MAINSTREAMING BIODIVERSITY AND DEVELOPMENT

UPDATE TO CONGO BASIN FOREST PARTNERSHIP

Submitted by
African Wildlife Foundation

November, 2018

INTRODUCTION

Biodiversity and development are mutually dependent and need an integrated approach. Biodiversity is essential for human wellbeing and economic development and therefore has an enormous value for all societies. Especially in Africa and the Congo Basin, biodiversity and ecosystem services are critical environmental assets that provide inputs and enabling environment for production which development and economic growth depend on. Africa's biodiversity provides natural resources that a majority of Africa's population depends on for shelter, cooking fuel, medicines, and other basic needs, especially in rural areas. As undiscovered biodiversity banks, Africa's wild lands represent an insurance policy and risk mitigation for future needs and discoveries including cures for diseases like cancer and AIDS.

However, biodiversity is on the decline. The 2018 Africa Regional Assessment of Biodiversity and Ecosystem Services of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)[1] reports that the decline and loss of biodiversity is reducing nature's contributions to people in Africa, affecting daily lives and hampering the sustainable, social and economic development targeted by African countries. Already, the Organization of Economic Cooperation and Development (OECD) Environmental Outlook to 2050[2] projects that biodiversity will continue to decline by a further 10% if the current conservation efforts are not doubled. Amongst several drivers of biodiversity loss, human development choices are the key driver of loss.

Still, in comparison with most other parts of the world, the ecological values of Africa's Congo Basin remain relatively intact. The Congo Basin contains the second largest tropical forest after the Amazon extending over six countries: Cameroon, Congo, Gabon, Equatorial Guinea, Central Africa Republic (CAR) and Democratic Republic of Congo (DRC). Its biodiversity and ecosystems constitute the second largest area of contiguous tropical forest in the world. The region harbours the most diverse assemblage of plants and animals in Africa including over 400 mammal species, more than 1,000 bird species, and likely over 10,000 plant species including some 3,000 endemics. Coupled with its global importance as a carbon sink and regulator of greenhouse gasses and of regional and local weather patterns, it provides a critically important resource base underpinning the livelihoods and well-being of tens of millions of people both in Africa and beyond.

Several international instruments have long emphasized the need for integrating or mainstreaming biodiversity into development strategies and agendas. The Strategic Plan for Biodiversity 2011-2020[3], including Aichi Biodiversity Targets and the 2030 Agenda for Sustainable Development represent a coherent way of addressing biodiversity and development issues in an integrated manner. The 2030 Agenda for Sustainable Development, sets out an aspiring framework of universal goals and targets to address a range of global societal challenges. Amongst the seventeen Sustainable Development Goals (SDGs) adopted, biodiversity is at centre of many economic activities

Box 1.
What is Biodiversity Mainstreaming?

The African Leadership Group (ALG)[1] of the Mainstreaming Biodiversity and Development Initiative, facilitated by International Institute for Environment and Development (IIED) and United Nations Environment Programme – World Conservation Monitoring Centre (UNEP-WCMC), has developed a definition of biodiversity - development mainstreaming which emphasizes "***the integration of biodiversity concerns into defined sectors and development goals, through a variety of approaches and mechanisms, so as to achieve sustainable biodiversity and development outcomes***". The definition considers reciprocal mainstreaming which emphasizes dual biodiversity and development outcomes through multiple routes or approaches that can be targeted and used.

[1] IPBES (2018); IPBES Regional Assessment for Africa, Bonn, Germany

[2] OECD (2012); OECD Environmental Outlook to 2050: The Consequences of inaction. OECD Publishing; Paris

[3] Convention on Biological Diversity (2010) Global Strategy for Biodiversity and Aichi Targets, CBD, Montreal

that will lead to sustainable development, including those related to agriculture, forestry, fisheries and tourism. Biodiversity mainstreaming has also taken a centre stage in the thirteenth and fourteenth Conference of Parties to the Convention on Biological Diversity (CBD) by providing guidance to the parties the importance for mainstreaming in development sectors. African Wildlife Foundation and its partners have been working with African Governments to ensure that biodiversity is put at the centre of development in order to deliver on the SGDs and CBD guidance on mainstreaming.

Mainstreaming in the Congo Basin Forest Partnership

The Congo Basin Forest Partnership (CBFP) convened a session at the 2017 Meeting of Partners in Douala, Cameroon on biodiversity mainstreaming titled *How to ensure that biodiversity is adequately represented in economic planning systems employed by the Congo Basin Countries.* The session convened Congo Basin government representatives, practitioners from the biodiversity conservation and development communities, international scientific communities and other experts to discuss opportunities and challenges to mainstream biodiversity into development policies and planning in Congo Basin countries. The session recognised that as a partnership invested in the sustainable development of the Congo Basin, CBFP partners are well placed to articulate the value of biodiversity and ecosystem services in meaningful ways to economic decision makers, to map out barriers to getting biodiversity and ecosystem services embedded into economic decisions, and to guide economic actors in processes to ensure that biodiversity risks and opportunities are taken into account and managed more effectively.

Faced with growing human populations, the countries of the Congo Basin are developing strategies for economic diversification, and poverty reduction to sustain future development and growing population. Policies are developed based on the development of key sectors, such as infrastructure, agriculture, forestry or mining. Regional economic and land use planning, however, is proceeding with little awareness or concern of development implications for biodiversity or ecosystem service values. Planning is often driven by formal extractive sectors involved in the direct consumption of raw materials while informal (e.g., non-timber forest products) or indirect values (e.g., water quality, climate sequestration) are scarcely understood much less considered.

Conservation practitioners have invested significant effort in prioritizing high value biodiversity and ecosystem service areas in the region and characterizing threats to them posed by emergent economic development schemes. Conservationists also recognize that the region is being reshaped, not by a single driver, but by a suite of drivers including population growth, changing resource utilization patterns, economic development and climate change. Planning and policy development in the region, however, commonly does not address these change drives holistically but rather in a piecemeal fashion. Consequently, though Congo Basin forest ecosystems have a demonstrable economic and livelihood value[4], especially for the poorest, their importance have been persistently marginalized by the very economic policies that are tied to strengthening livelihoods, reducing poverty and achieving sustainable socio-economic development.

There is, however, an appetite among political decision makers and leaders in the regional leaders (ECCAS and Ministers) to understand the economic values of biodiversity and ecosystem services including their contributions to the national economies and development plans. And thus there is a renewed call for information. Government Minister's in charge of biodiversity are under pressure to demonstrate the income generation potential of biodiversity, and the economic risk to other national economic sectors of not accounting for and managing biodiversity and ecosystems.

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[4] Hugues, N. J. (2011). The economic value of Congo Basin protected areas goods and services. *Journal of sustainable development*, *4*(1), 130.

Yet there are barriers to making this happen. Siloed institutions and decision-making structures mean that development decisions are often taken without sufficient or timely input of important information on social and ecological impact. Competing demands for resources among alternative development scenarios need to be negotiated, but there may not be time, resources, trust or capacity for those negotiations. There is lock-in to technologies and modes of production that externalise environmental and social impacts, and thus are not fully accountable for the costs to society. Though biodiversity could have a link with the economic development, there has not been enough progress in mainstreaming biodiversity into economic development processes, plans or implementation.

