Ministry of Foreign Affairs

Climate Change Profile

Democratic Republic of the Congo (East)

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Introduction

This climate change profile is designed to help integrate climate actions into development activities. It complements the publication 'Climate-smart = Future-Proof! – Guidelines for Integrating climate-smart actions into development policies and activities' and provides answers to some of the questions that are raised in the step-by-step approach in these guidelines.

The current and expected effects of climate change differ locally, nationally and regionally. The impacts of climate change effects on livelihoods, food and water security, ecosystems, infrastructure etc. differ per country and region as well as community and individual, with gender a particularly important vulnerability factor. This profile aims to give insight in the climate change effects and impacts in East DRC (Nord-Kivu and Sud-Kivu and to a lesser extent the provinces of Haut-Congo, Maniema and Katanga - see Map 1) as part of the Great Lakes region, with particular attention for food security and water. It also sheds light on the policies, priorities and commitments of the government in responding to climate change and important climate-relevant activities that are being implemented, including activities being internationally financed. If no specific information was available for this region, countrywide information was used.

Summary

Climate change is expected to increase current vulnerabilities within the Democratic Republic of the Congo (DRC). While there will be significant biophysical impact, particularly in the northeast, with increasing temperatures and changing rainfall patterns, due to its widespread poverty, high population density, and the country's conflict situation, DRC's high vulnerability is primarily related to socioeconomic factors. Food security will be affected due to crop losses and failures, increased livestock mortality, negative impacts on fisheries, and damage to infrastructure.

Overall ranking

DRC ranks 186 out of 188 countries for per capita carbon emissions[1] and contributes only 0.09% of global carbon emissions, primarily from land use, land use change and forestry (LULUCF)[2]. However, DRC is highly vulnerable to global climate change. DRC ranks 177 out of 181 countries in the ND-GAIN index[3] (2016) for climate vulnerability. Globally, DRC is the 12th most vulnerable country and the 5th least ready country – meaning that it is very vulnerable to, yet extremely unready to address climate change effects. *Vulnerability* measures the country's exposure, sensitivity, and ability to cope with the negative effects of climate change by considering vulnerability in six life-supporting sectors: food, water, ecosystem service, health, human habitat and infrastructure. *Readiness* measures a country's ability to leverage investments and convert them to adaptation actions by considering economic, governance and social readiness.

Biophysical vulnerability

Current climate. DRC lies on the equator and its climate is dominated by the Intertropical Convergence Zone (ITCZ). Although there is a scarcity of meteorological observations and limited information on the country's climate variability[4], there are general patterns that can be identified. In the regions near the equator, temperatures are high, humidity is high and it rains throughout the year with an average between 1600 and 2000 mm. Regions north and south of the equator, still have warm temperatures, but show more seasonal variation and have distinct dry and rainy seasons[5]. South of the equator, the rainy season lasts from October to May and north of the equator, from April to November. In both cases, the rainfall regime is primarily bimodal, meaning that there is a small dry season during this rainy season (see Map 2 for an illustration of climatic variation in DRC).

Annual **rainfall** for the whole of DRC is on average 1,070 mm. For the east of the country, it is higher; averages up to 1,570 mm per year have been reported[6]. Along the equator,

1 https://en.actualitix.com/country/cod/democratic-republic-of-the-congo-co2-emissions-per-capita.php based on an analysis of World Bank data (2011)

2 WRI (2017) http://cait2.wri.org/

3 ND-Gain Index (2017). ND-GAIN index summarizes a country's vulnerability to climate change and other global challenges in combination with readiness to improve resilience. http://index.gain.org/country/dem-rep-of-the-congo

4 USAID (2017) Climate Risk in Food for Peace Geographies: Democratic Republic of Congo. https://www.climatelinks.org/resources/climate-change-risk-profile-climate-risk-screening-food-security-democratic-republic-congo

5 Climate Service Center Germany (2016). Climate-fact-sheet Democratic Republic of the Congo. Update version, 2015. Available via http://www.climate-service-center.de/imperia/md/content/csc/kongo/fact_sheet_climate_drc.pdf

6 Beyene T., Ludwig F., Franssen W. (2013): The potential consequences of climate change in the hydrology regime of the Congo River Basin. In: Climate Change Scenarios for the Congo Basin. [Haensler A., Jacob D., Kabat P., Ludwig F. (eds.)]. Climate Service Centre Report No. 11, Hamburg, Germany, ISSN: 2192-4058. http://www.climate-service-center.de/imperia/md/content/csc/csc-report11_optimized.pdf

rainfall is fairly regular throughout the year[7]. Average **temperature** of the country is 25 °C, but around the eastern lakes it is significantly lower – in some areas below 15 °C[8].

