CARE Climate Change

RESILIENT LIVELIHOODS & LANDSCAPES IN THE SAHEL

THE CHANGING NATURAL RESOURCE BASE AND ITS USE

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REPORT HIGHLIGHTS

a. Many of the Sahelian countries have seen significant expansions in land used for crop production over the period 2000 - 2013. Whilst this is driven largely by rural population growth, in Burkina Faso, Mali and Mauritania the expansion of land use for crop farming has significantly out-paced population growth. The transformation of bushland to cropland has significant implications of Natural Resource Management across competing livelihoods.
b. Livestock increases have been especially significant across the Sahel. Between 2000 and 2017, in Burkina Faso, Chad and Mali, the average annual growth in the number of livestock has been more than twice that of the average annual rural population growth rate over the same period.
c. The area of land covered by water sources has decreased in all the Sahelian countries between 2000 and 2013. In Chad and Niger the reduction has been especially stark, with the landed area covered by water sources more than halving between 2000 and 2013.
d. The area of land used for dry-season farming, a period of traditional scarcity, has increased significantly in most of the Sahelian countries. In Burkina Faso, and Mali the area of land used for irrigated, dry-season farming has more than doubled between 2000 and 2013, and in Mauritania and Senegal, it has almost doubled over the same period.
e. There is a structural conflict in increasing the adaptatively capacity of farmers on the one hand, and that of pastoralists on the other. Managing natural resource in the context of multiple natural resource user groups will require strong, legitimate, transparent and accountable institutions across scales, which manage competing claims and entitlements, implement and enforce land use planning and sanction non-compliance.

1. INTRODUCTION

The Sahel is characterized by high levels of livelihood differentiation. Pastoralists, farmers, hunters, foragers and fish folk negotiate access to, and use of, the scarce resources which underpin fragile livelihoods. Negotiating these competing claims by different natural resource user-groups is complicated further by the fact that differences between the livelihoods or user groups, often coincide with existing social cleavages, such as ethnicity, language, culture, gender and age categories.

Simultaneously, the Sahel is undergoing rapid change. Population growth, urban sprawl and expanding extractive sectors are changing rural land use patterns. The rapid uptake of dry-season farming, and the introduction of fast and slow maturing cop and seed varieties are shifting crop calendars. These landscape-wide changes occur in the context of rapid climatic change and variation, with temperatures in the Sahel set to increase significantly faster than the global average. These changes have significant impacts on the sustainability of Sahelian livelihoods, but also, since competing claims to natural resources are a feature of the Sahel, as described above, on relationships between livelihoods, and the social categories with which they coincide, such as between men and women, between farmers and pastoralists and between the elderly and the youth. The upswing in the frequency and intensity of conflicts, especially between farmers and pastoralists is not unrelated to the natural resource changes happening in the Sahel.

As a result of the complexity of natural resource governance in the Sahel, understanding the changing availability, access and use of natural resources is critical for the design and implementation of policies, projects and programs which seek to develop secure and resilient livelihoods and landscapes. The following paper tries to quantify some the changes happening in terms of the Sahel's natural resource base, relevant for the resilience of natural resource users in the Sahel, including the governance of access and use of those resources by the various user-groups. It does so through a series of tables and charts relating to relevant natural resource changes in selected Sahelian countries.

The paper is working document produced by the Climate Learning and Advocacy for Resilience (CLAR) programme of CARE International in order to help in 'setting the scene' as climate programming in Sahel ramps up.