CBFP Members attending the 2017 MOP concluded that mainstreaming biodiversity into economic planning in the Congo Basin presents an opportunity to transform the relationship between development and conservation into a positive cycle whereby the protection and restoration of natural systems is created by and results in wealth creation and sustainable livelihoods for the growing populations of the Basin. The Heads of States of the ECCAS have committed to promote the establishment of a Green Economy model for the region and have established a Blue Fund, both of which support the Plan de Convergence of COMIFAC. These ambitions will be achieved through actions undertaken at national, sub-national, landscape and site levels and within institutions of every shape and size. The CBFP brings together expertise and resources that can be mobilised to operationalise the commitments of the Heads of State. Participants in the Stream 2 session on *Mainstreaming Biodiversity into Economic Planning* found ample scope for channelling Partner actions to align with ambitions to operationalise the Green Economy in the region. Focusing on the 12-month period going forward from the October 2017 CBFP meeting, Partners recommended the following priority actions:

- **Build the Business Case for a Green Economy**: Building out from available information and studies, including indigenous and traditional knowledge and values for biodiversity, to provide to decision makers in EECAS and the Member countries as a concerted effort to build cross sectoral support for biodiversity. All active partners in the Congo Basin can support this action by compiling information from landscapes and other sources. OFAC has a key role to play in creating a standardised framework for Partners to collate socio-economic data related to biodiversity values and by consolidating and analysing data. Initial 'Killer Facts' publication supported by data set and analysis presented at CBFP MOP 2018.
- **Revitalise the Partnership:** CBFP Facilitation will review the TORs for the Meeting of the Parties of the Partnership to open scope for engaging the range of sectoral actors implicated in ensuring the forest and biodiversity of the Congo Basin survive into the future. By CBFP MOP 2018.
- **Convene Ministries of Planning and Economy:** Capitalising on ECCAS commitments and convening capacity, engage economic and planning Ministries in country and through regional processes to build a network of Champions for biodiversity mainstreaming in the Congo Basin. 2018 ECCAS technical session adjoining formal ministerial meeting.
- **Engage and Convene Private Sector:** Partners will make an active effort to engage the private sector actors in landscapes and operations, building internal understanding of the drivers behind resource use and business management decisions and operations, and expanding the network of private sector actors engaged in the CBFP. Continuing with report back on progress at the CBFP MOP 2018, including new Partners invited to the CBFP MOP 2018.
- **Undertake land use planning and integrated land management** as a processes by which managers and stakeholders can plan, implement and monitor actions to support the Sustainable Development Goals at a workable scale, minimize tradeoffs between goals and maximise synergies between them[5].

[5] Meijer, J, S. Shames, S.J.Scherr (2018). Spatial Modelling to support integrated landscape management in the Kilombero Valley landscape in Tanzania.

- Develop Scenarios to understand relationships between biodiversity and development decisions, explore how changes occur and the possible implications for people and nature, and create space for dialogue about shared vision and pathways for inclusive green growth options.

Approaches to Biodiversity Mainstreaming

Biodiversity and development mainstreaming can be approached at different levels either at policy level or implementation level. These approaches result in a variety of outcomes, which link social, economic and biodiversity spheres. Policy level interventions range from governance outcomes which emphasize on improved involvement of relevant stakeholders to institutional capacity outcomes which stress on strengthening institutional capacity to understand biodiversity and development linkages and processes.

Through the analysis of the major development corridors in Africa (box 2), AWF and IUCN, assessed how the major development corridors in development or foreseen for the continent intersect with the Key Habitat Areas (includes Key Biodiversity Areas[6] and protected areas) in Africa (Figures in Annex 1). By providing evidence for understanding where these corridors are most likely to degrade high value ecological areas as well where they might offer benefits in terms of agricultural potential, this analysis offers relevant information for integration of conservation and development to achieve desirable outcomes. Identifying the risks to ecosystems and biodiversity posed by the corridors presents opportunities to mitigate those risks by better considering biodiversity values and the complex suite of land use change drivers in planning processes. Convening a diverse group of stakeholders representing government, land use sectors, conservationists, communities and corridor planners early in design stages to formulate objectives for a sustainable vision for a landscape would be a major step. ScenariAt implementation level, mainstreaming outcomes may range from improved domestic resource mobilisation for poverty-biodiversity investments or improved productivity and sustainability of use of biodiversity assets on which the poor depend on. Inclusive Green Growth (IGG) is one example of mainstreaming in practice where human well-being, social equity and shared economic opportunities are enhanced while protecting and restoring ecological systems.

For mainstreaming however to be successful, it requires that political will, investment and expertise come together through interest-driven partnerships. Finance also plays a role in incentivizing (even requiring) these conditions to emerge and be sustained.

Box 2: Africa's Development Corridors

Development Corridors are a comprehensive system that touches every country in Africa, potentially linking them together through stronger infrastructure and better policies connecting rural and urban communities to create functioning regional market systems and build opportunities across economic sectors and sovereign states. Under this overarching vision, the Program for Infrastructure Development in Africa (PIDA) aims to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services.

PIDA and related investments are intended to increase agricultural production, natural resource exports, and economic integration, much as similar infrastructure initiatives in Asia and Latin America set out to do in previous decades. This is part of a global trend towards unprecedented growth in consumption, demography and technology which will roughly quadruple the global economy in the first half of the twenty-first century.

ACTION SINCE MOP 2017

Current negotiations at the Convention on Biological Diversity Conference of Parties are focusing on this very issue and there is much progress in those negotiations that relate back to the action plan agreed to in Douala. Attached are information papers that have been prepared on the topic going into the CBD meetings, and I am getting daily reports from the team on the ground of progress on this issue. In fact, the High level ministerial segment for CBD

[6] BirdLife International (2018). Developed by the KBA Partnership at www.keybiodiversityareas.org.

focused on mainstreaming and adopted a declaration on the same. In addition, mainstreaming was a key agenda item for the conference of parties where the African group stressed its importance in Africa to enable the region deliver on the three objectives to the convention.

Furthermore, Point 5 of the African Ministerial Declaration which was adopted at the African ministerial summit held in the sidelines of COP 14 invites the United Nations Environment Programme, the United Nations Development Programme, the Food and Agriculture Organization of the United Nations, the United Nations Economic Commission for Africa, other United Nations agencies, development partners and the international community to provide support to African countries to implement the Pan-African Action Agenda on Ecosystem Restoration for Increased Resilience in order to: (a) Combat land degradation and enhance ecosystem restoration in the region; (b) Facilitate strengthening of biodiversity mainstreaming initiatives to address the sectoral drivers of land degradation and biodiversity loss; (c) Work towards implementation of sustainable food systems for well-being of people and nature.

Interventions by African delegations at the COP further pushed for action on mainstreaming biodiversity. The African Group highlighted the loss of valuable biological resources from the continent, and the digitalization and use of genetic resources without due recognition and sharing of benefits. The recently concluded Africa Biodiversity Summit and the Pan-African Action Agenda on Ecosystem Restoration for Increased Resilience demonstrated Africa's position on mainstreaming which has also identified it as an important element in the post 2020 framework. The high level segment also discussed opportunities in making developments in economic sectors compatible with biodiversity objectives; the role of legislation, good governance, research, and technological advances, along with community and stakeholder involvement; the need to reflect steps for mainstreaming biodiversity into economic sectors in the post-2020 framework; and the need for national-level policy coherence. The Sharm el Sheikh Declaration, also indicates governments commitments to working across all sectors to mainstream biodiversity through, among other actions: integrating biodiversity values in legislative and policy frameworks, and development and finance plans; phasing out or reforming subsidies and other harmful incentives; strengthening ecosystem-based approaches to climate change mitigation and adaptation; promoting sustainable consumption and production and a circular economy; and facilitating access to and transfer of relevant technologies. They further invite the UN General Assembly to convene a summit on biodiversity before CBD COP 15 in 2020, to highlight the urgency of action at the highest levels in support of a post-2020 global biodiversity framework.