In northeastern DRC, Nord-Kivu, Sud-Kivu, Haut-Congo, and Maniema fall within climate Zone 3 (of 5 zones) with two rainy seasons (March-May and September-December) followed by two short dry seasons in June-August and January-February. Average temperatures range from 24-25 °C with limited variability through the year (see Map 3).

Current trends. Between 1901 and 2013 a small increase in temperature (0.05 °C per decade) was found, which was stronger over the last 30 years (0.17 °C per decade). There was no substantial overall change in rainfall during this period although some changes in rainfall patterns were noted.[9]

Climate change. Projected changes for total **rainfall** under climate change vary, in part due to a lack of information, with some models projecting significant decreases in rainfall while others project increases. For the eastern part of the country, changes between -200 mm and +200 mm are estimated, with most projections however estimating a slight increase in rainfall of ca. 10% between 2010 and 2100[10] (see Map 4). **Temperature** change predictions are more consistent and estimate an average increase of 1-3 °C between 2010 and 2050[11] (see Map 4). For both temperature and precipitation, more frequent **extremes** are expected. For the northeast of the country, these changes are listed in the annex in Table 1.

The main projections for the period 1990-2100 are:

- the number of cold days and nights will decrease (6-10%) while the number of hot days and nights will increase (13-58% for days, 33-86% for nights);
- more dry spells are expected during the rainy season (up to 108% more);
- duration of the rainy season is likely to decrease (changes estimated between -6% and +2%);
- during heavy rain events, rainfall intensity is likely to increase by 3-27%[12].

These projections suggest that seasons of heat, drought and rainfall will become more intense. Moreover, changes in the east differ per season. Between 1990 and 2100, expected changes in the east are:

- December-February: temperature +1-5 °C, precipitation -4% to +26%;
- March-May: temperature +2-5 °C, precipitation -3% to +13%;
- June-August: temperature +2-6 °C, precipitation -10% to +13%;
- September-November: temperature +1-5 °C, precipitation -3% to +17%[13].

These changes are likely to result in an increased frequency of **extreme events**, primarily floods (resulting in erosion, landslides, and crop failure) but in some cases also droughts. Whereas problems due to excess of rainfall are mainly expected in central DRC, droughts are forecasted primarily for the south[14].

Food security will be affected by land and infrastructure degradation due to erosion/landslides[15], an increase in livestock and crop diseases due to temperature increase[16], direct crop failure due to floods and heavy rains, and possible nutrient leaching and fungal growth due to high humidity[17]. **Water availability** will be affected by possible periods of drought, but no serious water stress or water shortages for agriculture are expected for the east of the country[18]. Both green water consumption in agriculture and evapotranspiration are expected to remain similar over the century[19] (see Map 5). For urban areas, however, increasing population density combined with erratic rainfall may in some cases lead to water stress[20].

7 Haensler, A., Saeed, F. and Jacob, D. (2013): Assessment of projected climate change signals over central Africa based on a multitude of global and regional climate projections. In: Climate Change Scenarios for the Congo Basin. [Haensler A., Jacob D., Kabat P., Ludwig F. (eds.)]. Climate Service Centre Report No. 11, Hamburg, Germany, ISSN: 2192-4058. http://www.climate-service-center.de/imperia/md/content/csc/csc-report11_optimized.pdf

8 Beyene et al. (2013)

9 Climate Service Center Germany (2016). Climate-fact-sheet Democratic Republic of the Congo. Update version, 2015. Available via http://www.climate-service-center.de/036238/index_0036238.html.en

10 Haensler et al. (2013)

11 Nsombo, B.M., Thomas, T.S., Kyotalimye, M., Waithaka, M. (2013): Chapter 3: Burundi. In: IFPRI (2013): East African Agriculture and Climate Change. http://www.ifpri.org/publication/east-african-agriculture-and-climate-change-comprehensive-analysis

12 GIZ, WUR, CSC (2013a): *Fact-Sheet - Climate - Democratic Republic of the Congo (DRC)- Zone 3.* http://www.climate-service-center.de/imperia/md/content/csc/kongo/fact_sheet_climate_drc.pdf

