long-term projects to combat drought (see next chapter).

Poster of the "Cunene Precisa de Ti" (Cunene Needs You) campaign, taken from their Facebook page.

During this period, several campaigns of national and international solidarity were also developed, coming from both civil society and government structures. One of the first initiatives was the SOS Cunene and "Cunene needs you" campaigns (from the Angolan Political Science Association), which collected donations in cash and food items. At the same time, several churches – such as the 'Tocoista' Church, the Evangelical Church of Angola, the Bethel Church, CEAST and others – organised campaigns to collect and send essential food items. The same happened with opposition political parties such as UNITA.

Another example was the Solidarity Abraço Solidário (Solidarity Embrace) campaign, promoted in 2021 by the Ministry of Telecommunications, Information Technologies and Social Communication, which organised campaigns to collect food, clothes, toys and money to send to the south of the country.

Food donation was also promoted by the government itself on several occasions, for example through the Civil House of the Presidency of the Republic, or through provincial governments. These initiatives, although central to the immediate response to situations of extreme hunger, and powerful from the point of view of political performance, are seen locally as initiatives to "treat the symptoms" without, however, focusing on the causes of the problem.

On the other hand, on the part of civil society, some organisations have been denouncing some processes that have increased the food and health vulnerability of the region's inhabitants. In particular, the consequences of the installation of several farms and agro-industrial projects in the three provinces, which provoked increased pressure on aquatic resources, as well as disputes over land ownership and use. This was the case of Amnesty International, which

in June 2019 released the report "The End of Cattle's Paradise", in which it denounces that a large part of the situations of hunger and misery that are taking place in the Gambos region are linked not only to the lack of rain, but also to the occupation of land and the usurpation of aquifer resources by farms and agro-industrial projects - to the point of taking 67% of pasture area away from agro-pastoral communities (Amnesty International 2019). But before Amnesty International, the local NGOs Omunga and Associação Construindo Comunidades (ACC) had already denounced in 2016 a process of abusive occupation of 30 thousand hectares of land in the area of Ombadja, Curoca (Cunene), by the company Esopak, taking over communal lands and evicting communities residing there without any compensation. The following year, ACC and SOS Habitat publicly denounced the attempt to occupy the water source of the Catholic Mission of Santo António de Tyihepepe in the Gambos by agro-industrial projects in Tunda dos Gambos.

These complaints made it possible to expose some "invisible" processes in the context of the drought in Southwest Angola, namely the action (or inaction) of the Angolan State in the territory, namely in terms of infrastructure and in the complicit role with regard to the use of local resources. without any respect for the needs and rights of local communities.

THE POINT OF VIEW OF THE COMMUNITIES

From the point of view of communities living in the affected regions, the situation should also be measured in the way it affects their daily lives. From this point of view, it is simply reflected in the fact that insufficient or irregular rain causes them three serious problems:

- It does not allow them to reach the end of the *cacimbo* (dry) season with sufficient water reserves for consumption. This forces families to walk several kilometres on a daily basis to access water points to supply themselves with.
- It does not allow them to do subsistence agriculture, ruining crops that depend on rain, such as maize, millet, massambala and beans. Likewise, it does not allow them to use groundwater for other crops.
- It dries up pasture areas, namely in riverside and *chimpaca* areas.
- The lack of food for cattle sometimes causes their death or weight loss, making them incapable of providing milk or serving as a bargaining chip for other foods.
- It puts them in a situation of dependence in relation to the supply of water by cistern, or donation of food.

In addition to this, the traditional alternative strategies or "plans B" - trade or barter, for example - find themselves hampered not only by the referred hunger of livestock, but also by the

incapacity of agricultural production, as well as by more infrastructural issues. In particular:

- Lack of maintenance or investment in communication infrastructure, particularly on tertiary roads.
- The lack of structural water distribution and irrigation projects, or maintenance/repair of existing infrastructure
- The lack of energy and communication networks, in particular mobile networks.
- The implementation of agro-industrial and extractive projects in the region, which pose problems above all to transhumant groups, by closing paths and water points with barbed wire.

Finally, as mentioned in the previous point, the restrictions imposed by the response to COVID-19 are further limiting the available options.

RESPONSES

MOTO-CISTERNS IN CAHAMA (CUNENE)

INTRODUCTION: THE ARCHITECTURE OF THE RESPONSE TO DROUGHT

In this report, we make a practical distinction between programmatic solutions (strategic programs, funding lines, etc.) and technical solutions implemented in the field, in many cases financed from these same programmatic solutions. This will allow a better understanding of the architecture of the actors and programs involved in the process. As we will see, this intersection crosses several scales of action, from large international funding bodies to civic organisations of a local nature.

Organisational chart of actors, programs and projects in the field of drought response

PROGRAMMES, ACTIONS AND ACTORS

The Angolan government's response to the drought situation can be divided into two stages: a first stage of attempted development of instruments and structural programs, and, from 2019, a second stage of 'urgent reaction' to the 'drought crisis', dominated by campaigns for the immediate distribution of water and foods. In this context, several organisations that were already on site mobilised to, together with existing or purposely created national and international funding programs, respond to the environmental disaster. In this sense, it is observed that already before the 2019 crisis, there were several financial and organisational devices implemented to respond to the needs of local populations, many of which developed short, medium and long-term responses to the situation in southern Angola.

On the other hand, the 'drought crisis' of 2019 brought to light existing problems of infrastructural nature in the regions of Cunene, Huíla and Namibe, which proved to be a starting point for the vulnerability that the local populations were beginning to experience. We refer specifically to structures for access to running water, energy distribution networks, road circulation axes or even railway infrastructures that, due to abandonment, incomplete installation or lack of maintenance, have been jeopardising the well-being of local communities. As we will see below, the response to the drought problem only occasionally incorporated a logic of repair or rehabilitation of existing structures, favouring instead new construction and infrastructural development. Below we list some of the projects, programs and actors that have been appeared since the beginning of the 21st century, particularly focused on this region. These are presented according to the following logic:

- International organisations.
- National programs in response to the drought.
- Civic society campaigns.
- Actors in the field.

INTERNATIONAL ORGANISATIONS

In the architecture of the response to the problems of communities in southern Angola, the major transnational institutions have been the major partners and funders of projects, programs and initiatives. Here, there are four main interlocutors:

- The United Nations - through agencies such as UNICEF, UNDP, CERF or FAO.
- The World Bank, as Angola's partner for the financing of rural development programs.
- The European Union, also as a source of funding for programs to strengthen food and nutrition security.

- International Cooperation Agencies such as the Portuguese (Instituto Camões), the Spanish (AECID) or the North American (USAID) agencies.

In this context, one of the most active actors has been **FAO**, which since the beginning of the 2000s has supported several initiatives to strengthen the resilience of local communities. One paradigmatic example was the so-called Transhumance Project, a pilot project to support pastoralist communities in the transhumance corridors in southern Angola and to improve access to water and pastures, train shepherds and technicians and promote the use of technologies for mapping and controlling flora and fauna. In 2011, in collaboration with the German GFA Consulting, they published a *Handbook for Livestock Keepers*, focused on disease prevention (GFA 2011).

For its part, the **UNDP** carried out a survey of the situation in 2016, published in the report *Post-Disaster Needs Assessment 2012-2016* (UNDP 2016), which stated that the damage and losses caused by the drought in Angola totalled 750 million dollars and a yearly figure of 1.2 million people affected.

On the other hand, **UNICEF** invested in humanitarian intervention in emergency contexts in the areas of nutrition, health and education, in particular for the child population. This was the case in southern Angola as of 2019, to where instruments for the treatment and prevention of malnutrition were channeled. In any case, in addition to the studies and reports carried out, these interlocutors have been a key support for the programs developed by the Government of Angola, especially in the financial area.

NATIONAL PROGRAMS

Since the mid-2000s, and together with international partners, the Government of Angola has been developing various types of programs and lines of action with varying responses, both to the specific problem of drought and more generally to the situation of vulnerability of rural communities in southern Angola and other provinces. These programs are, in most cases, developed in a hierarchical fashion, from the central administration to provincial governments, municipalities and communal administrations.

The **Água Para Todos** (Water for All) Program was created in July 2007, through Resolution 58/07 from the Council of Ministers, with the aim of ensuring water supply to 80% of Angola's rural population. Thus, it did not emerge as a specific response to the drought, but rather to broader needs on the part of the rural population with regard to access to quality drinking water. The Program had an initial phase (pilot phase) which took place in the the 2nd Semester of 2007 and in which funds were allocated to the Provincial Governments of the Provinces of Bengo, Benguela, Cabinda and Uíge, for the construction of water supply infrastructures in rural areas. As of 2008, the Program was extended to all Provinces, with the exception of the Province of Luanda, which would only

benefit from the Program in 2012. Within the scope of this program, a subsequent pilot project was implemented in 2019 in Cunene, sponsored by the Presidency of the Republic, with the objective of strengthening the public program of water distribution to the population affected by drought in the region – until then supported by tanker trucks, with greater storage capacity but greater difficulty in traveling on the roads in the rural areas of the affected provinces. The pilot project included the distribution of 16 motorcycle tanks (*moto*-cisternas) to each municipality. Later, the distribution expanded to other provinces, to the point that today it covers several provinces of the territory.

The **Fundo de Apoio Social** (Social Support Fund) is an intergovernmental agency created in 1994 to promote sustainable development and reduce poverty. FAS focuses its action on responding to the needs of communities, particularly in the areas of education, water and sanitation, health, economic and environmental infrastructure. With an area of intervention of national scope, in the eighteen provinces of Angola, it financed several projects in these areas with financial support from different sources, including grants from the Government of Angola, credits from the World Bank and donations from the European Union, Norway, Sweden, Japan, Italy, Netherlands, Chevron, British Petroleum, Shell, UNDP and USAID. In the context of the drought, it financed several infrastructural improvement initiatives, such as the construction of boreholes, the rehabilitation of dams, the dredging and improvement of dams and *chimpacas* in regions such as Oncocua, Quilengues, etc.

The Integrated Program for Local Development and Combating Poverty (**PIDLCP**) was inaugurated in 2018 with the objective of combating extreme poverty, through the transfer of monthly allocations to municipalities. The PIDLCP comprises eleven axes: the promotion of agriculture, livestock, fisheries, hydraulics and engineering, gender promotion and women's empowerment in rural areas, primary health care, support for citizenship actions, water and sanitation, culture and sport, education, training and capacity building, and school meals. It is a transversal program and not specifically aimed at combating drought emergencies. However, in some cases it has been used to drill water holes, as in the case of the municipality of Virei.