ROLE OF THE CONGO BASIN FOREST PARTNERSHIP

The CBFP has a role to play in supporting Parties to the CBD in efforts to fulfil their commitments on mainstreaming biodiversity. Already from the 17th MOP held in Douala, Cameroon, a number of governments expressed interest in replicating the Africa Leadership Group process for mainstreaming biodiversity. These processes could be linked to other ongoing work, such as the Africa Biodiversity Conservation Group efforts to incorporate inclusive green growth scenarios development into integrated land use planning tools and approaches. The CBFP Partners together bring extensive experience in relevant fields of planning, partnerships, and negotiation that are relevant. Important steps to taking mainstreaming agendas forward in the Congo Basin, based on existing proposals that have been developed by AWF, UNEP-WCMC and IIED and based on the ALG approach to mainstreaming biodiversity are:

- Convening national stakeholder workshops
- Refining the development and biodiversity mapping and analysis based on up-to-date information and plans
- Designing a mainstreaming intervention based on rapid institutional/political economy analysis
- Deploying technical support for biodiversity integration
- Convening annual workshops to review progress and adapt actions as required

- Compile and disseminate lessons learned (ideally at CBD COP15 planned for Beijing in 2020).

CONCLUSIONS AND RECOMMENDATIONS

This vision for Africa is set out most forcefully by Africa's leaders in Agenda 2063[7] which sets out a roadmap for *A prosperous Africa based on inclusive growth and sustainable development.* The future of biodiversity in Africa therefore will largely depend on how Africans manage human population; urbanization process; consumption; economic investments; and the general resource use and disposal management as the Agenda 2063 will be implemented. Biodiversity mainstreaming will therefore be important to ensure that both conservation and development outcomes are met. For successful biodiversity mainstreaming, African countries may wish to consider the following;

- Champions from key ministries and agencies (e.g. Ministry of Finance, National Development Planning and sector ministries) who are able to make a strong economic case for biodiversity, linking biodiversity and poverty alleviation. These champions should also be able to ensure that biodiversity concerns are integrated into policies and plans of government ministries and private sector companies.
- Engagement of the right stakeholders is very critical. The engagement should also be timely, from planning, budgeting, implementation, monitoring and evaluation
- Data: It is important to ensure available data about ecosystems and biodiversity is readily accessible to decision makers, particularly ministries of finance and development and those developing the specific plans for different sectoral projects.
- Knowledge and expertise: Beyond data, interpretation of information requires expertise. Multi-disciplinary teams are needed to inform designs from a range of perspectives including gender, age, ethnic and tribal groups.
- Sustainable land use planning that combines many of the components listed above and explicitly values the role of biodiversity and natural resources. The Africa Biodiversity Collaborative Group, for example, has applied a common sustainable development planning framework to four landscapes involving multi-sectoral stakeholders in a participatory, data-driven, scenario-based process generating spatially explicit policy recommendations[8]. Several sites are in the Congo Basin.
- Enabling policy frameworks are needed to ensure incentives align with the vision set out in Agenda 2063, the Sustainable Development Goals and other continental strategies. This will ensure avoiding, reducing and reversing land degradation which is essential for reaching the majority of the Sustainable Development Goals
- Nature based solutions that link ecosystem services to development processes are one way of ensuring investments are going into the natural systems we depend on, and unnecessary damages are avoided.
- Support land use planning and integrated land and resource management.
- Above all, political commitment is essential to ensure the richness of Africa's biodiversity, and our global heritage, are sustained into the future and continue to provide for our children and our children's children.

[7] https://au.int/en/agenda2063

[8] African Biodiversity Collaborative Group (2018). www.abcg.org/action/document/show?document_id=873

Annex 1. Figures Analysing the Extent of Overlap between African Development Corridors and Key Habitat Areas

The map series presented in this Annex has been produced by David Williams, Director of Conservation Geography with the African Wildlife Foundation with funding and support from IUCN as part of the SUSTAIN project. Figure 1 Shows the extent of overlap between the planned corridors and key habitat areas as defined by protected areas (IUCN Categories I-VI) and key biodiversity areas. Intersections are identified at 0, 10, 25, and 50Km from corridor center. As per Laurance et al, 2015, intersects at 25km are deemed 'conservative'. The corridors are ranked by the number of intersections (at 25 km) per Km (defined by corridor length). All corridors with 10+km buffer intersect at least 1 KHA. At 25km from center, the corridors make a total of 783 KHA intersections; numerous KHAs are intersected more than once.

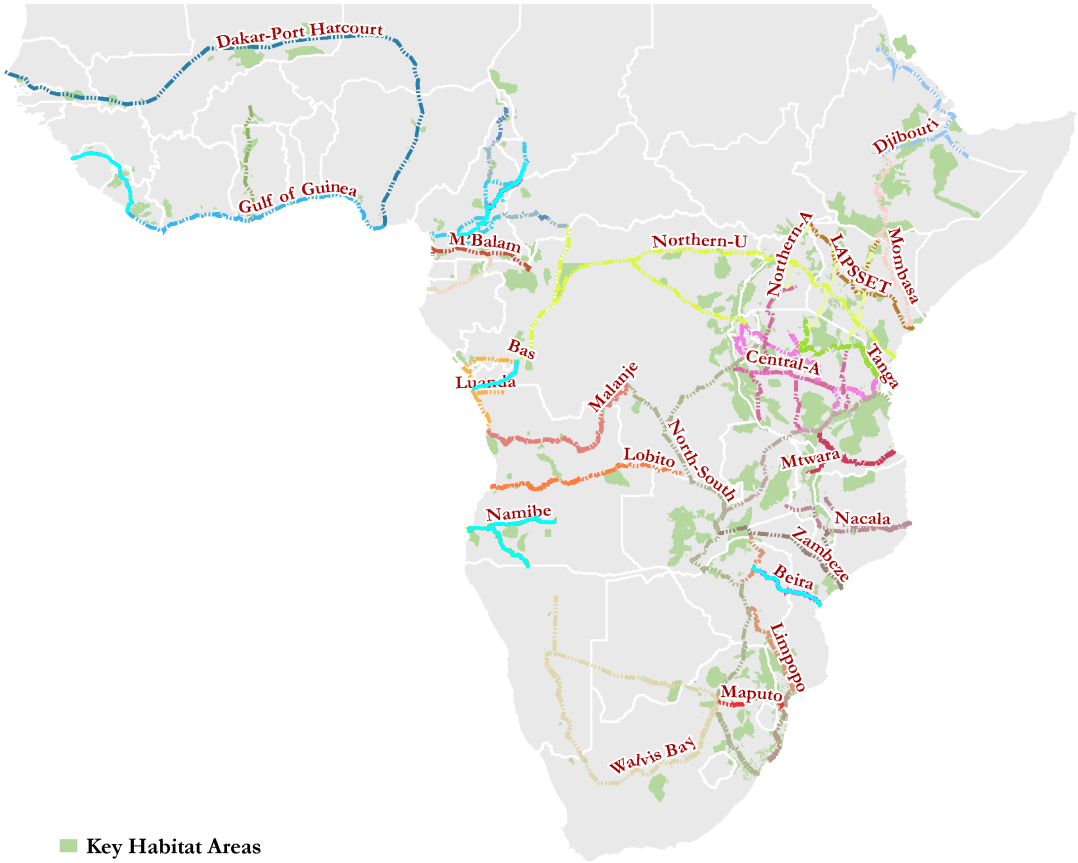


Figure 1. 33 major development corridors across continental Africa in various colours with Key Habitat Areas (combination of Key Biodiversity Areas and protected areas).