13 GIZ, WUR, CSC (2013a)

14 BBC World Service Trust (2010): *Democratic Republic of Congo Talks Climate: The public understanding of climate change.* http://r4d.dfid.gov.uk/PDF/Outputs/MediaBroad/02-Democratic-Republic-of-Congo-Talks-Climate.pdf

15 SIDA (2008): *Democratic Republic of Congo: environmental and climate change policy brief.* http://www.sida.se/Global/Countries%20and%20regions/Africa/DR%20Congo/Environmental%20policy%20brief%20DR%20Congo.pdf

16 SIDA (2008)

17 Ludwig F., Franssen W., Jans W., Beyenne T., Kruijt B., Supitl. (2013): Climate change impacts on the Congo Basin region. In: Climate Change Scenarios for the Congo Basin. [Haensler A., Jacob D., Kabat P., Ludwig F. (eds.)]. Climate Service Centre Report No. 11, Hamburg, Germany, ISSN: 2192-4058. http://www.climate-service-center.de/imperia/md/content/csc/csc-report11_optimized.pdf

18 GIZ, WUR, CSC (2013a) ; Ludwig et al. (2013)

19 GIZ, WUR, CSC (2013b): Fact-Sheet - Agriculture - Democratic Republic of the Congo (DRC)- Zone 3. http://www.climate-service-center.de/imperia/md/content/csc/kongo/fact_sheet_agriculture_drc.pdf

20 BBC World Service Trust (2010)

Socio-economic vulnerability

Key facts(national):

GDP (PPP) per capita (2016)[21]:	USD 801
Population (July 2017)[22]:	82,242,685
Projected population (2050)[23]:	197,404,000
Population density per km² (2016)[24]:	35
Human Development Index (2016)[25]:	176 out of 188 countries
Corruption Perception Index (2016)[26]:	156 out of 176 countries
Gender Inequality Index (2016)[27]:	153 out of 188 countries
Adult literacy (2015)[28]:	63.8% (male 78.1%; female 50%)

A map presenting overall vulnerability to climate change for various countries in the Great Lakes region is included in Map 6. The associated study concluded that DRC's vulnerability to climate change is low in terms of physical factors (climate hazards and environment) but high due to household and community vulnerability. Poor governance and high population density further increase climate vulnerability in the eastern region, mainly in the Great Lakes region along the country's eastern border[29]. The security and governance situation in the region has worsened over recent years of conflict. The UN estimates that there are some 2.3 million displaced persons and refugees in the DRC and 323,000 DRC nationals living in refugee camps outside the country[30]. By increasing poverty, displacement, immobility, and eroding social networks, conflict contributes to climate change vulnerability. At the same time, climate change may be a contributing factor to conflicts in the future, especially related to the scarcity of productive land[31].

In climate change issues, women are more severely affected than men: they are more vulnerable to climate change due to stronger dependency on climate-related resources (through their responsibility to provide or produce water and food). At the same time, their adaptive capacity is low because of limited mobility, restricted access to education, credit and banking, land ownership arrangements, combined with low female involvement in formal sector employment (30%) and political positions (20%)[32]. It has been reported that women in DRC have limited participation in discussions on climate change issues[33].

DRC has one of the world's highest population growth rates, from 16 million in 1960 its population reached more than 82 million in 2017, and current estimates suggest a population of almost 200 million by 2050. Population density is highest in the east of the country, particularly in towns at the Ugandan and Rwandan borders (500-2,000 persons per square kilometre)[34]. Internal migration, partly due to ongoing conflicts, has led to land tenure issues including fragmentation of farm lands and absence of measures to improve long-term soil quality. This decreases adaptive capacity to climate change, and increases vulnerability especially for the agricultural sector and for food security.

Although raw materials are the main source of export revenue (e.g. copper and cobalt provide 80% of export earnings), agriculture, especially in the eastern region, is the primary source of livelihood for the majority of Congolese, contributing 40% to GDP and employing an estimated 70% of the country's population[35] [36]. The agricultural sector is one of the sectors with the highest vulnerability to climate change, and small-scale farmers are among the most climate change-vulnerable people in the country (next to the urban poor)[37]. Even small changes in climate patterns are likely to have a major impact on agricultural GDP and economic growth[38].