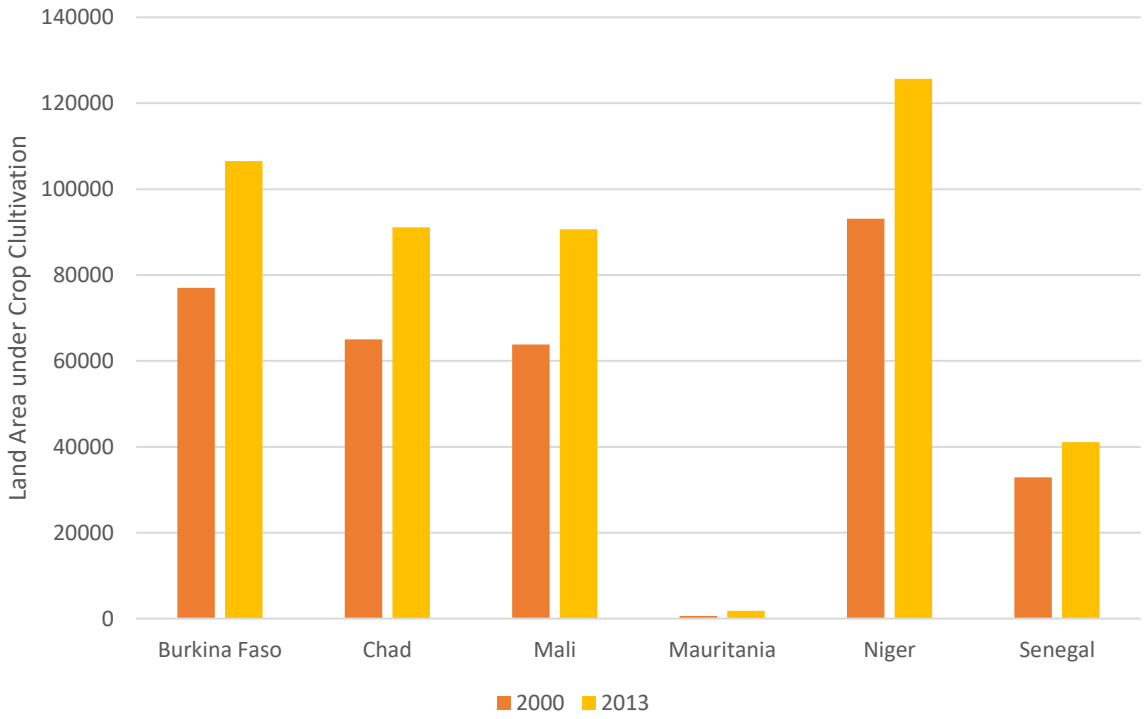
2. CHANGING USE & AVAILABILITY OF NATURAL RESOURCES IN THE SAHEL:

a. Expansion of Crop Farming:

Crop farming has seen a rapid expansion across much of Sahel over a sustained period, since the Sahelian droughts of the 1970s and 1980s. Across the Sahel, agriculture expanded into areas of savanna bushland, used traditionally by pastoralists for grazing cattle. The expansion of cropland has been especially high in Burkina Faso, Mali and Niger (see Figure 1 below). Importantly, in Burkina Faso, Mali and Mauritania, the average annual expansion in cropland is significantly higher than average annual rural population growth rate, suggesting that in those countries, more farmers are farming larger areas of land.

Figure 1: Growth in cropland area in Sahelian countries, 2000-2013 (USAID/ USGS data)

	Cropland area in 2000 (km2)	Cropland area in 2013 (km2)	Average Annual Cropland Growth Rate	Average Annual Rural Population Growth Rate
Burkina Faso	77040	106532	2.94%	1.79%
Chad	65012	91064	3.08%	3.11%
Mali	63808	90652	3.24%	1.87%
Mauritania	648	1796	13.63%	1.13%
Niger	93140	125672	2.69%	3.48%
Senegal	32904	41112	1.92%	2.33%