Rank	Corridor	Length Km	0km	10km	25km	50km	#/Km
1	Maputo	507	4	29	61	97	0.1203
2	Lubombo	606	10	41	65	122	0.1073
3	Tanga	1208	3	19	47	65	0.0389
4	North-South	4766	13	55	119	219	0.0250
5	Limpopo	1388	1	14	26	47	0.0187
6	Mtwara	1142	5	11	19	30	0.0166
7	Douala-N'djamena andDouala- Bangui (A)	1830	0	13	30	53	0.0164
8	Djibouti	1711	5	12	26	37	0.0152
9	Gulf of Guinea	2095	6	22	31	40	0.0148
10	Zambeze	1388	2	7	19	28	0.0137
11	Northern-A	2510	10	18	30	51	0.0120
12	Central-A	3552	18	20	41	78	0.0115
13	Uhuru/Tazara	1741	10	8	20	31	0.0115
14	Sekondi/Ouagadougou	899	2	7	10	19	0.0111
15	Mombasa	1631	6	12	18	26	0.0110
16	Conakry-Buchanan	741	2	6	8	13	0.0108
17	LAPSSET	1689	5	13	18	24	0.0107
18	Douala-N'djamena andDouala- Bangui (F)	381	0	1	4	7	0.0105
19	Northern-U	5110	14	26	50	73	0.0098
20	Beira	623	0	1	6	8	0.0096
21	Central-F	3134	12	16	29	51	0.0093
22	Dakar-Port Harcourt	4344	10	24	38	46	0.0087
23	Nacala	1543	3	9	12	20	0.0078
24	Mablam Railway	792	2	4	6	8	0.0076
25	Walvis Bay	3801	3	11	21	37	0.0055
26	Lobito	1717	2	7	8	10	0.0047
27	Douala-N'djamena andDouala- Bangui (U)	874	2	3	4	6	0.0046
28	Cameroon-Chad	923	0	2	3	4	0.0033
29	Libreville-Lomie	618	1	2	2	4	0.0032
30	Malanje	1878	2	2	5	6	0.0027
31	Namibe	1163	1	3	3	5	0.0026
32	Luanda	1190	1	2	3	5	0.0025
33	Bas	471	0	0	1	1	0.0021

Rank	Corridor	KHA Area
1	Northern-U	38,742
2	Central-A	32,507
3	Central-F	21,482
4	Dakar-Port Harcourt	20,818
5	Mombasa	17,674
6	North-South	15,463
7	LAPSSET	15,215
8	Djibouti	11,938
9	Uhuru/Tazara	11,605
10	Lubombo	10,468
11	Northern-A	9,998
12	Tanga	8,616
13	Zambeze	8,062
14	Mablam Railway	7,866
15	Limpopo	7,769
16	Walvis Bay	5,720
17	Gulf of Guinea	5,682
18	Mtwara	5,570
19	Nacala	5,240
20	Sekondi/Ouagadougou	5,206
21	Malanje	4,043
22	Maputo	3,957
23	Lobito	3,706
24	Libreville-Lomie	2,680
25	Conakry-Buchanan	2,110
26	Douala-NΓÇÖdjamena-U	2,043
27	Namibe	2,017
28	Luanda	1,721
29	Cameroon-Chad	1,058
30	Douala-NΓÇÖdjamena-F	1,019
31	Douala-NΓÇÖdjamena-A	968
32	Beira	571
33	Bas	67

Ranking by area of corridor-KHA intersections at 25 km from corridor center. Total KHA area within 25 km of a corridor is 291,602 km^2 or 7.8% of African continental KHA area. Corridor length is also predictive of KHA intersection by area ($r=0.30$, $P<.0006$).