In a similar vein, the **Kwenda Program** is a program of the Angolan government, supervised by the Ministry of Social Action, Family and Promotion of Women, and financially executed by FAS, which aims to financially assist the most vulnerable families in the country with a monthly support of 8,500 kwanzas per aggregate. Created in 2020, the transfer program, in the total amount of USD 420 million, aims to benefit up to 1 million and 600 thousand families across the country. In this case, it did not emerge as a specific response to the problem of drought, but established itself as an instrument to combat situations of hunger in several regions, insofar as it

allows an income for families who have lost their sources of livelihood due to the drought. In June 2021, several municipalities in the provinces of Huíla, Cunene and Namibe were developing the process of mapping and registering the most needy families.

The **PIIM** (Integrated Plan for Intervention in Municipalities) is a plan created by presidential initiative in 2018 and with a multi-ministerial management. It was designed as a funding scheme for infrastructure projects at the municipal level, based on applications made at the local level after identifying the main infrastructure needs of each municipality, in particular with regard to school and sanitary equipment, etc. In this context, it appears as an instrument for financing infrastructural interventions (repairs, rehabilitations).

The **FRESAN** Program - Strengthening Food and Nutrition Resilience and Security in Angola - is undoubtedly the main drought-oriented response program in southern Angola. Created in 2017 from an agreement between the Government of Angola and the European Union (financing entity), FRESAN emerged in the first instance as a program to "reinforce sustainable family farming", incorporating various public entities and national and development partners. international organisations, namely ministries, provincial governments, municipal administrations and NGOs. Coordinated by the Camões, Institute for Cooperation and Language (Portugal), it also has cooperation agreements with United Nations agencies. The initial funding was in the order of 65 million euros.

The program's main areas of action focused on sustainable agriculture as a method of responding to the challenges posed by climate change. One of the flagship programs is the Farmers Field Schools (ECA), whose implementation is being carried out jointly with FAO and various organisations in the field. The project, imported from pilot projects in Asia and other African contexts, involves building the capacity of local farmers to increase resilience, sustainable production and food and nutrition security in the South of the country. The target is 7875 vulnerable small family farmers, through the promotion of income-generating activities for women, the introduction of technologies and the promotion of climate-smart agricultural and pastoral practices.

However, despite the focus on developing resilience and food security in the medium and long term, the program was confronted from 2019 onwards with the problem of drought, which forced the development of several programs and lines of financing especially aimed at the lack of water. In this context FRESAN has emerged as the main source of funding for the various national and international organisations on the ground, subsidising several immediate action projects for water access and retention, support for agricultural practices, etc..

Subsequently, the Government of Angola launched the **Programa Emergencial de Combate à Seca no sul**

de Angola (Emergency Program to Combat Drought in Southern Angola), with the aim of bringing together actions to respond to the short-term drought, namely for the distribution of food.

Finally, in September 2021, at the presidential initiative, the creation of a **Task Force de Combate à Seca** (Drought Combat Task Force) was announced, coordinated by the Minister of State for the Social Area, to combat drought in an "in situ" format, with a delegation installed in Cahama village. The task force aims to provide assistance and food distribution to populations affected by drought, especially in the areas of food, health services, vaccination, monitoring of primary health care, nutritional aspects and education.

ACTORS

In addition to the government and public entities involved in the drought response, several non-governmental or civil society organisations mobilised with the same objective. In this framework, several organisations were already on the ground with various projects and development initiatives, and ended up getting more directly involved in the architecture of the drought response. We list the most significant ones, in alphabetical order.

ACC (Association Building Communities) is located in Lubango. It was created in 2003, as a continuation of another association, ALSA, an ecclesiastical youth organisation inspired by the work of the late Father Leonardo Sikufinde, a priest originally from Cunene who was dedicated to human rights causes, murdered in 1985. The ACC is an association that works in defense of the interests of local communities, lobbying and promoting social and legal advocacy with government and civil society institutions. In this sense, it is part of an advocacy network, being an observer member of the African Union Commission on the Human Rights of Peoples and a member of the Human Rights Monitoring Working Group in Angola.

ACC's intervention in support of local communities has focused on different areas:

- Immediate assistance campaigns to the populations, through the distribution of food and seeds.
- Monitoring and reporting situations of land occupation and usurpation of aquatic resources.
- Support for water access or retention projects.
- Legal education to defend the rights of local communities.
- Combatting the rural exodus.

ADRA (Association for Rural Development and Environment). Founded in 1990, ADRA has been a long-standing actor in southern Angola, thanks to its expertise in safeguarding agricultural activities in the territory and protecting land rights. ADRA is present in Luanda and in the provinces of Malanje, Huambo, Benguela, Namibe, Huíla and Cunene. In this context, it is a long-standing interlocutor, with a long

history of working in the field with rural communities.

ADRA's response to the problem of drought in the provinces of Huíla, Namibe and Cunene, as part of the PARMES project (Project to Support Resilience for Mitigating the Effects of Drought), has focused on the following aspects:

- Struggle for accessibility in transhumance, seeking to preserve the traditional practices of pastoral communities against processes of occupation and fencing of communal territories.
- Promotion of agricultural and livestock development projects, through research into drought-resistant crops and the promotion of the cattle production chain.
- Implementation of systems for the collection and retention of aquatic resources, in particular the so-called *cisterna-calçadão* (see next section).

ADPP (Ajuda de Desenvolvimento de Povo para Povo) is also a long-standing interlocutor in rural areas of Angola. Its scope includes education, health, agriculture and the environment, and integrated community development. It promotes several education and training projects in rural areas, for example in the training of teachers and community agents. Likewise, it develops several projects in the area of environmental sustainability, for example in the use of forests and in the production of charcoal. In the southern provinces of Angola, ADPP has several projects of this nature, although not designed as an emergency response. One of them is the participation in FRESAN-funded Farmers Field School projects.

The Italian NGO **COSPE** is a non-profit association created in 1983 and recognised in 1984 as a Non-Governmental Organisation (NGO) by the Italian Ministry of Foreign Affairs and the European Union. Cospe acts in the field of international cooperation in around 30 countries, promoting sustainable development, intercultural dialogue and human rights. In southern Angola, they are developing the project "TransAgua: from good practice of transhumance shepherds in water resource management and adaptation to climate change", with the aim of sharing good agricultural practices and knowledge to help rural communities in Virei and Bibala (Namibe) to improve their use of rainwater. The project uses different participatory methodologies to promote self-organisation and apply the techniques of the Agroecological Field Schools.

The **IECA** (Igreja Evangélica Congregacional de Angola), through its social area, helped to implement boreholes and underground tanks with the *calçadão* system, for example in the municipality of Quilengues.

For its part, the **Norwegian Church Aid** (NCA) is part of Actalliance, a network of Protestant churches with various humanitarian aid and development projects in Africa. In Angola, among other projects, NCA is implementing the project "Coexisting with the Semi-Arid

Region of the South and Southwest of Angola", a climate resilience program with the objective of providing instruments to local communities to be able to cultivate resilience strategies within of the population. In this context, one of the main outputs is the promotion of the construction of *cisternas-calçadão* ("pavement cisterns") in the municipalities of Gambos (Huíla) and Namacunde (Cunene), in collaboration with ADRA and other institutions.

World Vision International is a Christian NGO that has been operating in Angola since 1989, working in the areas of health, education, nutrition and child welfare. Since 2015, it has responded to the drought emergency in the south of the country. Its coverage area covers the provinces of Namibe, Cunene, Huila and Cuando-Cubango. It has worked with governmental and non-governmental partners to combat child malnutrition, which affects more than 15% of children under five in the region. Since the beginning of 2018, it has carried out the monitoring of the nutritional status of the child population and distributed tons of therapeutic food. It has also collaborated on water access and agrarian resilience development projects.

TECHNICAL SOLUTIONS

Intervention area of the Cunene River Water Transfer System

MACRO-ANSWERS: INFRASTRUCTURAL PROJECTS

As mentioned above, despite the existence of a system of water infrastructure from colonial times which, in many situations, still serves as support for many small farmers and shepherds, it is in most cases in a situation of abandonment or requiring urgent maintenance/repair. This is the case, for example, of the Matala Dam, the Neves Dam in Humpata and the Calueque Dam in Cunene. Despite their age, these infrastructures still play a fundamental role in the irrigation of hundreds of kilometres of farm plots. However, in response to the drought, the Angolan Government has opted instead for a plan to build new dams through a new **Water Transfer System for the Cunene River**, particularly in Cunene province. Specifically, three dams:

- Cafu
- Calucuve
- Ndué

Water hole in Tchibemba (Gambos)

Rehabilitated dam in Oncocua, with the support of the FRESAN program

Solar powered water hole in Virei (Namibe)

Cacimba or traditional water hole in Gambos


Manual pump hole in Taka (Gambos)

These projects include the construction of dams, catchment and pumping areas, open-air channels and pressurised pipelines, and *chimpacas*. They anticipate a very relevant impact on local communities. The construction is coordinated by the INRH, under the auspices of the Ministry of Energy and Water, and carried out by Sinohydro Ltd., a Chinese state-owned hydroelectric company. Construction began in 2019, with the Cafu Dam corresponding to the first phase. Completion is scheduled for 2022. In this sense, despite the promised long-term solution, the project has not yet managed to provide a visible response to the population's needs, particularly with regard to agricultural practice.

On the other hand, there are areas not covered by these projects that also beg for pipelines and water transfer systems from the Cunene River, namely in the region on the west bank of the Cunene River, not to mention the provinces of Huíla and Namibe (see next section).

DISTRIBUTION PROJECTS

In addition to the infrastructure projects described above, the transfer and distribution of water in response to drought has also incorporated other initiatives seeking a more immediate response to the lack of water. Here, two types of solution are distinguished. In a first phase of response, several tanker trucks (**camiões-cisterna**) were put into circulation, capable of transporting large amounts of water to different distribution points. On the other hand, given the absence or poor state of road infrastructure and the isolation of many rural communities, access to them becomes difficult or even impossible for most vehicles.