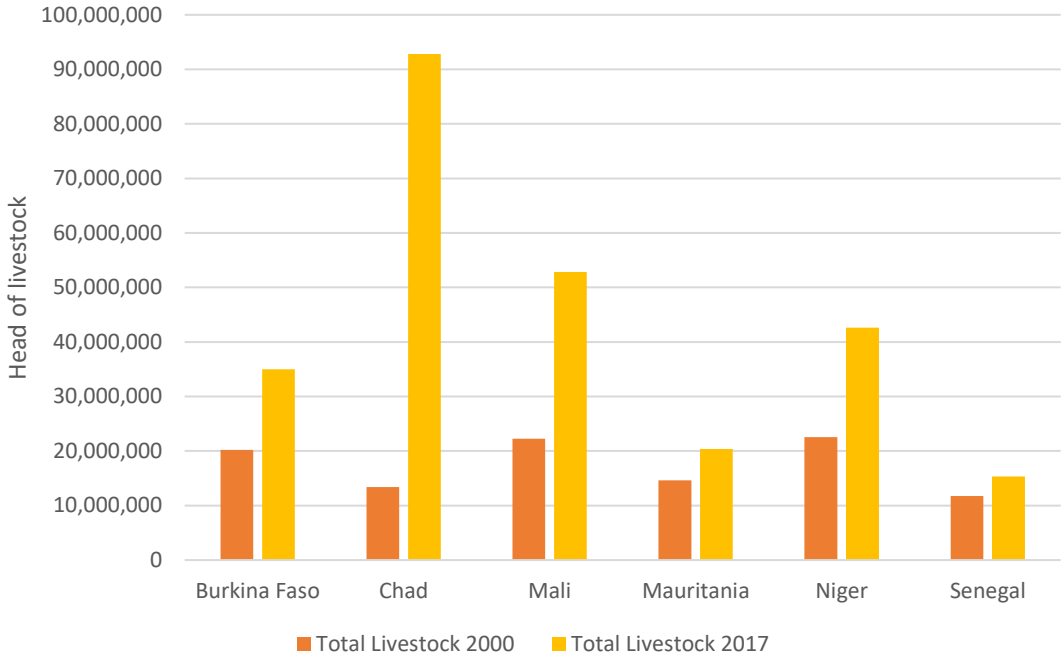


b. Increase in Number of Livestock

The transformation of land from savanna bushland used by cattle for grazing, to cropped farmland has been prolific across the Sahel, especially in Burkina Faso, Niger, Chad and Mali. Simultaneously, the number of livestock has increased significantly since the Sahelian droughts of the 1970s and 1980s (see Figure 2 below). The livestock growth rates in Burkina Faso, Chad, and Mali significantly out-pace the average annual rural population growth rates for those countries over the same period. In Chad and Mali, the annual growth in livestock between 2000 and 2017 has been twice that of the rural population growth rates over the same period. As above, this suggests that in those countries, rural communities, including pastoralist societies, are holding increasingly larger numbers of livestock.

Figure 2: Growth in Livestock in Sahelian countries, 2000-2017 (FAOSTAT data)

	Total Livestock 2000	Total Livestock 2017	Average Annual Livestock Growth Rate	Average Annual Rural Population Growth Rate
Burkina Faso	20,227,942	34,964,536	3.15%	1.79%
Chad	13,404,997	92,800,788	7.05%	3.11%
Mali	22,234,736	52,839,700	4.94%	1.87%
Mauritania	14,641,296	20,356,875	1.82%	1.13%
Niger	22,548,419	42,608,278	3.66%	3.48%
Senegal	11,734,000	15,333,240	1.64%	2.33%



BOX 1: CHANGING PASTORALIST MOBILITY PATTERNS:

PROGRES III is the third round of a program implemented by CARE and its partners in Niger. It has, as its first Specific Objective, to ensure that by 2021, pastoral communities are mobilizing and are more resilient to climate crises and conflict. The PROGRES III baseline survey asked respondents (all of whom identify as pastoralists or agro-pastoralists) about changes in mobility, over a 30-year period. Of those surveyed, 49% indicated that over a 30-year period, mobility had decreased, whilst 23% indicated that mobility was unchanged over the same period, and 29% indicated that it had increased. Perhaps a more significant change relates, however, to changes in the types of mobility. Figure 3 and 4 below present the results.