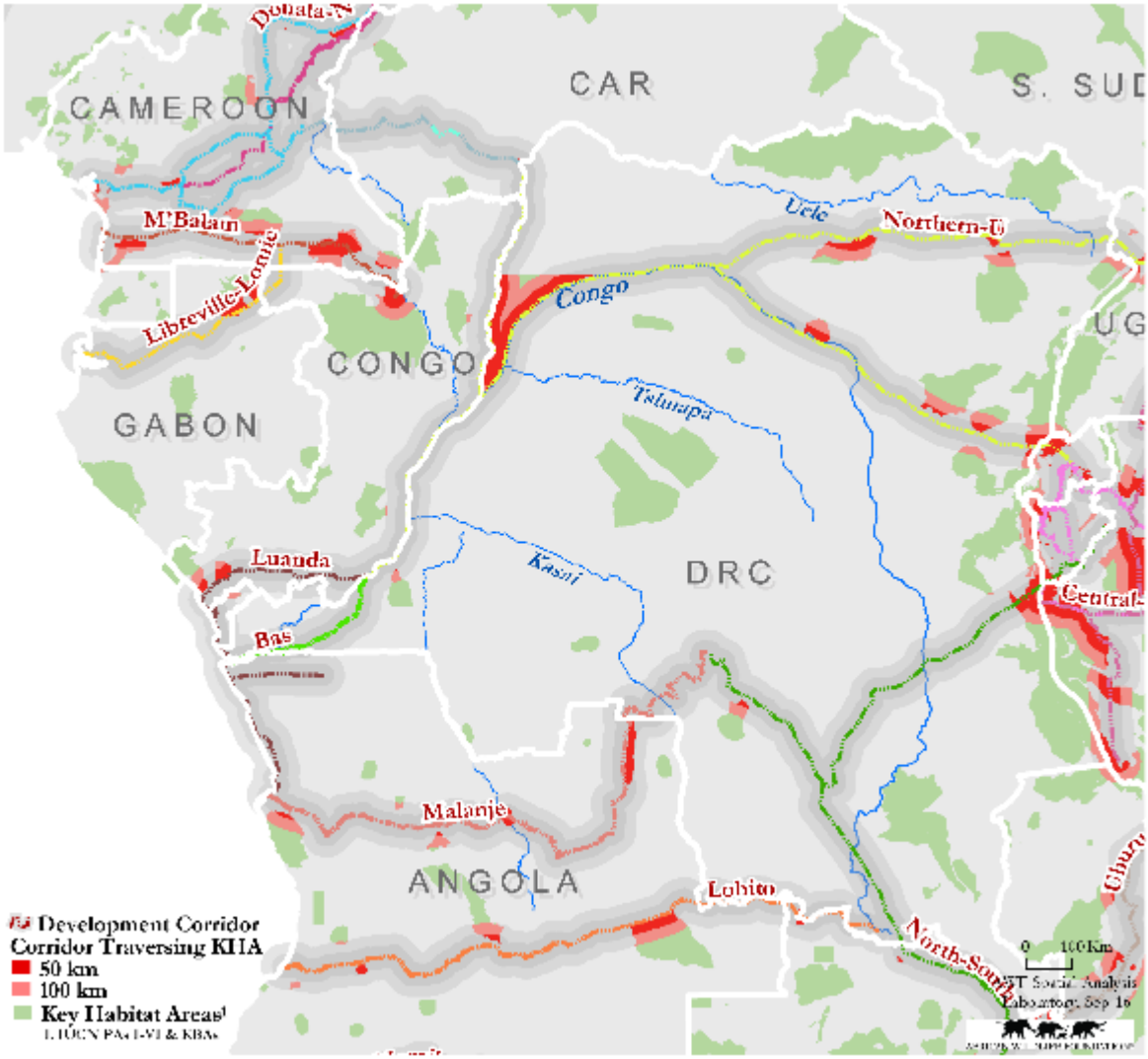


Figure 1. Intersection of Development Corridors & KHAs: Central Africa

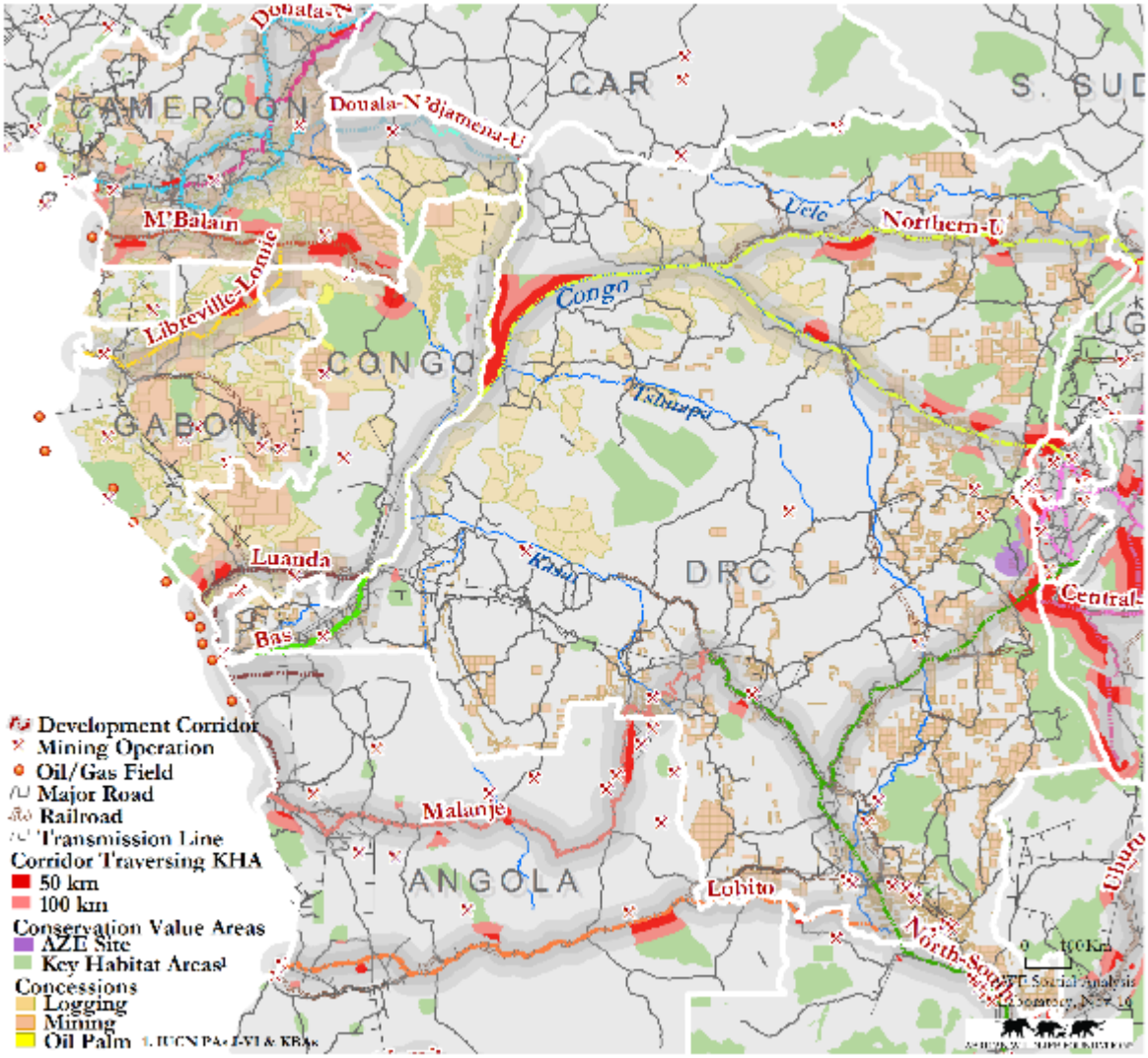


Figure 2. Intersection of Development Corridors & KHAs: Central Africa

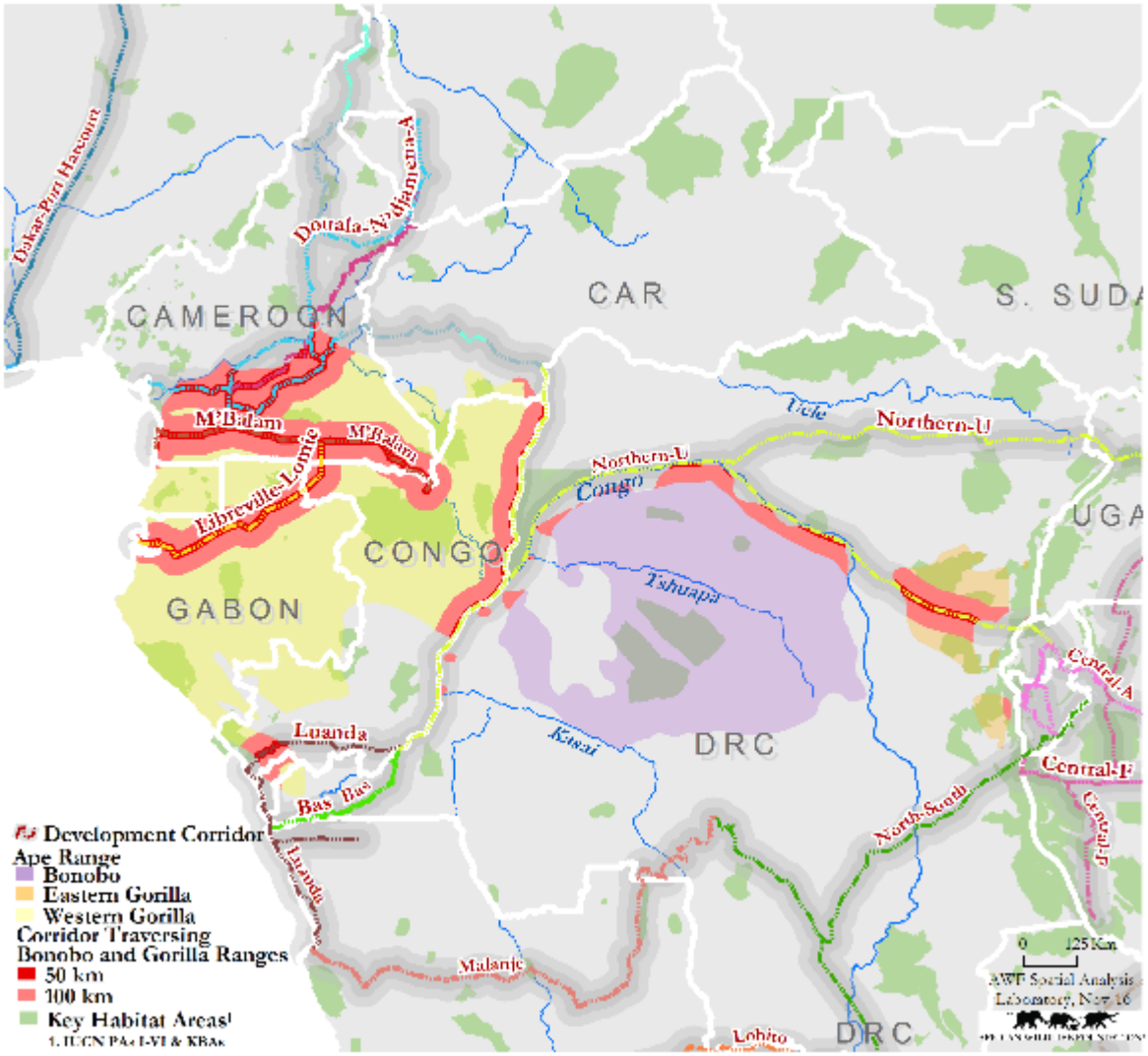


Figure 3 Intersection of Development Corridors & Select African Ape Range

Investigating within corridor areas where human influence is likely to be high and adjacent to habitat areas further analysis taking into account 10km buffer zones around the KHAs and assuming more corridors have impact with proximity, the African Human Influence Index was used to assess the current human influence on KHAs and 10km buffers within a 50 km band around corridors.