In 2019, a pilot project was implemented in Cunene, sponsored by the Presidency

of the Republic, with the aim of strengthening the public program of water distribution to the population affected by drought in the region through so-called motorcycle tanks (**moto-cisternas**). The pilot project included the distribution of 16 motorcycle tanks to each municipality. Later, the distribution expanded to other provinces, to the point that today it covers several parts of the territory. Today, along the roads of southern Angola, it is common to see several 'moto-cisterns', adapted from the famous "*keweseki*" or "*kupapata*" 3-wheel motorcycles, coupled to a cistern for transporting water. For many inhabitants of the rural areas of this region, these motorcycle tanks eventually replace the traditional use of the donkey, or even the heads of women and children, to transport water. Each motorcycle tank has a capacity of 1,000 litres, and the program has some interesting features: on the one hand, it introduces a participatory process in local communities, making them responsible for collecting and distributing their own water. At the same time, the initiative adapts to already established socio-economic practices, taking into account the traditional use of *kupapatas* to transport people and goods on this road. In this context, they fit perfectly into the local economy. On the other hand, motorcycle tanks also incorporate problematic dimensions, namely the temporary and non-structural nature of the solution, and the dependence on other energy sources (gasoline) and infrastructure (roads in good condition) for their operation. Likewise, the process

'Moto-cistern' circulating in Humpata

ends up monetising the access to water, forcing families to pay for water by the litre, whereby most of them, especially those living in the most remote areas, live mostly on the barter economy and do not own kwanzas.

LOCAL OUTREACH PROJECTS

In addition to the structuring projects mentioned above, several technical solutions of local scope have been rehearse and developed by the different actors on the ground. We now list the most recurrent solutions. **Water holes** have been the most recurrent technology observed in the field. Many of the programs developed at the local level, both by the public administration and by NGOs, have promoted the repair or construction of new points of access to water, replacing the traditional water holes (*cacimbas*) or wells. For example, and according to data collected on the ground, 39 water holes were drilled in the municipality of Virei alone, through the PIIM program. In Taka (Gambos), 24 holes were carried out. Here, several capture and pumping technologies can

be observed, ranging from the use of solar energy (renewable, autonomous but without energy accumulation, which makes its operation irregular) to the use of diesel pumps (which increases dependence on fuel) and manual technologies. Taking into account the amount of water available in the water table in the different regions of the South and Southwest of Angola, water holes play a fundamental role for the survival of local communities. However, despite the profusion of water hole projects, in our field research it was possible to observe several cases of water holes carried out without previous studies or consultation with local populations, which resulted either in "negative" (empty) holes or in seasonally or permanently dry holes. This is mainly due to the lack of regulation of the activity as well as the lack of dialogue with those who know the terrain at the local level.

On the other hand, ***chimpacas*** or other water retention technologies such as **dams** also play a vital role both for agricultural activities and for human consumption and livestock watering. In this context, several of the projects developed by the actors in the field focused on the desanding, repair or construction of new dams or *chimpacas*.

At this level, it is important to highlight the promotion of rainwater collection projects, the above mentioned **cisternas-calçadão**, under construction mainly in the province of Huíla. It is a project imported from a Brazilian NGO (Diaconia), previously rehearsed in the Northeast of that country, with a view to maximising collection and sustainable use of rainwater during the rainy season, creating reservoirs for consumption and also for small-scale farming during the *cacimbo* (dry season). Its implementation involves not only its construction but also the involvement of local populations in the construction process and the respective maintenance of the infrastructure. As we were able to appreciate in situ, the cistern, despite being dependent on (irregular) rainfall, is a fundamental aid for food security and household resilience. Not only does it allow localised access to water, but it also reduces dependence on external distribution, and relieves families of having to travel kilometres for hours every day in order to access it. On the other hand, as there are still few cisterns in operation, there was a concentration and intensive use of the available ones, which does not allow for completing the cycle of the *cacimbo* with enough water available in the reservoirs.

LOCAL KNOWLEDGE

A central but often overlooked dimension in the context of drought is the knowledge that local communities have of the landscape and consequently of the available water resources, within the scope of their subsistence activities. For example, through the practice of transhumance, communities accumulate wisdom regarding water access points and water retention strategies, as well as the existing fauna and flora. In this framework, we can highlight for example:

Channeling and management of water flows. The ancestral knowledge of the territory (soil, climate, species) makes it possible to identify and put into practice various braking and water retention techniques, such as *cacimbas* and *chimpacas*. Likewise, they take advantage of the seasonal and intermittent flow of sand rivers to retain underground flow for farming or obtain fresh pasture for the animals.

Transhumance. In addition to its historical, social and cultural components, transhumance is an ancestral technique for the management and circulation of livestock, aquifers and forestry resources, based on the recognition of their scarcity and seasonality. In this context, it is based on an established and rationalised use of aquatic resources in contexts of water scarcity, privileged in many communities against agriculture as the main source of livelihood. In this context, pastoralists' topographical and ecological knowledge is extremely useful for mapping available resources.

Fruit culture. Although it is not a systematic agricultural practice, the collection and consumption of wild fruits plays an important complementary role in the local communities' diet, insofar as it makes it possible to compensate for some food shortages.

These axes are based on a common denominator: the micro-response, based on a localised approach to the potentialities and limitations of local ecosystems. As mentioned at the beginning of this report, the different communities that populate the Southwest of Angola inhabit very diverse ecosystems, so solutions and initiatives of a general nature run the risk of only having partial and localised success.

CASE STUDIES

FAMILY FROM QUILEMBA VELHA, BIBALA (NAMIBE)

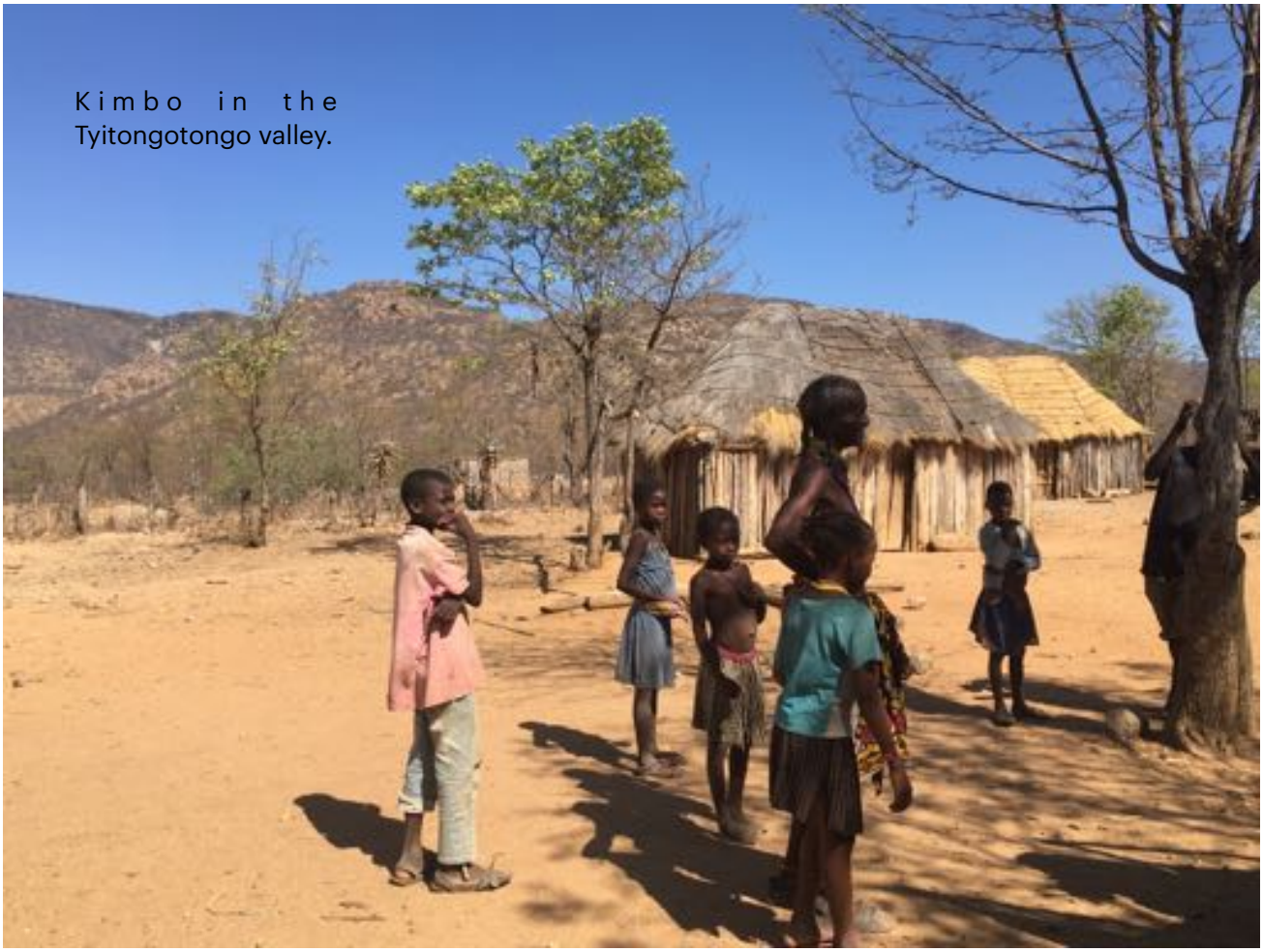
INTRODUCTION

As mentioned above, in addition to the narrative of a generalised drought that is occurring in Southwest Angola, there are very diverse causes and processes, which result in very different experiences of drought. In this context, the problem of drought has very different characteristics when we compare a commune like Curoca do Namibe, with traditionally low rainfall, and a commune like Humpata in Huíla, traditionally used to a large aquifer inflow. The same happens in regions with higher population density and with a high pressure on water resources, compared to regions with low population density. In response, we argue that it is necessary to look at the drought from a particular case study approach, in the form of a portrait of the situation between October 2020 and June 2021, in order to understand the specific consequences of drought in each region and the different solutions that may work on a case-by-case basis. Next, we present perspectives collected in the locations visited in each of the 3 provinces under study.

HUILA

Map of the province of Huíla and sites visited.

TYITONGOTONGO The Tyitongotongo ("valley of the mountain") valley is located 28 kilometres west of the municipal administration headquarters of Chiange in the Gambos. The road that leaves the headquarters is under construction, but the intervention only extends to the village of Pocolo. In the valley live mainly Ovamwila or Ovangambue communities, although it is also possible to find some Kuvale communities circulating. The *kimbos* (family compounds) are mostly empty, because the elders and their children are in the mountains looking for pasture for their cows, and also for new places to farm. In the kimbo of the seculo (village chief) João Mucuvale, women try to do the farming, but the lack of rain does not allow them to grow corn, only massango and massambala. The *kimbo* has 33 people, and it only has a few dozen heads, they lost a lot of cattle. Here, good farming is only possible with plows, to better bury the seed. Doing it manually, the moisture disappears. The death of their oxen does not allow them to develop a more sustainable agriculture. With the absence of rain in 2019, there was no longer any harvest. When it rains, the corn they produce can even be consumed and exchanged for cattle. This year, for now, it's the same. This brings hunger and disease, in sharing diarrhoea with blood. Tyikuyele, the eldest of the kimbo, tells us that the



Kimbo in the Tyitongotongo valley.

children who have lived there since they were born have only known drought, to the point where they ask adults why they live in this place and not another...