Figure 3: Pastoral Mobility Patterns in Niger's Diffa Region 30 years ago

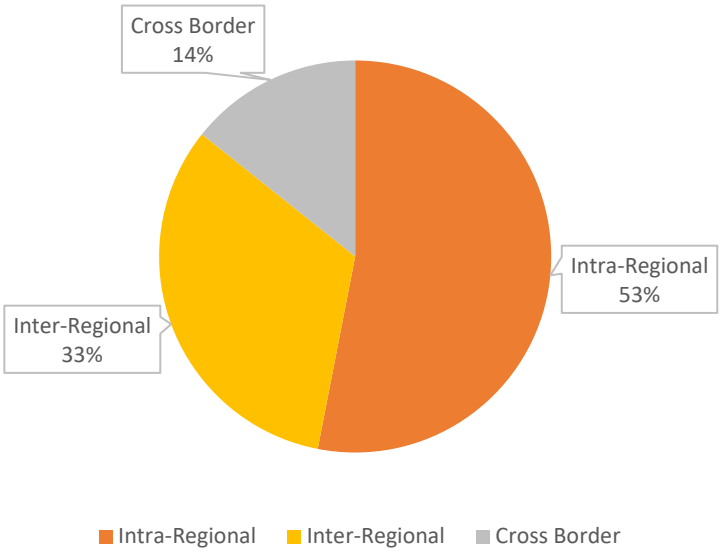
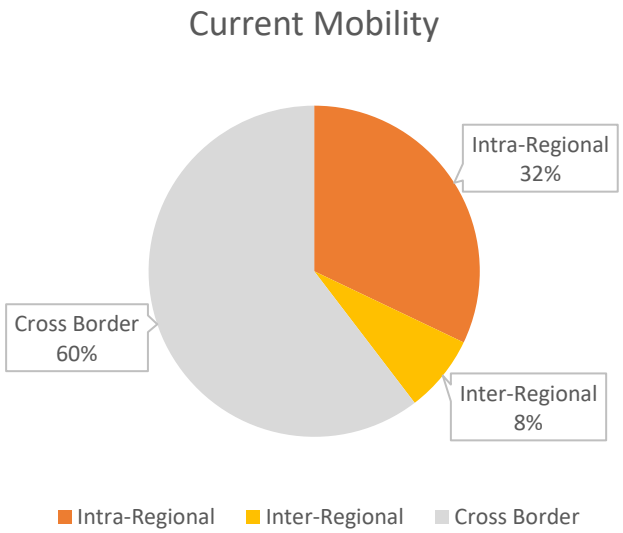


Figure 4: Current Pastoral Mobility Patterns in Niger's Diffa Region



They indicate a sharp decline in inter-regional mobility (between regions in country) from 33% 30 years ago, to only 8% currently. Intra-regional mobility (remaining in one region, within the country) has also dropped significantly, for 53% to 32%. Whilst this drop is sharp, intra-regional mobility continues to be widely practices (32% of respondents). In contrast, whilst only 14% of respondents indicated they practiced cross-border transhumance 30 years, 60% of those dependent on mobility currently practice cross-border mobility.

We can draw a number of conclusions, although there is a clear need for additional research on changing pastoral livelihoods. Firstly, whilst it should be remembered that it appears as if pastoral mobility has decreased over the past 30 years, a greater portion of pastoralists who continue to depend upon mobility, cannot meet livelihood needs within Niger. This may be the result of growing population pressure, climate change and/or security concerns. Secondly, the data reveals a polarizing dynamic occurring within pastoral livelihoods, with, on the one hand, some pastoralists being very nomadic, covering large distances across borders and others, settling, presumably building upon relationships and alliances, and moving short

distances, probably daily, within the regions in which they have come to settle. The middle segment, of semi nomadic pastoralists who move between regions within countries is being squeezed out. The collapsing of this type of pastoral livelihoods (which again, requires additional research to confirm) may have important implications for practitioners and policymakers who seek to strengthen pastoralist resilience.

Figure 5: Livestock composition in Niger, 1961 – 2016 (FAO Data)