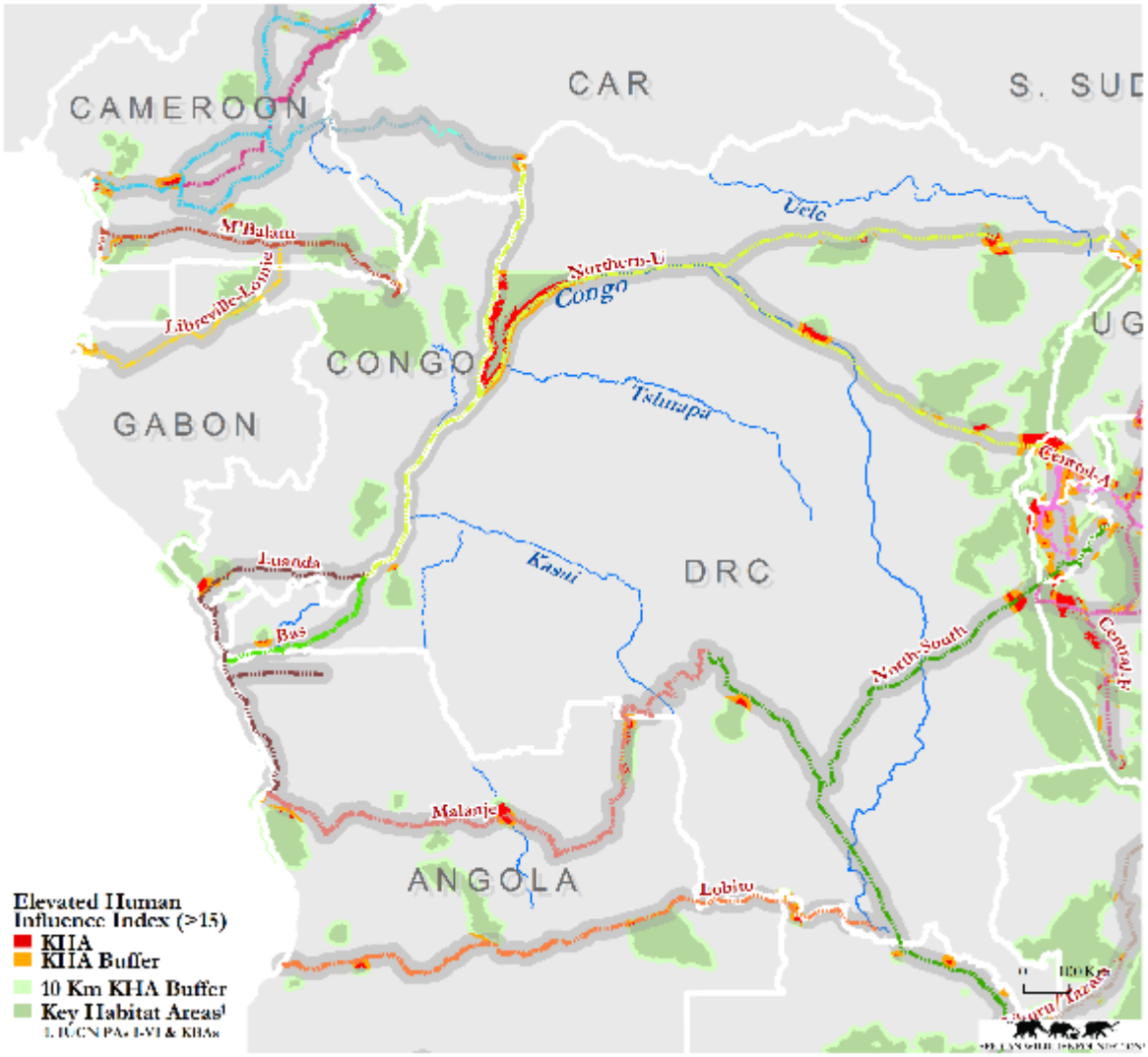


Figure 4. Current Human Influence Index Influence on KHAs: Central Africa

Rank	Corridor	KHA	10km Buffer	Affected Area
1	Central-A	19,232	24,246	43,478
2	North-South	16,569	24,299	40,868
3	Northern-A	8,871	25,668	34,539
4	Mombasa	11,157	7,933	19,090
5	Dakar-Port Harcourt	4,574	14,131	18,704
6	Lubombo	5,804	10,238	16,042
7	Northern-U	4,869	11,059	15,928
8	Tanga	4,427	10,152	14,579
9	Gulf of Guinea	2,741	11,456	14,196
10	Djibouti	4,416	9,064	13,480
11	Limpopo	3,793	9,428	13,221
12	Central-F	3,456	8,297	11,753
13	LAPSSET	3,322	7,516	10,838
14	Maputo	2,415	6,901	9,316
15	Nacala	2,198	6,535	8,732
16	Zambeze	2,354	5,391	7,745
17	Mtwara	2,299	5,299	7,597
18	Uhuru/Tazara	4,855	2,479	7,333
19	Sekondi/Ouagadougou	453	4,463	4,916
20	Walvis Bay	1,191	3,471	4,662
21	Malanje	1,685	2,437	4,123
22	Lobito	556	2,689	3,245
23	Conakry-Buchanan	330	2,656	2,986
24	Beira	425	2,537	2,961
25	Douala-N'djamena/Douala- Bangui (A)	461	2,382	2,843
26	Douala-N'djamena/Douala- Bangui (U)	569	1,808	2,377
27	Douala-N'djamena/Douala- Bangui (F)	640	1,584	2,224
28	Namibe	736	1,474	2,210
29	Cameroon-Chad	431	1,598	2,028
30	Luanda	572	1,189	1,761
31	Mablam Railway	125	984	1,109
32	Libreville-Lomie	4	508	512
33	Bas	60	445	505

This table ranks all African corridors by area of KHA & 10km periphery within 25Km corridor under moderate to high using human influence index values (>15%). Corridor length is also found to be predictive of cropland expansion (r=0.26, P<.0001).