In 2015, the administration built a water probe nearby, which only allows them to obtain water for consumption and distribution with the motorcycle tank provided for this purpose. On the meantime they received aid from the state, in the form of food donations: rice, pasta, beans, salt, mineral water.

For the members of this *kimbo*, the most appropriate solution to help them survive the drought is, more than just donations, to obtain animals. A few years ago, there was a program by an NGO to raise goats, in which they offered the most vulnerable people (orphans, widows) a pair of male and female goats, and what they reproduced was shared by the community. But with the lack of rain, the goats died. However, it allowed them to have more resources and instruments in terms of food, exchange and sale. According to the older Tykuyele, the campaign is worth repeating.

TYIPEYO A few kilometres away from Tyitongotongo is the valley of Tyipeyo, where the *ehumbo* (poligamic family compound) of the *seculo* Pedro Uchito is

located, inhabited by 15 people. There is hunger in this *ehumbo*. Last year they failed to cultivate. There was some support, but only for the elderly. Their main complaint is the road that connects the valley to Pocolo, which is impassable - particularly on the steep and stony Morro do Issako section. This prevents them from doing business and finding alternatives to drought through trade. Traders avoid the area, so they find it very difficult to trade in the village. The cost of bringing a motorcycle to the valley is too high. For example, the pigs they own would be a valuable source of income, but they cannot sell them for the same reason. There is no health center in the valley (only a temporary mud-brick house), and the school is unusable. In the area there is a *sonda* (water probe) built by the administration, but the water is salty and does not favor cultivation in the gardens. The water they consume comes from some traditional water holes that still have water. The problem with the hole is that where it is is tight, it is a stony terrain, it should be in another location. The technicians chose the place without consulting them. On top of that, the probe's tank fell in July and is damaged. Meanwhile, the cattle are dying, not only from thirst and hunger, but also because the vaccine has not arrived, either for the cattle or for the goats. Once again, the road gets in the way. On top of that, the situation accentuated the issue of cattle theft among the Mungambwe, Nganguela and Kuvale.

In terms of agriculture, again the biggest problem is the rain. They grow massango and occasionally massambala and corn. If there were more water holes, perhaps the situation would be better. But in the end you always have to buy food. The money is obtained by selling cattle or sacks of corn in the square. But cattle are dying, and sacks of corn can only be sold for 150,000 kwanzas (before they could sell sacks of corn for 200 or 300,000).

On the meantime, women are kept waiting, because they can neither cultivate nor do business. They are waiting for the rain. And young people are struggling with the barrier of the pandemic, because on other occasions of crisis they would go out to Luanda or Benguela to work in construction or on tomato farms. But with limited circulation, they can no longer leave the valley.

With regard to support received, in 2019 the administration brought cornmeal, rice, beans, oil, salt. But in the meantime, they didn't have support again. They also built a water tank in the kimbo, and brought in a 'moto-cistern'. But once it got there, it never circulated again, because of Morro do Issako. Recently, they received support from the Santo António dos Gambos Mission: rice, cornmeal and clothes.

TAKA To the south of Chiange we find the region of Taka. This is an area where several different groups and ethnicities converge, flocking to the local square. Here there are Mungambwe, Kuvale, Mundimba, Mumwila and Mwacavona. Many of these groups combine herding activity with farming for their own consumption or small trade. A Kuvale group has set up a bakery with a wood-fired oven, and a group of women sells artisanal pottery. In addition to these economic activities, Taka has a school recently built with the support of ADPP, a water point and a medical post. However, there is no ambulance to transport the sick in case of serious illness. In conversation with soba Matias Kalangolungo and other members of the various communities, we learned that hunger is real. The animals that remain are "poor ones", the kids are skinny, dry. On top of that, the shortage of livestock has increased livestock theft among the various groups.

In addition to the lack of rain, there are several other problems that are causing the famine. The local *soba* continues to wait for a tractor that would allow him to work the land deeper. The access route is also lengthy, everything takes time to reach Taka. For example, if the seed arrived faster, they could grow faster and do more business, not wait until the rain ends. On the other hand, the lack of a telephone network makes their lives even more difficult, as they cannot communicate with the administration in good time, nor with each other to control the movement of cattle. Axes and machetes are also lacking to work the land, namely massambala, massango, corn, beans, macunde, cavicu. As for the holes, there are several that have dried up. When it rained, they had water, but now it has dried up. In some it is only in the morning. Holes were drilled in places that do not have water, the technicians who carried out the undertaking never asked for their opinion. The holes that still have water are increasingly distant from the kimbos. Now, those who don't have a donkey cannot carry water to their *kimbo*.

Hunger and misery are also affecting social and family structures. Cattle serve both as a livelihood and as a social and political status. Many chiefs, *seculos* and patriarchs in the area have 4-5 wives, but they are no longer able to support them or their children, which forces them to emigrate. In addition to government assistance, only the Mission of Santo António dos Gambos has supported them, which on 28 October 2020 brought 20 bags of salt, 3 of beans, 4 boxes of oil. But it's not enough, there's still a lot of hunger.

TUNDA UM Located on the outskirts of Chiange, the Tunda Um community was one of the first to host the *cisterna-calçadão* project, in this case developed by ADRA with the support of Actalliance (Norway) and with a participatory methodology, involving the communities

Elements of the *cisterna-calçadão*, Tunda Um (Chiange).

themselves in the process of construction and maintenance.

We spoke with Belinha Uatengapo Pedro, vice-coordinator of the Tunda Um Association. It's the beginning of October 2020. Belinha was there to collect the first water that fell this year, which is muddy, and also to clean the tank. The water in the cistern dried up in July, and the rain had stopped in February. Some cistern tanks also came to deposit water, but it was immediately consumed. One of the reasons for this is that there are many *kimbos* from the surrounding regions who come to fetch water here - up to 10 *kimbos* in total. Next to the cistern is a vegetable garden, where Belinha grew cassava, yams and cabbage. However, the garden dried up due to lack of water.

Before the cistern existed, the members of the kimbo walked 5 km to a probe at the bottom, or in the village. Sometimes it took 6 to 10 hours in the process. In this sense, the cistern is very useful, it's not like before. But as it is located along the road, during the day many people come to fetch water here.

In this sense, despite thinking that an underground water hole is better than depending on rainwater, for Belinha this project allows to retain and store water, and possibly with more tanks per project it would be possible to manage storage and maintenance better. At the same time, with more cisterns spread across the territory, the pressure on Tunda Um would decrease and allow access to more water in dry weather.

TYIHEPEPE Located near the road that connects Lubango to Cunene, Tyihepepe is the place that has hosted the Mission of Santo António dos Gambos for several decades. Since the end of the 19th century, this mission was a central point in Portuguese colonial expansion campaigns in the territory, serving as a water supply station on the Caculuvar

River. It also historically served as a transit point between Lubango and Damaraland (Namibia). Since 1997, it has been led by Father Pio Wakussanga. It is close to Tunda dos Gambos, where several farms are located, as mentioned in the Amnesty International report (2019). Around 2003-4, the mission denounced a problem of violent occupation and land grabbing. In 2012, the drought began, and the mission visited the communities to produce a report in order to alert national and international communities to the problem that was being experienced in the region. At the same time, they promoted several campaigns to receive donations, purchase motor pumps and finance the drilling of water holes. They also developed seed distribution campaigns for the neighbouring communities

At the same time, they began to invest in the issue of eco-sustainability and clean energy, and developed the Escola Comunidades project, with the objective of promoting education, based on knowledge of the local reality, agro-ecology and concepts such as recycling, permaculture, seed banks, etc. In this framework, several previously developed projects (eg under the Kwenda Program, PRODEP, etc.) failed precisely because they were not locally based and were compartmentalised. However, land conflicts with farmers continued. There was a dispute over land ownership, due to a government project to take water from the mission zone to the 7 farms that are across the road towards the Tunda. They wanted to connect 3 holes in the area for a single tank of 60 thousand cubic meters. Local communities rose and called a demonstration, which prevented the project from moving forward. In any case, the episode reflects the pressure on aquatic resources, at a time when rainfall is scarce.s

HUMPATA Situated a few kilometres southwest of the city of Lubango and leaning against the Serra da Chela, the village of Humpata, unlike other areas of the province severely affected by low annual rainfall, has remained a relatively wet municipality throughout the current drought cycle. The explanation lies in its topography and the abundant flow of water (both rain and underground) coming from Chela - a microclimate that also explains why Ovanyaneka indigenous communities and Boer and Portuguese settlers explored the area for their grazing and farming ventures throughout the 19th and early 20th centuries. In this sense, Humpata is served by hydraulic infrastructures such as the Neves dam and the open-air water channels that flow from it since that time. Today, the main road that crosses the municipality (connecting Lubango with the province of Namibe) is populated by large agro-industrial enterprises, specialising in a variety of products from citrus and strawberries to dairy and meat products. Around these farms, away from the main road, we find

Collapsed irrigation channel in Tchihanina (Humpata, Huíla).

communities of small farmers and herders (Ova-nyaneka, Nganguela or even Ovimbundu), who live mainly by selling their products in the local market. However, in 2018, the Tchihanina irrigation channel, which carried water from the Neves dam to these communities, broke due to a sudden episode of flooding of the bed that passed under the channel, due to works carried out upstream which diverted its usual flow intensity. The flooding put excessive pressure on the old infrastructure and led to its collapse, causing the dispersion of water flow and the consequent disruption of downstream distribution. This affected several hectares, leaving several communities of pastoralists and small farmers suddenly without any access to water. The water flow now spreads around the broken channel and is only good "for the cows to drink". There are approximately 2,000 people directly affected by this circumstance. On the other hand, the collapse did not dramatically affect the agro-industrial projects located in the area, mainly because they already had the infrastructural resources necessary for water autonomy, namely privately built underground water holes.