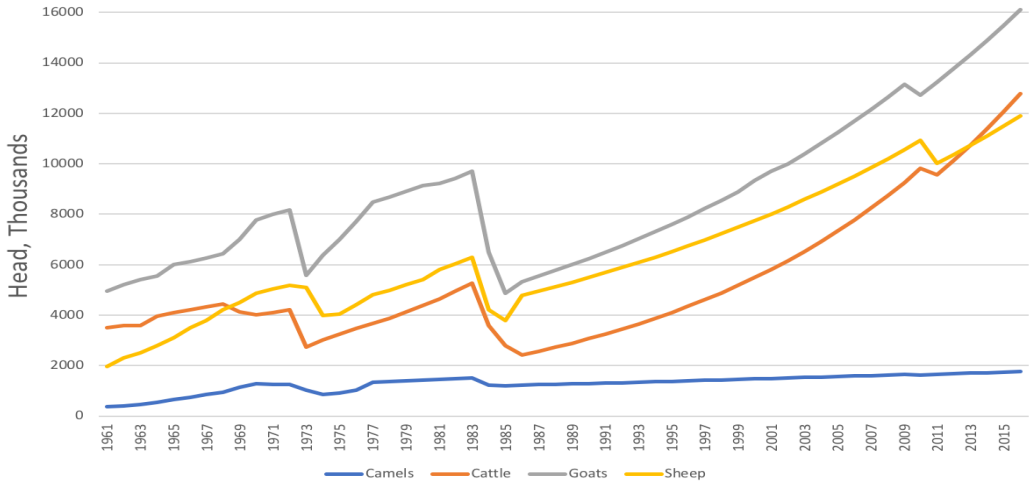


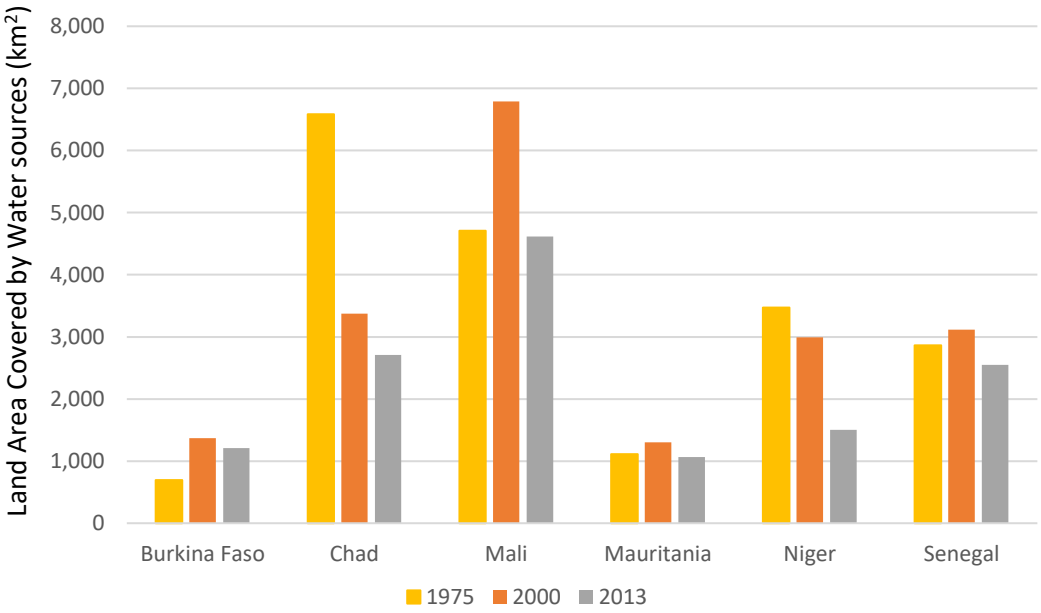
Figure 5 above shows the number of goats, sheep, cattle and camels over the period 161 10 2015. From Figure 5 we can draw at least one important conclusion; the Sahelian droughts of the 1970s and 1980s resulted in large scale livestock losses, evidencing that whilst pastoralism as a livelihood was born out of scarce and unpredictable resource availability, a threshold of pastoralist resilience exists, at which point its inherent flexibility is no longer able to absorb shocks.

c. Reduction in the Availability of Water Sources:

An important change in natural resource availability relates to the availability of water sources. Whilst there are important distinctions between countries, some, notably Niger and Chad, have seen drastic reductions in the area of land covered by water sources (see Figure 6 below). In Niger, the land area covered by water sources more than halved from 3,472km2 in 1975 to only 1,504km2 in 2013. Furthermore, the reduction in the land area covered by water sources was faster from 2000 to 2013, than from 1975 to 2000, reflecting a speeding up of the drying up of water sources. Chad returns equally worrying data; the land area covered by water sources in reduced from 6584km2 in 1975 to 2708km in 2013. However, in contrast to Niger, the reduction in the land area covered by water sources appears to have been more pronounced between 1975 and 2000, than between 2000 and 2013.