21 World Bank Data – GDP per capita, PPP. http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

22 World Population Review – DRC. http://worldpopulationreview.com/countries/dr-congo-population/

23 UNDESA (2017): *World Population Prospects: The 2017 Revision, Key Findings and Advance Tables.* Working Paper No. ESA/P/WP/248. https://esa.un.org/unpd/wpp/Publications/Files/WPP2017_KeyFindings.pdf

24 World Bank Data – Population density. http://data.worldbank.org/indicator/EN.POP.DNST

25 UNDP (2017). Human Development Report 2016: Human Development for Everyone. Table 1. http://hdr.undp.org/en/content/human-development-index-hdi

26 Transparency International (2017) Corruption Perceptions Index (CPI) https://www.transparency.org/whatwedo/publication/corruption_perceptions_index_2016

27 UNDP (2017) Human Development Report 2016. Table 5 http://hdr.undp.org/en/content/human-development-index-hdi

28 CIA (2015). The World Fact Book. https://www.cia.gov/library/publications/the-world-factbook/geos/cg.html

29 Doty, B., Grajeda, E., Phillips, P., Shrestha, A. (2011): Vulnerability to climate change: An assessment of East and Central Africa. https://www.strausscenter.org/ccaps/publications/student-working-papers.html?download=36

30 World Bank (2017). Overview DRC. Available at http://www.worldbank.org/en/country/drc/overview#1

31 SIDA (2008)

32 AfDB (2013): *Democratic Republic of Congo: 2013-2017 Country Strategy Paper.* http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Democratic%20Republic%20of%20Congo%20-%202013-2017%20-%20Country%20Strategy%20Paper.pdf

33 Peach Brown, H.C. (2011): Gender, Climate Change and Redd+ in the Congo Basin forests of Central Africa. *International Forestry Review* 13(2), pp. 163-176

34 Nsombo et al. (2013)

35 Nsombo et al. (2013)

36 USAID (2017)

37 SIDA (2008); BBC World Services Trust (2010)

38 Nsombo et al. (2013)

The main staple crops in DRC, in order of importance, are cassava (throughout the country), maize (mainly in the central region), and groundnuts and rice (in smaller quantities). Both cassava and maize have been found to be sensitive to precipitation changes, which suggests that their yields will be affected by climate change. Coffee, of importance in South Kivu, is also climate-sensitive. Projections of climate change effects for these crops include:

- cassava yields are expected to increase in all of the country[39] – although rising temperatures may also increase the risk of the cassava mosaic virus and other diseases[40];
- maize yields will decrease in all of the country (except western regions) – specifically in the southern part of Kivu province, losses of 0-25% are expected;
- rice yields will increase in the east of Kivu, along the lakes (and in some western regions);
- groundnut yields will have a modest yield increase;
- coffee yields will be reduced due to increased temperature (with increase in berry bore and other pests that are well adapted to higher temperatures) and increased humidity (leading to fungi and insect attacks)[41]

Within DRC, yield losses in some areas may be offset by yield increases in other parts of the country. Even so, total yields will not be sufficient to feed the DRC's rapidly growing population: the number of malnourished children will increase under all climate change scenarios[42].

Food security may also be affected through the effects of climate change on fisheries. Increasing water temperatures are reported for various lakes in the Great Lakes region, including Kivu and Tanganyika at DRC's eastern borders. Small variations in climate can cause wide fluctuations in freshwater thermal dynamics. For that reason, combined with the large dependency of poor parts of the population on fisheries, DRC has been identified as one of four most vulnerable countries in the world in terms of the effects of climate change on fisheries[43].

National government strategies and policies

DRC has ratified the UN Convention on Biological Diversity (CBD), the Convention to Combat Desertification (CCD), the Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. DRC signed the Paris Agreement on climate change in April 2016 and ratified the agreement in December 2017 with it entering into force in January 2018 (see Nationally Determined Contributions below). It prepared an Initial National Communication on climate change in 2001, prioritizing agricultural production, rural development, natural resource protection, conservation and development. Although a large number of activities were planned, political and economic difficulties initially prevented the implementation of all but two of the proposed activities (Agricultural/Rural Sector Recovery Programme and Protected Areas/National Parks Rehabilitation Project, both with GIZ assistance). After preparing a National Environment Action Plan and a National Biodiversity Strategy (2002), the government drafted a National Adaptation Programme of Action (NAPA) in 2006 and a Second National Communication on climate change in 2009.