On the meantime, while the local and provincial administration did not move forward with the repair work, the affected populations looked for alternative solutions. Farmers with sufficient financial resources paid Chinese companies to build their own water wells and *chimpacas* to collect rainwater or retain groundwater from the mountain peak to the west. Others have resorted to more artisanal methods, using motors to pump upstream water into containers. But farmers with fewer resources, who relied on the canal for their fields where they grew corn, potatoes, carrots or cabbage to sell in the local market, had to abandon agriculture, also due to the lower rainfall observed in 2019 and 2020. Many of them drove their business elsewhere, investing their meager pocket money (up to 1500 kwanzas, or 2 euros) to buy other goods and resell them on the market. Others moved to the city of Lubango in search of employment, working as *kupapatas* (motorcycle taxi drivers) or *zungueiros* (street sellers). At the same time, women and children had to walk back and forth to collect and carry water "head on", as they could not afford to pay for water distribution with water tankers.

Throughout 2020 and 2021, a group of volunteers self-organised to repair the canal, while they await the government's undertaking.

IMPULO Impulo is a commune located in the municipality of Quilengues, close to the border with the province of Benguela. In this framework, it is not usually included in the "drought in southern Angola" map. It is a commune whose communities are mostly agro-pastoral, of Nyaneka ethnicity, but there are also Vachilengue-Musso and Mukuishi (or Mukwandu) groups, the latter being more dedicated to hunting and gathering fruit. In any case, as the soil does not make agriculture much easier, basically what they grow is only for subsistence within the yearly farming cycle.

The commune has approximately 15,000 inhabitants, but in terms of infrastructure, it only has 7 water collection systems to feed 35 villages scattered throughout the commune. The system is small, does not respond to needs, especially with regard to neighbourhoods that are in the 'uplands', in the areas farthest from the river beds (*baixas*). Here, the issue of water is a serious problem, both in terms of consumption, animal watering and farming. Consequently, the population sees drought as a survival situation, with many consequences. They scream for help, there's a lot of hunger. Another consequence is school dropout. In this academic year of 2021, only 35% of students completed the year, both because of the pandemic and the drought; children are forced to work at

home because parents have to go out looking for money.

Several NGOs and religious entities are on the ground. For example, IECA helped to implement water holes and underground tanks with the *cisterna-calçadão* system. The system works for now, but there are a lot of people coming to the cistern, so the water doesn't last. Also present are World Vision and FRESAN, who work in the areas of water, agriculture, livestock, health and food security. Concretely, this has been translated into goat distribution campaigns, for example. From the governmental point of view, FAS is present, and the Kwenda Program is in the process of implementation, to support needy families.

In any case, a major difficulty arises from the problem of communications and road infrastructure. There is no mobile network on the Impulo. The population continues to demand this, but so far they remain isolated. In 2015, UNITEL was in the commune to carry out surveys and determined a location to deploy an antenna. But until June 2021, nothing happened. In 2017-8, they installed a repeater in the neighbouring commune of Cacimbas. It even gave some signal, but only occasionally (late afternoon or early morning), and sometimes you have to walk for miles or climb a tree to get a signal. As for the roads, they were usually rehabilitated on the Quilengues-Impulo section, but this was interrupted 3 years ago, and the road has been deteriorating. This negatively influences the flow of products. There are several agricultural producers and livestock breeders (cattle, goats, pigs) who are waiting for a response to their complaints, but none has arrived yet. This is a concern for the administration, which has also tried to mobilize, for example, traditional authorities and churches to rehabilitate or open paths, to facilitate the transport of people and products.

At the same time, this region has a business and agricultural enterprise history that is not new. For instance, the Babaiela farm (of the Jembas group) is a well known actor, who occupied a significant portion of the land and forced the displacement of several communities. There was, for example, the case of the Aurora Impulo Project, which benefited from a governmental business credit program developed in 2014. Many companies applied to receive this support, received the money and then disappeared. In this sense, many farm projects that were developed in the commune are now halted, to the point that many families that were living on the land and that had been moved to the installation of farms are returning.

Map of the Cunene province and sites visited

CUNENE

ONCOCUA The headquarters of Oncocua is located precisely 333 kms from Ondjiva, covers an area of 7998 square kilometres and has an approximate population of 41,100 people. Due to the last cyclical droughts there was a reduction in the population, but also an exodus to Namibia, displacement in search of better living conditions. There are a total of 7 ethnic groups here, many of them transhumant. Mainly Muximbas (West zone, Oncocua) and Kuvale, who circulate through the Virei into Oncocua. The drought in the region dates back to 2011. It is a large-scale drought, which varies from commune to commune, given the inconsistency of the rainfall. In some years it rains in the southern part, and in others in the eastern part. It is an increasingly difficult situation. In 2021, the populations were unable to sow, and

circulated around the main village looking for water and cereal. The Administration received some donations, but they were not enough to make it to the rainy season, it was too far away. These donations came largely from NGOs, and through the Provincial Directorate of Social Assistance. The main activity of the populations of Oncocua is mainly livestock. Here, the goat is the main "commercial currency". It gives milk, which is the main source of food, but also serves as a bargaining chip, to supply other products. But the drought hit the goat right away, forcing transhumance, which weakened the communities' diet. The goat in this area is very competitive, selling up to 55 thousand kwanzas a head. But with the drought and COVID lockdown, it went down to 25,000. It is in this sense that populations become even more vulnerable.

In response to the drought, organisations such as FRESAN and FAS have stepped in with the construction of water holes and the rehabilitation of dams, and with the dredging and improvement of *chimpacas*. These projects make it possible to accumulate more water reserves, but at the same time they are still depend on rainfall. The

administration of Oncocua has made appeals for the diversification of socio-economic activities, in order to increase resilience. In particular, in the promotion of farming. However, given the scarcity of rainwater and the difficulty of accessing groundwater (due to the stony nature of the terrain), competition for aquatic resources increases and some conflicts occur between farmers and herders.

Here, one of the most recurrent requests from local communities is the urgent implementation of water capture systems, especially from the Cunene River, through an open channel or pipe. There was a project or idea to bring water from Montenegro, 50 kilometres away, but so far it has not progressed.

As a result, a migratory movement has been observed, both towards Ombadja (to work in the fields and in the collection of massango) and to Namibia. However, the border is closed due to restrictions imposed by COVID-19, which further reduces the survival strategies of local communities.

The municipality has some farms and mining and quarry projects. For example, it was in this region that the Horizonte 2020 agro-industry project was installed in 2016, causing a conflict with local communities over the abusive occupation of land. A joint report published by Associação Construindo Comunidades, SOS Habitat and the Open Society reported that 32,000 hectares of land had been confiscated, affecting 2,130 families with more than 10,000 children.

In any case, these developments have not resulted in an improvement in infrastructure for the population. In addition to collecting water for Oncocua, another major issue is the transport routes. If the road between Cahama and Otchinjau is passable, from that point to Oncocua it takes an average of 4 hours to travel 50 kilometres. This situation makes the movement of people and goods difficult - in a municipality whose main source of energy is the fuel that has to be manually transported.

EROLA The Erola area is located on the geographical boundary between Cunene and Namibe. Although administratively it belongs to the province of Namibe, social support is provided by the administration of Oncocua. Most of those who live here are Muximba, but there are also Muakahona and Vatua groups. For the local chief Kaukumbwa, "*everything is wrong here, our life is compromised*". The main problem is the rain, it hasn't rained here for 10-14 years, even less than in Oncocua. What's more, the terrain is rocky, which hinders the development of farms. The main source of food is sour milk (*omaver*), it is no longer possible to cook *funge*. In terms of plants, there are nombé, múcua, nonhandi, nocela. There used to be honey, but now with the lack of rain

there hasn’t been any. They also receive seeds for farming, the government gives them corn, massango, massambala, cowpeas. But since it doesn't rain, they don't plant. In recent years, many families have gone to Calueque, to see if they can satisfy their hunger. The problem is that they become visitors in other peoples’ lands.

On the meantime, with the drought they lost hundreds of heads, and those remaining they have are forced to sell at 15,000 kwanzas every 25 kilos. When there is no drought, they don't sell the kids, they prefer to milk and eat them when they get old. At the time of ceremonies they used to sacrifice up to 4-5 heads; but at this point, there are so few heads that they don't even sacrifice animals in the traditional rituals. The lack of rain causes hunger in the goat, which in turn loses weight (sometimes 6-7 kilos) and thus loses value.

In terms of problems and solutions, local communities mainly need telecommunications (Erola has no network) and a decent road. Trucks do not reach the valley because of this. Sometimes communities get together to sell the goats together (eg 100), and then buy foods to bring back to Erola. It is these problems that cause the prices

of products to increase. Another important complaint has to do with the closure of the border with Namibia, because of restrictions associated with COVID-19, which has interrupted the traditional crossing by canoe. The populations need the crossing to be reopened, so that they can go back to work. Many people are crossing illegally, and recently a member of the community died while crossing.

NAMIBE

Map of the province of Namibe and sites visited.

VIREI The road from Moçâmedes to Virei (approximately 130 kilometres) starts reasonably with some asphalt, but as we go along, it gets worse and worse until it turns into a trail. A few years ago, there was a contract to build the road to Virei, but in the meantime it was abandoned due to disagreements between the governor(s) and the contractors. The vegetation is minimal or non-existent, and there are almost no geographic features. Only welwitschia can be seen, as well as small thorny bushes. The municipality of Virei is one of the poorest in Angola. It has 39,866 inhabitants covering 15,092 square km. It borders Tombwa, Chibia, Gambos, Bibala, Curoca do Cunene. In this framework, the local population, despite being mixed (Mucubal, Mumwila, Kuisse), shares similar characteristics, namely pastoralism and nomadism (except in the case of the Kuisse, more dedicated to hunting and gathering).

The municipality has been severely affected by the drought in the last nine years, having a direct impact on the transhumance that forced herders to migrate longer distances to other places in search of pasture. This because, for

the population, livestock enjoy an important social status, equivalent to traditional (not necessarily economic) wealth. From this perspective, for instance, cattle theft is a tradition, linked to rites of passage ("*whoever does not steal cattle is not a man*"), but also a source of violent conflicts between different ethnic groups. Drought and consequent loss of livestock has increased cases of inter-group violence.

With regard to responses to the drought, the local administration invested on the recovery of water holes in the municipality, through a local team of technicians from the Provincial Infrastructure Office. Many were no longer functioning because the water table had dropped after nine years of lack of rain. There were also projects in collaboration with the NGOs World Vision, COSPE and FRESAN, which focused both on the issue of infrastructure rehabilitation and on the promotion of micro-agriculture (through the allocation of plots and donation of seeds and tools) among transhumant populations. In this area, despite the scarce rain, the soil is of good quality, fertile. In 2020, under the Poverty Support Program, 30 artisanal water holes were drilled to support farming. And through FAS and PIIM, dozens of new holes were drilled in Virei, aimed at watering cattle, along transhumance routes, and also for small farms. Many of these holes are brackish water, which reduces the possibilities in terms of human consumption.