Figure 6: Change in Land Covered by Water Sources 1975, 2000 and 2013-2017 (USAID/ USGS)

	1975	2000	2013
	Area (km2)	Area (km2)	Area (km2)
Burkina Faso	692	1,368	1,212
Chad	6,584	3,376	2,708
Mali	4,708	6,792	4,616
Mauritania	1,112	1,304	1,064
Niger	3,472	2,992	1,504
Senegal	2,864	3,116	2,548



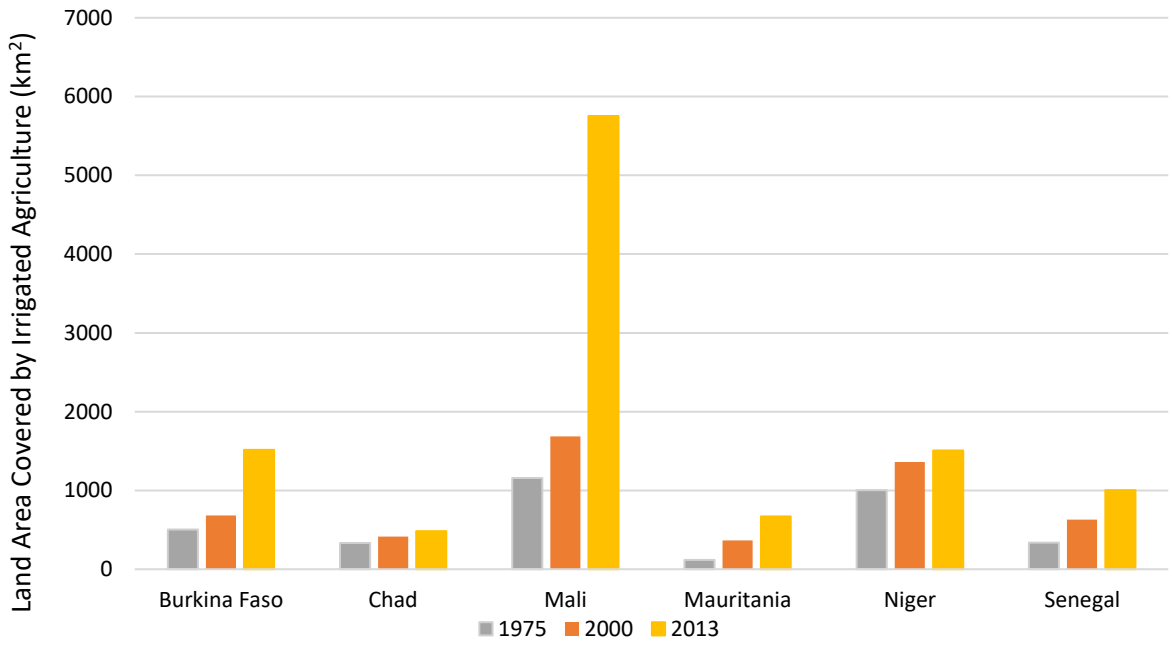
Whilst changes in the surface area covered by water so in the other Sahelian countries is less perhaps less pronounced, they all returned a reduction in the land area covered by water sources over the period 2000 and 2013.

d. Expansion of Dry-Season Farming

Finally, seasonal dimensions of livelihood portfolios, and associated natural resource dimensions are subject to significant change in a number of the Sahelian countries. More specifically, dry-season farming has expanded the crop calendar, and intensified agricultural activity along river banks and around water sources. Dry-season farming involves pumping water from rivers and dugouts to irrigate high-value vegetables. This has a number of upsides in terms of resilience; not only does dry-season farming diversify income (buffering against the risk of rainy-season crop failures), it also results in a reduction of livelihood portfolios to increasingly unpredictable and erratic rainfall (in terms of rain-fed farming). As a result, many Sahelian governments have orientated climate policy frameworks around increasing farmers' engagement of dry-season farming. Figure 7 below shows the expansion of land area employed for irrigated agriculture, which refers overwhelmingly to smallholder dry-season farming activities.