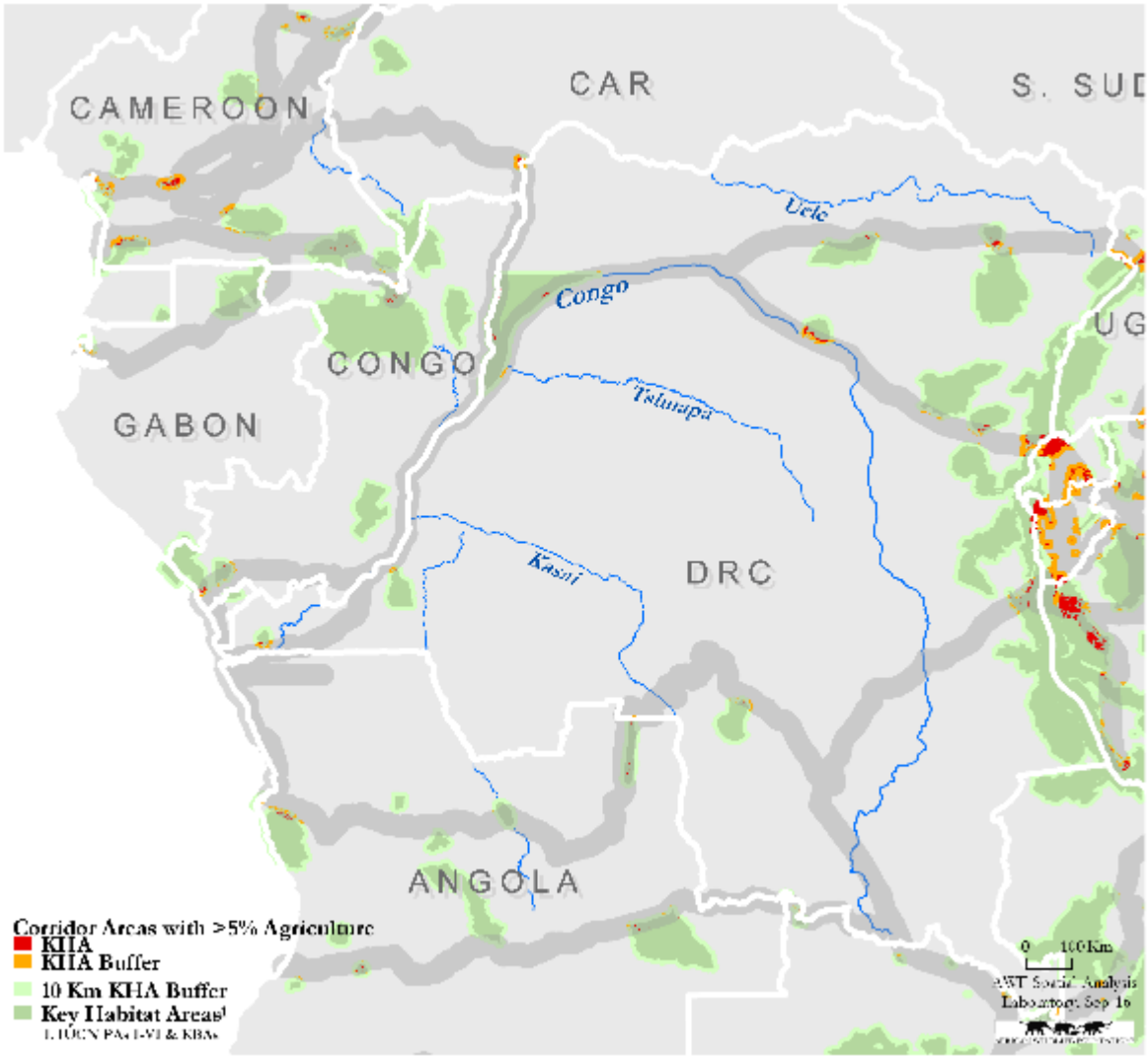
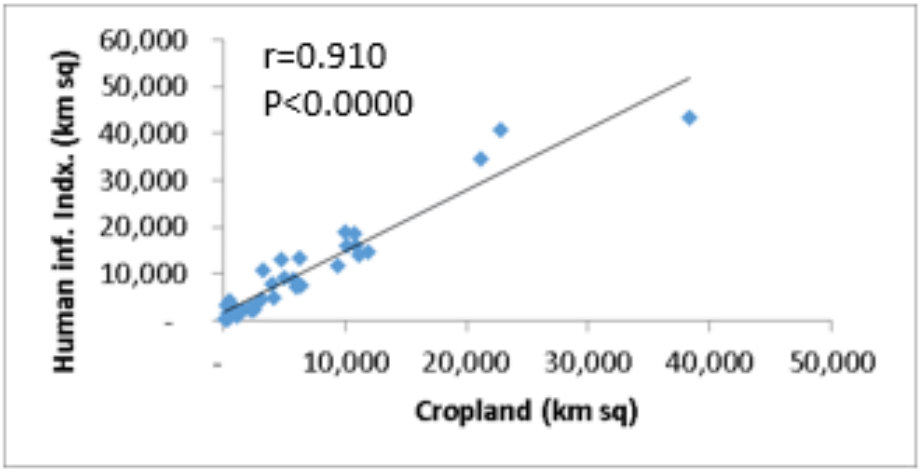


Figure 5. Current corridor cropland influence on KHAs: Central Africa

Ranked by area of KHA & 10km periphery within 25Km corridor under cropland (>5%). Cropland influence highly correlated with human influence index results. Corridor length is also predictive of cropland influence (r=0.45, P<.00012).



Current Corridor Cropland Influence on KHAs

Rank	Corridor	KHA	10km Buffer	Affected Area
1	Central-A	17235	21,132	38,367
2	North-South	7338	15,506	22,843
3	Northern-A	5014	16,119	21,132
4	Tanga	2683	9,189	11,871
5	Gulf of Guinea	1946	9,218	11,164
6	Northern-U	1998	8,938	10,935
7	Dakar-Port Harcourt	2084	8,756	10,841
8	Lubombo	3094	7,023	10,116
9	Mombasa	4373	5,624	9,996
10	Central-F	2078	7,311	9,389
11	Mtwara	1739	4,631	6,370
12	Djibouti	1677	4,583	6,260
13	Uhuru/Tazara	4263	1,741	6,004
14	Nacala	1057	4,705	5,762
15	Maputo	1038	3,961	4,998
16	Limpopo	1220	3,540	4,760
17	Sekondi/Ouagadougou	366	3,755	4,121
18	Zambeze	1266	2,732	3,998
19	LAPSSET	612	2,645	3,256
20	Walvis Bay	916	2,225	3,140
21	Conakry-Buchanan	257	2,297	2,553
22	Douala-N'djamena andDouala- Bangui (F	996	1,459	2,455
23	Douala-N'djamena andDouala- Bangui (A	260	2,007	2,266
24	Namibe	816	1,427	2,243
25	Douala-N'djamena andDouala- Bangui (L	335	1,361	1,696
26	Mablam Railway	292	861	1,152
27	Cameroon-Chad	268	877	1,144
28	Beira	71	648	719
29	Malanje	138	336	474
30	Luanda	126	279	405
31	Bas	21	307	328
32	Lobito	78	176	253
33	Libreville-Lomie	0	111	111

To classify the likelihood of agricultural expansion, AWF GIS assembled an array of model inputs, we used Maxent, a predictive modelling software based on the maximum entropy principle. Maxent has been used effectively in a wide range of spatial modeling applications including agriculture. Maxent generate models estimating probability of occurrence based reference observations (e.g., hunting camps as above). We 1875 observations of agriculture across the analysis area generated by AWF and GeoWiki interpretations of hi resolution satellite imagery. and 25 environmental covariates (e.g., precipitation, distance to road, climate, soils, topography). The 'x,y' represents the process of sampling common coordinates the dependent and each independent variable to generate statistics driving the models.