According to the local administration, for 2021 the construction of rural villages for the population settlement is planned, including typical residences, made with local materials (*pau a pique*, manure), but incorporating water systems, solar panels and plots. The proposal was presented to the Provincial Government. The idea is that all places have a school, teacher's residence, health center.

They also received 50 motorcycle tanks with a capacity of 1000 litres each. These motorcycles are placed in the communities, under the tutelage of the *sobas* or *seculos*.

On the other hand, with the tradition of transhumance, many of the communities that live around Virei often suddenly abandon everything and move elsewhere. In this context, the Bibala Kuvale, for instance, may have a Virei family, and circulate between both locations, despite cultural differences among both groups. In this context, migration makes it difficult for the administration to offer health and food conditions. Given this mobility, joint work is needed between the populations and administrations of neighbouring municipalities (Virei, Chibia, Bibala, Gambos).

It has not rained consistently in Virei for 9 years. In December/January 2020-1 it still rained a little, but only 20-30

minutes each rain, and that was it. However, with the waters from neighbouring municipalities, some floods were registered in the intermittent rivers. However, there is no water retention programme in the municipality. There are 3 dams, but they are in need of repair and dredging. They also need funding to create dyke systems to protect water, and to build barriers on the riverbanks so that water seeps into the subsoil and enriches the water table around the rivers. In this context, before the drought, the population used to dig the river itself to draw water, where artisanal water holes could also be found. Another added difficulty is the roads and current state. Traveling to the provincial capital can only be done with traction cars, and 60 km are covered in two hours. Tires last for merely months. Often, administrators have to lend their personal cars for public services.

BIBALA Quilemba Velha is part of the municipality of Bibala, province of Namibe. It is an area affected by drought and suffering a high level of malnutrition in children and adults. Due to the famine that plagues the population of this community, the local inhabitants resort to the root of a tree called mutunda (boscia polyantha). They put the roots in a mortar, smash them and then go to a stone that serves as a mill, and they spread it out, boil it and drink it as if it were *quissangua* (fermented corn). On the other hand, it causes some reactions such as weakness, trembling and slight discomfort. According to the local administrator, in the last week of April 2021 they had three children hospitalised after consuming *mutunda*. The consumption of this root is related to previous famine situations such as the one in 1972 when the inhabitants used this plant – it is an ancestral alternative to the lack of rain. If some rain falls, as happened this year, it causes the reactions described above.

It is a very resistant tree that does not "die"... Furthermore, it exists in large quantities in the region, and has been used for the unsustainable production of charcoal. Likewise, they have few oxen, which limits the consumption of *omahini* (sour milk). They have some goats but they don't feed on that milk, they don't have this knowledge. They have chickens and eggs that help them... They also seek mushrooms, but only when it rains; they resort to guavas but only in times of abundance. They cultivate massambala, but only when there is rain. They also eat mucuio, a wild fig. They don't have eggs because hens only lay eggs when they have food.

Therefore, the populations need permanent food support and efforts are being made to identify some planting areas, and to create *chimpacas* for irrigation. The population is very dispersed and there are around 789 families. Bibala has schools, and children

have been intermittently participating in classes. But only one school has school lunches, juice with cookies or bread with cookies... There are 14 year olds who are learning to read, the poverty level leads to a high level of school absenteeism, pushing children to sell charcoal on the road. There are some organisations working in the area, such as ADPP, who is supporting a community within its strategy to implement Field Schools. They are thinking about installing water holes because rainfed agriculture is not having any effect. But the plots are very far from the riverbanks.

When there is rain, maize, sorghum, mung bean and manioc are cultivated. What they produce is usually enough to support the population for a year, with good rain. They manage to have some surplus to sell. The food varies between corn, massango, massambala. Massambala is used to make macau and invite people to help with the farming (the so-called *ndjuluka*). The soils allow for production without chemical fertilisers, and organic fertilisers (manure) are used. On the other hand, there are no orchards, just one farm that has tangerine and lemon trees. However, it is semi-abandoned and in the process of being sold..

CUROCA To the north of Tômbwa is the Lagoa do Carvalhão - which, together with Lagoa dos Arcos and Onguaia, feeds the Curoca River. This considerably large lagoon appears as a verdant valley in the arid scenery of Namibe. However, 7-8 years ago it ran out of water. Not for lack of rain - because rain is almost non-existent here - but because the groundwater that comes from Lubango (Chibia) has been less and less every year. In this sense, the thorny vegetation that we can see around it reflects this aquatic scarcity. In the past, when there was water, fishing (in particular, catfish) was an important activity for the livelihood of families. In any case, like Lagoa dos Arcos, Lagoa do Carvalhão continues to host commercial agriculture endeavours, without reaching industrial levels. There are several farmers who come from other provinces, specifically from Benguela and Huila. They bring in their own workers from outside to work with them. They found a way to settle here by leasing the land to the local *sobas*. But they ended up "taking", and they practice a very intensive agriculture. This initially this was not a problem because the locals (many of them Kuvale) practiced little to no farming. However, once the farmers started to be successful, some conflicts appeared, and the locals needed to show that they still owned the land. There was also a conflict related to livestock, as the lands had their own watering zones which eventually invaded by farmers. Thus, the animals, which had already established their routes, crossed the fields and spoiled some of the productions. This led to a new conflict, but in the

meantime it seems to have calmed down.

José António, one of the farmers, from Lubango, has been a tenant in Lagoa for approximately 5 years. His children continue in Lubango to study and work. On the farm they mainly produce tomatoes and onions. Tomatoes do well in this dry climate without rain. In fact, José António says that *"I have never seen it rain here"*, only fog from time to time. From this perspective, "*if it rains here, it's the end of the world*", as the land gets muddy and our flip-flops are stuck to the ground. The pond has dried up, that's why it's so good for farming. They can make good production and export to Namibe, even Luanda. The real problem is the tomato disease ("industrial caterpillar"), which makes things difficult. In any case, the advantage here is that they manage to do several annual production cycles, unlike other regions of the country that harvest tomato annually. Irrigation is done drop by drop, through an artisanal hole, of 25-30 meters, pumped with their own means. The problem with this intensive agriculture is the long-term consequences of the land, through monoculture and the use of fertilisers, insecticide and industrial manure. The land needs rest, it needs rotation and not intensive monoculture. But farmers cannot wait.

On the other side of the lagoon is the village of Curoca. Its inhabitants are mainly of Kuvale origin, although today we find other groups for example Nyaneka. We sat down at the local jango for a chat with the soba António Manuel Kapolicia ("little policeman"), who told us how, when it rained, drought was normal here. Before, they were able to combine the cattle with working with the river water, they cultivated where the water passed. But it hasn't rained for years, the rain stopped in 2010 and so the river doesn't bring water. When the farmers arrived, they took the opportunity and tried to grow sweet potatoes and corn. However, there is no engine any more, so they can't do anything. The drought is really bad. They are stopped, they need an engine and farming tools, for them it is the only solution. On the meantime, the community of Curoca asked the government for help. The PAM program brought food, but it didn't solve the problem, they wait, but they can't work, and they don't want to be dependent on food offers. They need money.

As for the *ngombe* (ox), there were many, but the drought took the oxen away, almost all of them died in 2019. Some families have 5 oxen, others 2, 10 or 20... They didn't receive government help, and buying new ox is very expensive. The National Repopulation Program, which distributes a couple of oxen to the communities, which then "return" it by reproducing and distributing it throughout other members, has not yet arrived in Namibe.

Both in Curoca and in the village of Umbú, the few cattle ranchers that remained entered transhumance, searching for grass in Gambos, others in Bibala, or in Camucuio (where it still rained a little). This is not the first drought in Curoca. The elders remember that when they were kids, there was a big drought. But it has nothing to do with what happened in 2019, which was the worst drought they have ever experienced. In any case, here, without water, only those who have money can farm.

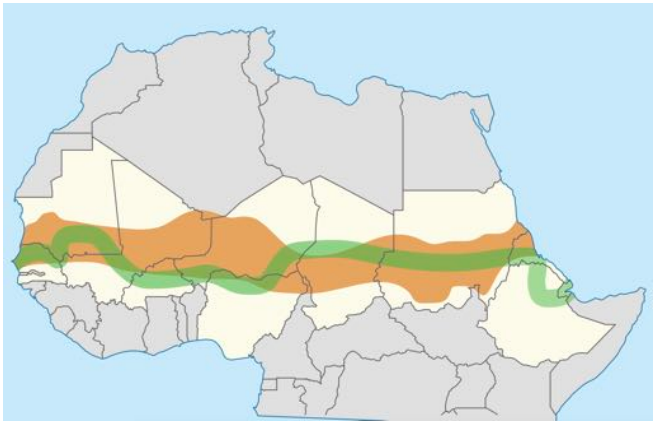
GOOD PRACTICES

IRRIGATION OF A SMALL PLOT IN VIREI (NAMIBE)

As we are aware, drought is not an easily resolved phenomenon. On the contrary, taking into account its socio-environmental and economic nature, it requires a set of intersectional approaches that are capable both of mitigating the effects of climatological drought and of offering instruments to preserve the dignity, autonomy and survival of local communities. Here, knowledge exchange, particularly with regard to good practices and sustainable solutions, is crucial. What can Angola learn from other regions of the world with similar histories of living with arid climates, such as the Brazilian Northeast or East Africa, for example? In this section we list some solutions that have been mentioned and collected throughout our research, both in the context of Southwest Angola and in other African and global contexts. These are solutions of a technical or socio-political nature, of different scales and with complementary characteristics, which can be explored simultaneously in different contexts.

REFORESTATION

Faced with scenarios of increasing desertification at a global level, several initiatives at a local and trans-regional level have invested on reforestation projects as a measure of combat, mitigation or even restoration. In this framework, there are two major initiatives on the African continent: the **Great Green Wall of the Sahara and the Sahel Initiative**, (GGWSSI) and the Green Belt Movement, (GBM). The Great Green Wall of the Sahara and the Sahel Initiative was promoted and funded by the African Union in 2007, drawing on inspiration from previous projects such as the Green Dam Initiative in Algeria or the Great Green Wall in China. It evolved from from an overarching tree planting initiative to an integrated multi-sectoral approach through interregional cooperation on a continental scale (Leonardsson et al. 2021). With results varying from country to country, the initiative has in any case managed to plant millions of trees and restore degraded ecosystems in countries from Nigeria to Ethiopia.



Map of the area covered by the GGWSSI project.
Source: Wikimedia Commons.