FIGURE 7: Change in Land Covered by Irrigates Agriculture 1975, 2000 and 2013 (USAID/ USGS)

	1975	2000	2013
	Area (km2)	Area (km2)	Area (km2)
Burkina Faso	504	684	1516
Chad	332	412	484
Mali	1156	1684	5752
Mauritania	116	364	672
Niger	1004	1360	1508
Senegal	336	628	1004



e. Availability of, versus. Access to, Natural Resources:

An important distinction is between the availability of natural resources, on the one hand, and access to natural resources, on the other. Whilst there have been profound expansions of land area used for crop farming, as well as an equally profound increase in the number of livestock, meta land use cover data suggests that there is not (yet) an absolute shortage of natural resources required underpinning both farmer and pastoral livelihoods. More specifically, land use cover by a percentage of total land area, shows that only in Burkina Faso, is land used for crop farming above 30 percent (38% - see Figure 8 below). The next highest is Niger, with only 24% of the total land area employed for crop farming. Furthermore, the percentage of the total land area which, in principle, is suitable for pastoral livelihoods (Sahelian Short Grass Savanna, Savanna and, to a lesser extent, Steppe), continues to be significant (see Figure 8 below).

FIGURE 8: LAND USE COVER BY PERCENTAGE OF TOTAL AREAS (USAID/ USGS)

	Land Use Cover by Percentage of Total Land Area			
	Agriculture	Sahelian short Grass Savanna	Savanna	Steppe
Burkina Faso	38.98%	5.03%	31.19%	16.34%
Chad	11.72%	27.89%	28.06%	22.19%
Mali	12.10%	15.06%	18.51%	29.35%
Mauritania	5.75%	7.15%	0.00%	52.03%
Niger	24.46%	22.77%	6.46%	44.50%
Senegal	20.80%	2.64%	34.98%	5.42%

Figure 8 above, although by no means conclusive in terms of evidence, and much will depend on the geographic distribution of water sources, points, to the fact that some of the issues driving natural resource degradation and conflicts over competing claims to natural resources, stem from barriers to access, rather than absolute availability. This suggests that the key to effective and just natural resources management are located in the domain of institutions and entitlements, and not only in the domain of farmer and pastoralists capacities and their access to knowledge and information about sustainable natural resource management. This has implications for the governments and development practitioners seeking to improve natural resource management.

3. IMPLICATIONS FOR POLICY AND PRACTICE:

- Natural resources in the Sahel are rarely managed by one group; farmers, semi-nomadic and nomadic pastoralists, fisherfolk, landless youth and domestic water users, to name a few, negotiate access to, and the management of, natural resources in the Sahel. Strengthening the interactions of distribution of, and access to, natural resources, between different user groups, is a necessary condition for Sustainable Natural Resource Management.
- Many of the Sahelian countries have seen significant expansions in land used for crop production over the period 2000 - 2013. Whilst a part of this is driven by population growth, in Burkina Faso, Mali and Mauritania the expansion of land use for crop farming has significantly out-paced population growth. The transformation of bushland to cropland has significant implications of NRM.
- Livestock increases have been especially significant across the Sahel. Between 2000 and 2017, the number of livestock in Burkina Faso, Chad and Mali, the average annual growth in the number of livestock has been twice that of average annual population growth.
- The availability of water sources has decreased in all the Sahelian countries between 2000 and 2013. In Chad and Niger the reduction has been especially stark, with the landed area covered by water sources more than halving between 1975 and 2013.
- Due to the multi-user and contested nature of Sahelian natural resources, Efforts improve natural resource management, must focus on strengthening governance institutions which manage natural resources.
- A reduction in Water Sources, along with the expansion of cropland (from savannah bushland/pasture) and an increase in the number of livestock, are the most significant natural resource changes occurring in the Sahel (there are important differences between the Sahelian countries in this regard).