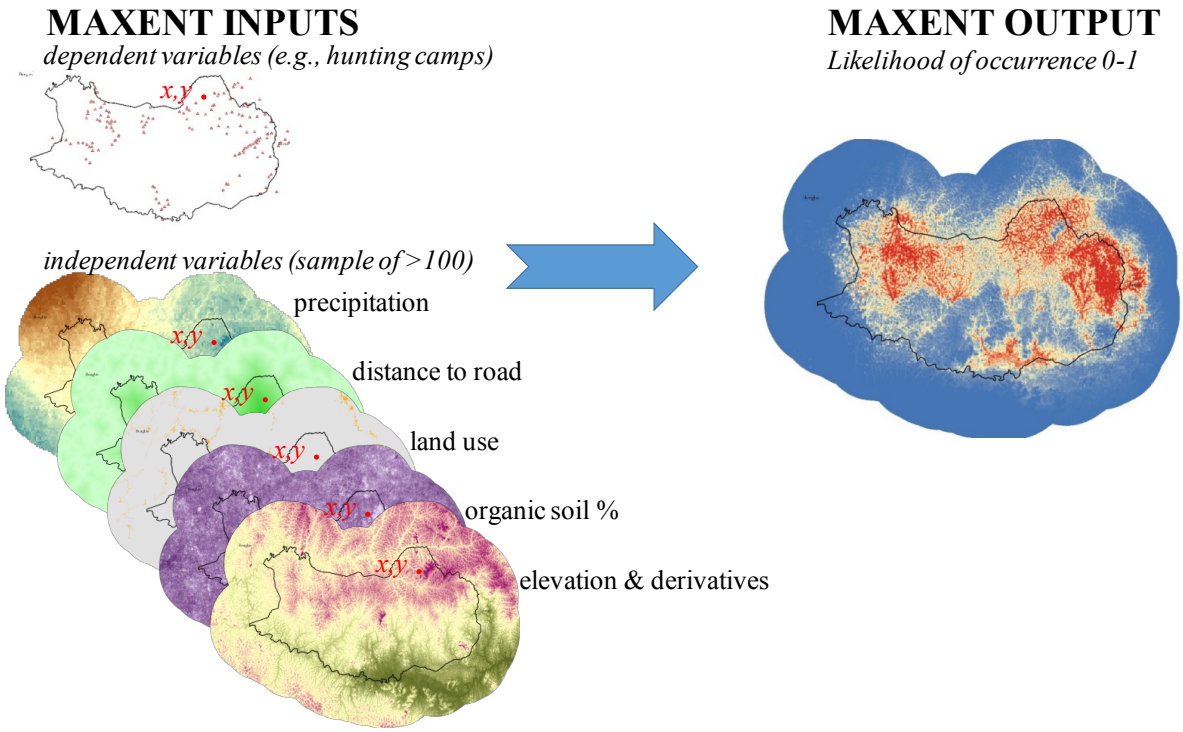


Figure 6. Dja Faunal Reserve Analysis of Likely Agriculture Expansion

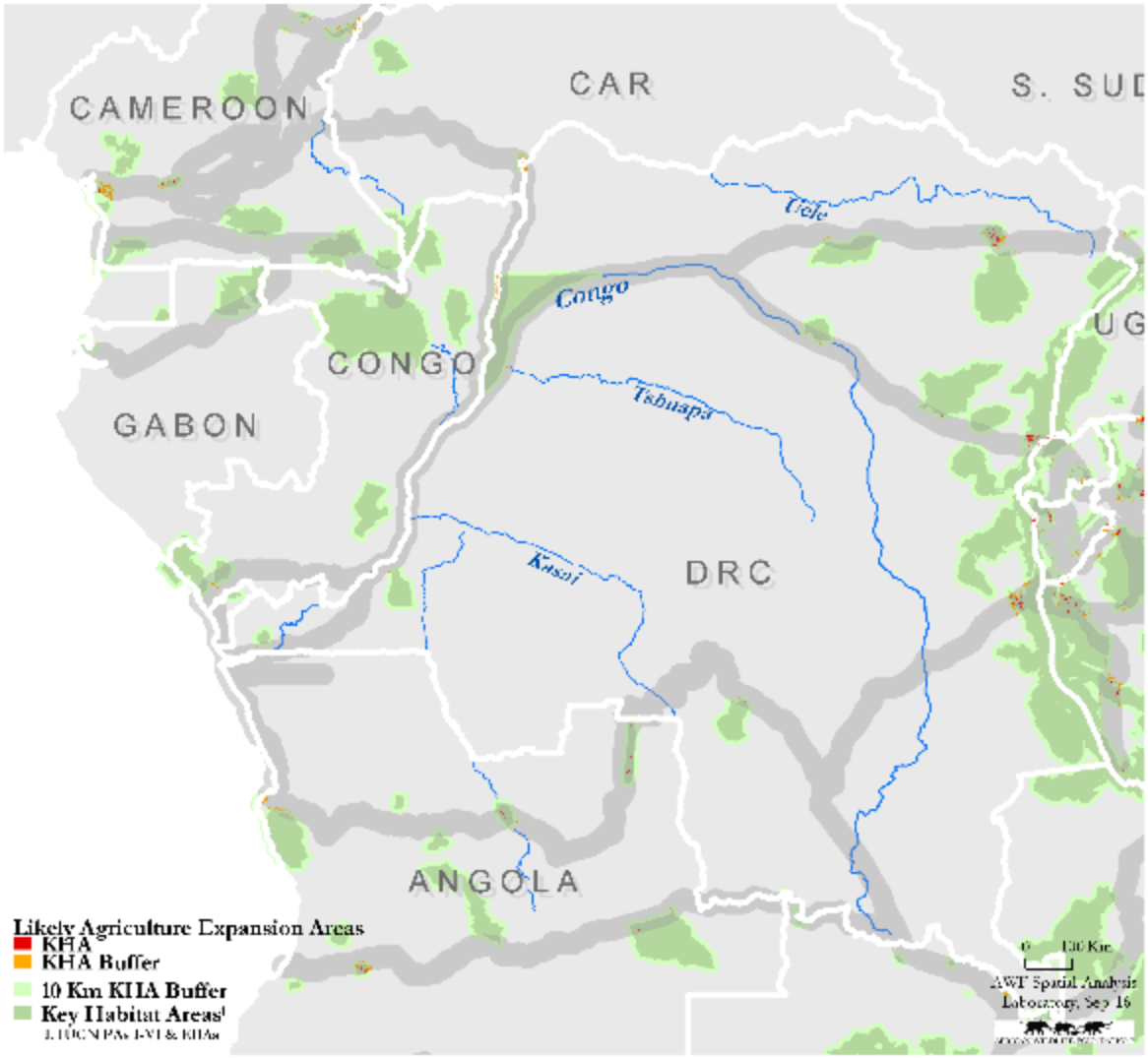
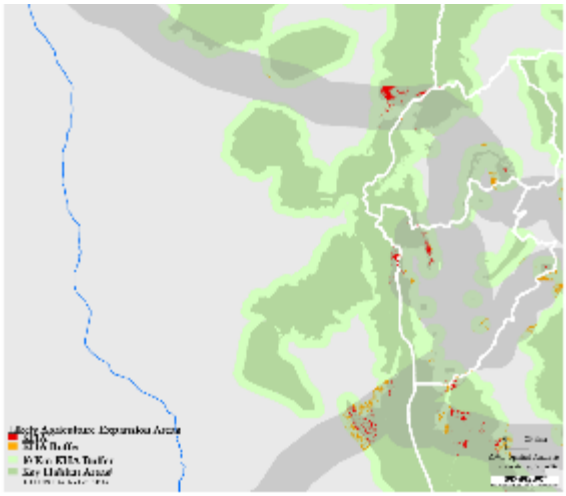


Figure 7Likely Agricultural Expansion Influence on KHAs: Central Africa



Ranked by area (km^2) of KHA and 10km buffer land likely to be converted to agriculture under current socio-economic and biophysical conditions. A total of 89,310 km^2 of KHA and buffer areas are likely to be converted (36,838 is KHA). Corridor length is also predictive of cropland expansion (r=0.32, P<.001) Current corridor-wide cropland area—likely a good indicator of agricultural potential—is positively correlated (r=.22; P<0.027) with cropland expansion.

Rank	Corridor	Into KHA	Into 10km buffer	Total
1	North-South	4,644	9,543	14,186
2	Mombasa	8,469	2,706	11,174
3	Limpopo	2,752	4,336	7,087
4	Central-A	2,812	3,386	6,197
5	Northern-U	1,967	3,699	5,666
6	Lubombo	2,738	2,836	5,574
7	Djibouti	1,616	2,608	4,224
8	Northern-A	1,982	2,035	4,017
9	Dakar-Port Harcourt	1,247	2,689	3,935
10	Walvis Bay	1,361	2,435	3,796
11	Maputo	1,525	2,015	3,540
12	Tanga	1,499	1,529	3,028
13	Gulf of Guinea	455	1,411	1,866
14	Central-F	736	1,055	1,790
15	Beira	153	1,532	1,685
16	LAPSSET	490	1,088	1,577
17	Zambeze	275	1,207	1,482
18	Nacala	266	1,207	1,473
19	Conakry-Buchanan	134	1,250	1,383
20	Sekondi/Ouagadougou	296	764	1,060
21	Uhuru/Tazara	643	382	1,025
22	Namibe	325	594	919
23	Douala-NΓÇÖdjamena-	83	670	753
24	Mtwara	95	371	466
25	Lobito	81	248	329
26	Cameroon-Chad	56	232	288
27	Douala-NΓÇÖdjamena-	13	236	249
28	Malanje	92	131	223
29	Luanda	-	167	167
30	Douala-NΓÇÖdjamena-	23	80	103
31	Mablam Railway	13	17	30
32	Bas	0	19	19
33	Libreville-Lomie	-	0	0