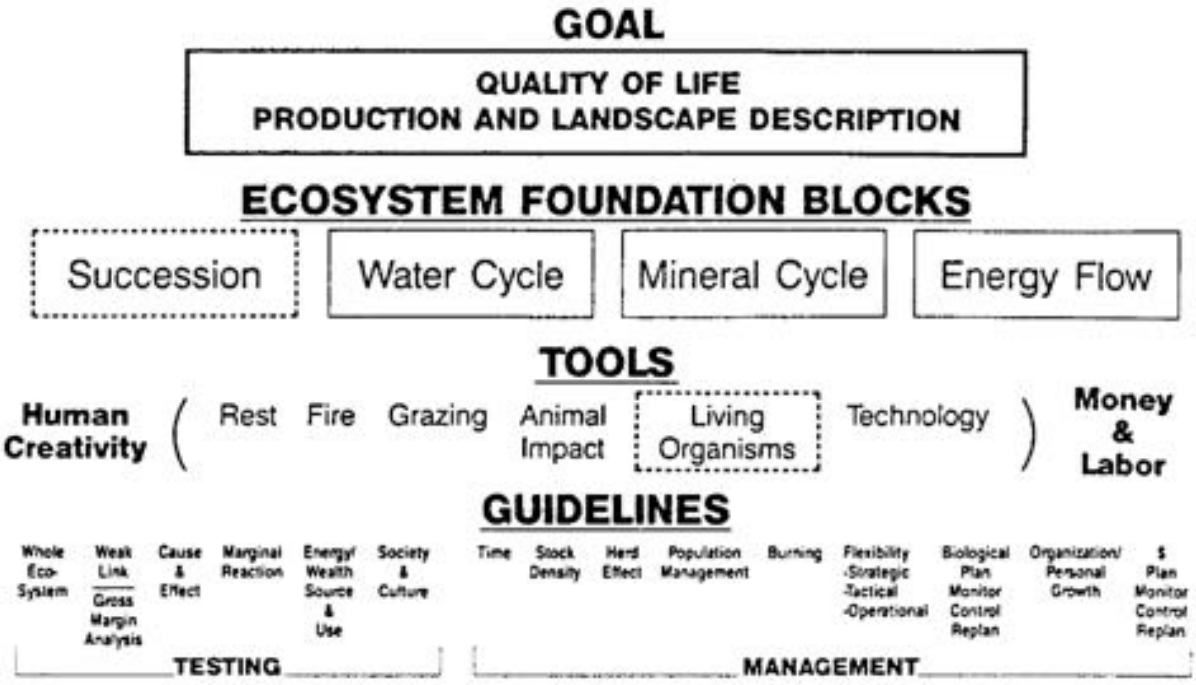
The **Green Belt Movement** (GBM) was inaugurated in the 1970s in Kenya by the Nobel Peace Prize laureate Wangari Maathai (1940-2011), with the aim of mobilising communities for their self-determination, and promoting justice, equity, poverty

reduction and environmental conservation, using trees as a gateway for women's organisation in rural Kenya to plant trees, fight deforestation and restore their main sources of fuel for cooking, generating income and preventing soil erosion. In this framework, the Maathai initiative has intersectionally incorporated women's advocacy and empowerment, ecotourism and general economic development. The scale of his intervention in the decades that followed is such that, in 2018, it counted 51 million trees planted in 6,500 different locations, involving thousands of Kenyan women (Zawadee, 30 October 2018).

Wangari Maathai in 2001. Source: Wilkimedia Commons

In both cases, the key to success was, in the first place, the "micro-" and bottom-up approach, developed from the recognition of the local socio-ecological contexts and their respective particularities. A second determining factor was civic mobilisation and cooperation at local, regional and transnational levels. In the case of the GGWSSI, for example, up to 20 countries collaborate in its development.

Another relevant example in this context is the development of ecological restoration projects such as those at Fazenda Olhos D'Água in Baía, Brazil. Originally proposed by Swiss farmer and researcher Ernst Grosch using a technique called **biodynamic agroforestry** or syntropic agriculture, through which soil moisture and biomass levels are restored as a starting point for forest restoration. This approach managed to reverse the process of desertification. in the region. In this case, the importance of crossing technical and scientific knowledge with social mobilisation to combat desertification is highlighted. This is an example of a movement known as **greening the desert**, based on a holistic and integrated management of knowledge and techniques for reversing desertification (see Savory 1991).



Holistic resource management model proposed by Allan Savory (1991)

WATER MICRO-MANAGEMENT

In addition to reforestation initiatives, another methodology to combat drought comes from the intelligent management of water resources, both in terms of retention and storage of available water (see below) and the use of rainwater and atmospheric humidity in regions with such climate characteristics. In this framework, there are multiple solutions, both at the macro level (dams, transfer systems, etc.) and at the micro level.

Desalination station in Cape Verde. Source: DW / V. Teixeira.

At the micro level, there are several projects that allow for more effective water management, especially with regard to agriculture and individual consumption. For example, **drip irrigation**, reverse osmosis desalination and wastewater treatment technologies. In the case of drip irrigation, it is a generalised practice, both in industrial agriculture and in more familiar-scale farms.

As for **desalination**, it is necessarily a technique adapted to coastal regions (in the case of Southwest Angola, Namibe would be a case in point). For example, in countries like Cape Verde, whose archipelago cyclically deals with periods of water insufficiency or crisis, desalination has been used for decades, and allows several of its islands to have access to water for consumption, for example. Despite the still relatively high cost of the technology (with a tendency to decline in the coming decades), it is a high-impact solution with regard to combating water stress in traditionally arid regions such as Australia or California (Robbins 2019).), in particular with a view to human/animal consumption and agrarian development. Furthermore, it is an industry that can be developed using renewable energy resources. Finally, it is a technology based on a rational use of water, which in turn may increase the level of awareness and involvement/participation of local communities. Finally, **wastewater treatment** incorporates the perspective of rational use of water through its recycling and reuse. In areas of irregularity or scarcity of rainfall, it will have the potential to meet immediate needs in terms of irrigation or animal watering, for example.

On the other hand, taking into account their material and infrastructural complexity, these last two proposals incorporate temporal and geographical limitations and will have a greater chance of success if developed in an urban or peri-urban context (and in the case of desalination, coastal context). From this perspective, it does not solve immediate problems of access to water in inland and rural areas.

AGROECOLOGY

In a context in which traditional pastoralism is increasingly being undermined as a livelihood, there is constant pressure from public entities and from development agencies to 'convert' local communities to more sedentary ways of life, namely into farming. Although many local communities already adopt mixed agro-pastoral systems, other communities maintain their nomadic or transhumant lifestyle. In this context, agro-ecology emerges as a principle or ideology that, based on the recognition of agro-ecosystems as biomes, or complex and symbiotic units, seeks to offer integrated and participatory solutions to take full advantage of environmental

Agroecological project in Sikkim (India). Sourcee: aseed.net

resources while maintaining the balance of same. In this framework, agroecology is based on the application of principles that combine ecological and social values, whose application is adapted to different socio-ecological contexts and also at different scales, from the micro for self-consumption to the large scale, including landscape management. Agroecology's fundamental principle is biological diversification, from which it restores and strengthens the ecological functions that maintain the ecological and social resilience of production systems.

The principle of agroecology has been rehearsed in various contexts at a global level. For example, in 2020 the European Union funded research projects in this field under the Horizon 2020 program (Societal Challenge 2), worth €236 million. But a concrete example of success comes from India, where the state of Sikkim (in the Himalayas) transitioned to 100% organic production after adopting an agroecological model, free of pesticides and based on agrobiodiversity (see Meek and Anderson 2020). There are also examples on the African continent. For example, the Keita rural development project in Niger began in the 1980s and took about 20 years to restore ecological balance and dramatically improve the agrarian economy of the region, which was heavily affected by desertification processes. During this period, 18 million trees were planted, the surface under the forests increased by 300%, while the shrub steppes and sand dunes decreased by 30%. At the same time, agricultural land was expanded by about 80%. Across the region, several projects have used agroecological solutions to restore degraded lands and make rational use of scarce water resources, while increasing food production and improving farmers' livelihoods and resilience (Mousseau 2015) .

At the Santo António dos Gambos Mission, there is a project under development that incorporates an agroecological aspect, based on education for biodiversity. Once again, the key point is the integration of traditional knowledge and technical-scientific knowledge in order to recognise specific environmental characteristics and the symbiotic relationship between the different elements that make up the living ecosystem.

PARTICIPATION

Example of Farmer Field School in Southern Angola. Source: FRESAN

Several intervention projects have insisted on a participatory approach with positive results, particularly with regard to the involvement of communities in the design and development of local solutions. The case described above of the **cisternas-calçadão** promoted by ADRA and NCA is based, as we have seen, on a model of pedagogy and participation that allows the *kimbos* to manage and carry out the maintenance of the infrastructure. This was possible thanks to a pedagogy and a dialogue with the local communities, in order to instruct the population in its management and maintenance, and to make the *kimbos* responsible and the first beneficiaries of the projects. The communities were active participants in the construction of the cisterns.

Another example of this participatory logic has been developed by FAO itself in recent decades, with the implementation of **Farmer Field Schools** (in Portuguese, Escolas de Campo). This approach was first developed in Southeast Asia as an alternative to the top-down approach of the Green Revolution, which failed to address the local complexity of agricultural problems, such as pesticide-induced pest outbreaks. In response, the Farmer Field Schools project proposes the organisation of local teams (groups of 20-25 farmers), which meet regularly on site under the guidance of a trained facilitator to analyse and monitor the fields and compare results, in order to identify "best practices" at the local level. This analysis includes observing key elements of the agro-ecosystem, measuring plant development, taking samples of insects, weeds and diseased plants, comparing characteristics of different soils, etc. The Escolas de Campo are also being implemented in southern Angola through the FRESAN program to strengthen resilience and food security. They are being built in areas where agricultural activity is underdeveloped due to the drought, in order to encourage horticultural production and help communities to develop scientific

production techniques, through the training of local technicians in good agricultural practices. For example, until October 2021, 74 field schools were implemented in the province of Cunene, benefiting about 2,500 peasant families in the province of Cunene, in the last 10 months, in 74 field schools.

The great advantage of these initiatives is the communication, dialogue and involvement of local communities in the design and implementation of drought response projects, ensuring a more equitable process.

DEMOCRATISING INFRASTRUCTURES

Amuna in Peru. Source: wetlands.org

As mentioned above, the infrastructural dimension assumes a central role with regard to the production of drought situations among local communities. In this context, we refer both to water infrastructure (water collection and distribution systems, whether for consumption or farming) as well as roads and communication. In this framework, the democratised access to these infrastructures is decisive not only for combating desertification but also for the development of local autonomy and resilience. Here, the question of **maintenance, recycling or repair of existing infrastructure**, and the involvement of local communities in the process, arises. In Angola, due to the excessive centralism of governance, this reality does not exist. At the same time, the delay or lack of infrastructure maintenance creates or increases situations of inequality and discrimination.

From this perspective, an infrastructural policy that is based on local knowledge and practices can reduce situations of inequality. Here, we refer both to the design of circulation and communication structures that reflect and serve local practices, as well as the use of technologies - such as water collection and transfer techniques - that 'make sense' for the local communities.

One relevant example in this context is the so-called *amunas* in Peru. The *amunas* are systems of 'harvesting' and retention of water, dating back to pre-Incan times, through the collection of rainwater and respective canalisation, based on the knowledge of the

aquifer and geological properties of the local landscape. With these systems, local communities were able to store water from the rainy season for use in the dry season. Despite their antiquity, the recovery and communal use of these systems has been cited by several authors as an example of both a 'nature-based solution' (Ribeiro 2021) and a 'hydrogeoetic system' (see for example Martos-Rosillo et al. 2021) , that is, the study and ethical use of hydrogeological knowledge.

CIÊNCIA E TECNOLOGIA

As mentioned in the latest report on drought in 2021 from the Global Assessment Report on Disaster Risk Reduction (GAR 2021), climate research and monitoring, and related early warning systems, are essential to avoid or mitigate the environmental and human consequences of cycles. of aridity (Tartari 2021). In this context, for example, satellite technology is a great ally in terms of monitoring climate change, enabling real-time information to be made available for decision-making in scenarios of natural disasters and climate crises. Likewise, the systematic collection of quantitative data at an environmental, geographic and meteorological level allows for sustained decision-making. Similarly, understanding historical developments and socio-cultural aspects allows for a better understanding of populations' reaction to drought and their acceptance of response programs. The key issue is the dialogue and synergy between researchers and decision-makers.

ASSESSMENT AND RECOMMENDATIONS

LANDSCAPE NEAR MOÇÂMEDES (NAMIBE)

In this section, we summarise the main conclusions of the report, in the form of the main problems identified, and main recommendations drawn from the feedback received in the field and the bibliographic research resulting from it.

IDENTIFIED PROBLEMS

- In addition to the meteorological drought situation, there is an **infrastructural dimension** that is causing localised drought situations from human action or omission, due either to the insufficiency, degradation or non-existence of currently existing infrastructure: roads, energy, communication networks, canals, pipelines, etc. This was evident in communities such as Tytongotongo in the Gambos, whose single circulation route is practically impassable. A similar situation can be seen at Oncocua's headquarters, without mobile network coverage and with roads in poor conditions that complicate access to goods and resources or the flow of production.
- Likewise, the recent and growing focus on agro-industrial projects is intensifying the **pressure on the soil and its water resources**, and preventing or hampering traditional pastoralist circulation routes. These situations were identified by Amnesty International in Tunda dos Gambos, and by the ACC in Curoca do Cunene and in Typeyo in Gambos. There are also no known compensations to local communities for the use of their traditional lands.
- The **government response**, through its various programs and initiatives, has focused both on immediate assistance and long-term infrastructure projects. However, it is **slow, fragmented, partial and in some cases redundant,** causing several shortcomings in the response. Many of the emergency and structural programs arise from the presidential initiative and propose generalised responses rather than localised ones, being implemented based on decision-making without knowledge the reality on the ground. Anti-poverty programs (from FAS to PIDLCP) multiply and overlap. Instruments such as the PIIM, aimed at infrastructural interventions, are currently underutilised with regards to combating drought
- Likewise, the **excessive centralisation of the financial and material operationalisation** of the response turns its execution slow and difficult, making it time-consuming and subject to political agendas in the capital Luanda, instead of being

designed and crafted based on local needs. Local administrations do not have sufficient financial and legal autonomy to be able to respond in good time.

- Still at the infrastructural level, the government response has focused on new macro-projects, namely around the Cunene River. This response promises to solve several supply problems. However, these are **long-term projects with an unpredictable conclusion**, delaying more immediate and localised solutions. At the same time, they focus on new construction instead of taking advantage of existing water infrastructures (dams, canalisations), many of which date back to colonial times, and around which populations have organised themselves for decades. This is the case, for example, of the Neves Dam and its irrigation channels in Humpata, or the Matala Hydroelectric Power Plant - which, after an incomplete intervention between 2011 and 2013, lost its capacity to retain water and distribute it throughout the commune.
- The **response by NGOs and aid and development organisations** has solved several problems at the local level, but there is a **lack of dialogue and knowledge exchange** between the different organisations and entities in the field, in particular with regard to the reuse of well-developed, successful previously rehearsed responses. Many communities do not understand why some useful support (such as the distribution of animals or agricultural implements) has been interrupted or cancelled. There is a lack of a general framework that makes it possible to take advantage of good practices and avoid redundancy.
- In many cases, there is **insufficient consultation and involvement of local communities**, in particular in relation to the design of practical solutions such as the installation and maintenance of water holes and the development of farm plots, especially taking into account the socio-cultural and ethnic diversity in this region. For example, the sedentarisation of communities around agrarian projects, while useful from the point of view of increasing resilience, is not in line with the lifestyle of many of the communities.
- The **scientific community** (from meteorology to geography, social anthropology) is available to contribute, however there is no systematisation and cross-referencing of scientific data with projects developed in the field. There is therefore an **under-utilisation of these resources**. One example is the scientific program *Cunene: Das Secas aos Cheias*, which brought together national and international experts in 2020, but which so far has not

produced the necessary synergies with actors on the ground.

RECOMMENDATIONS

- Decentralisation in decision-making, and attribution of greater operational and financial autonomy to local authorities.
- Greater dialogue and synergy between the agents involved, through a common framework of actions, for example in the form of a "portal" or "observatory".
- An integrated approach to the issue of land and use of environmental resources, both in terms of compliance with existing legislation and respect for the practices and strategies of local communities - in particular with regard to transhumance.
- Greater emphasis on local knowledge, not only in terms of traditional practices and socio-environmental knowledge, but also on the co-authorship of solutions, in a participatory manner, based on the recognition of the socio-historical, cultural and environmental particularities of each affected area.
- More circulation of knowledge between the different actors on the ground, in particular with regard to good practices that have effectively solved problems at the local level.
- Greater use of good practices in drought response, both nationally and internationally.
- Emphasis on investment in road, energy and communication infrastructure, both in terms of taking advantage of existing infrastructure and building new infrastructure in more remote areas.
- Incorporation of a logic of democracy and environmental justice, designing and developing projects primarily based on respect for the dignity of human life and concern for environmental diversity.

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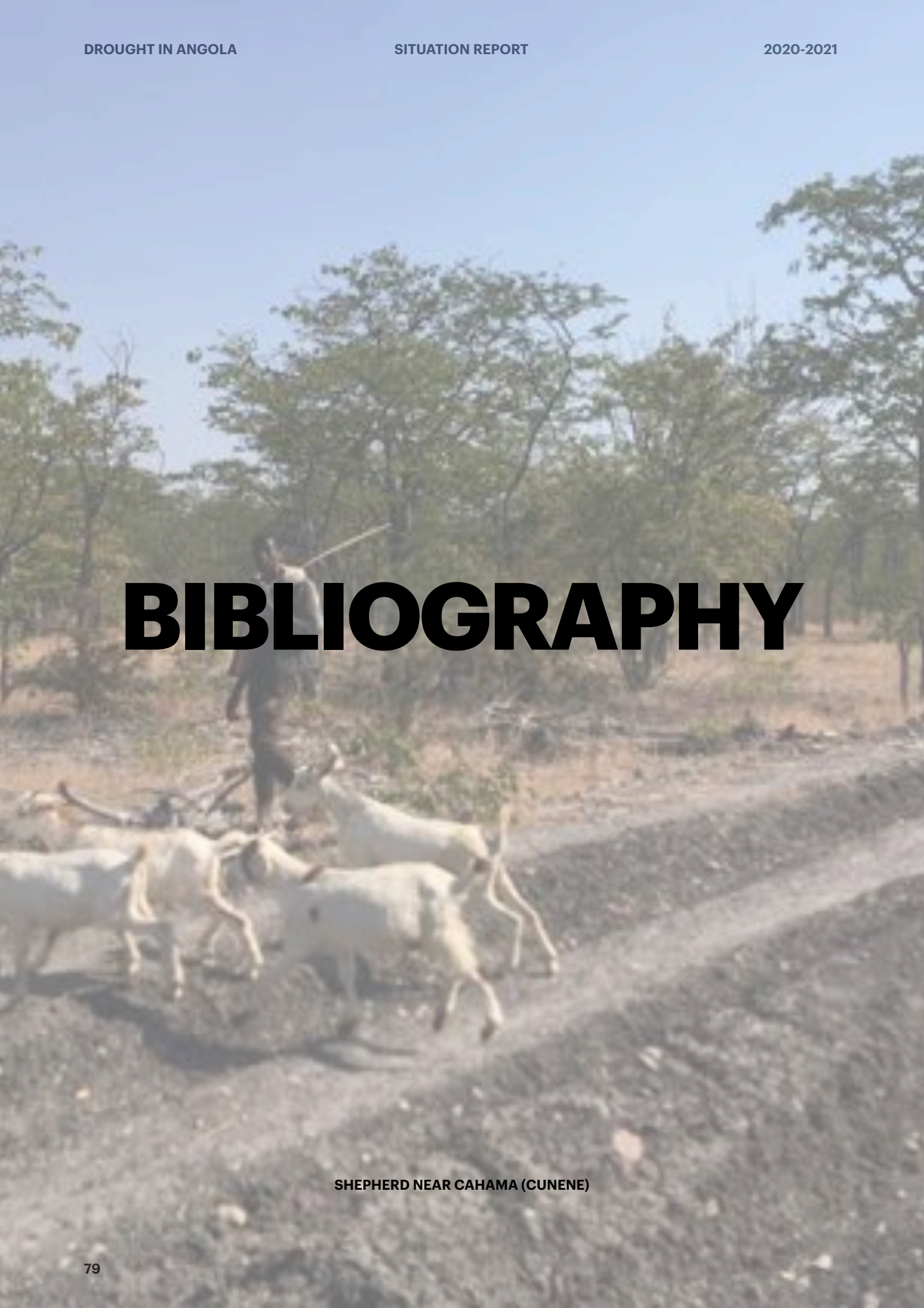

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