The NAPA identifies five key priority areas: water resources, coastal area, health, agriculture, and land and ecosystem degradation[44]. Activities under the NAPA were being implemented with support from UNDP, funded by the Least Developed Countries Fund, between 2010 and 2015[45]. Specific activities that were implemented include improved meteorological monitoring and forecasting and local level resilience-building to climate change. The focus is however on provinces in western, central and southern DRC; the east of the country is not prioritized.

The Second National Communication (2009) on climate change focuses primarily on the coastal area and some vulnerable regions in the west. It does however include some nation-wide strategies concerning agriculture and food security, with a focus on capacity building and improved technologies and infrastructure[46]. Climate change is also addressed in the country's Poverty Reduction Strategy Paper (PRSP), in which DRC expresses the aim to be a carbon sink by 2030. Again, east DRC is not specifically targeted[47]. A major focus of the Third National Communication (2015) is on the opportunities from REDD+ (Reducing Emissions from Deforestation and Forest Degradation) and related forest programs[48] which it promotes as being compatible with its economic and social development objectives as well as respectful of the environment. The geographic focus is primarily the forests of the Congo Basin.

39 Nsombo et al. (2013)
40 BBC World Services Trust (2010)
41 USAID (2017).
42 Nsombo et al. (2013)
43 IPCC (2014): *Climate change 2014: Impacts, adaptation, and vulnerability. Volume I: Global and Sectoral Aspects.* Chapter 22. Africa. http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap22_FGDall.pdf
44 UNDP ALM website: http://www.adaptationlearning.net/democratic-republic-congo-napa
45 GEF (2009): *The Least Developed Countries Fund (LDCF).* https://www.thegef.org/gef/sites/thegef.org/files/publication/LDCF-factsheets09_0.pdf
46 Second National Communication – Executive Summary, p. 20. http://www.undp-alm.org/sites/default/files/downloads/drc-second_national_communication_2009_english.pdf
47 IMF (2013): *Democratic Republic of the Congo: Poverty Reduction Strategy Paper.* http://www.imf.org/external/pubs/ft/scr/2013/cr13226.pdf
48 UNFCCC (2017) available at http://unfccc.int/resource/docs/natc/codnc3f.pdf

It has been argued that conflict in the DRC has protected the country's forests from widespread destruction. If political stability however will increase, much-needed economic development of the country is likely to take off – which may result in increased risks to DRC's forests[49]. Deforestation is already taking place (although the deforestation rate is below the global average), with over 300,000 hectares of forest being destroyed annually. While concessions to the logging industry and palm oil plantations have played a role in the deforestation, most of the deforestation in the country continues to be driven by the expansion of subsistence farming and small-scale agriculture[50].

As noted in its Third Communication to the UNFCCC (see above) curtailing deforestation is a major focus by the DRC in addressing climate change. As the largest carbon stock in Africa DRC's forests are of global significance, equal to 17 million tons[51]. It has been estimated that, in a worst-case scenario, complete deforestation in the country could cause up to 140 billion tonnes of greenhouse gases being released[52], the equivalent of almost three years of current total global GHG emissions. The government aims to reduce over 18 million tons of GHG emissions over 30 years[53]. Using the REDD+ mechanism, in 2014 DRC initiated a pilot programme to safeguard 12.3 million hectares (10% of the country's total forests) in Maï Ndombe and Plateau[54 55]. This programme combines enabling activities (strengthening governance, capacity building, local level land-use planning, securing and modernizing land tenure) and sectorial activities (reduce impact logging, agroforestry, fire management) in order to reduce deforestation and emissions[56].

Due to this attention to deforestation, the focus of climate action in DRC is mostly on the Congo Basin. This focus is urgent and logical, and attracts donors and climate funds (see below). However, a vast part of the DRC – mainly in the east – is not receiving attention; since the REDD+ initiatives focus on mitigation (with some co-benefits), there is a relative lack of support for adaptation actions.

Nationally Determined Contributions (NDC)[57]

DRC submitted its Intended Nationally Determined Contribution (INDC) on 18 August 2015, in which it cited the major projected impacts of climate change that threaten 'daily lives': damage to infrastructure, habitat destruction (especially in poor urban areas), increase in water borne diseases, and severe disruption to farming cycles because of seasonal droughts. The First NDC (the INDC with few changes) was submitted in December 2017. It sets an emission reduction target of 17% by 2030, compared to a Business-as-Usual (BAU) scenario. This target of **17% is conditional** to adequate financial and technical support (financial resources, technology transfer and capacity building). Estimated cost of implementation of INDC measures are USD **21.64 billion**, of which USD 12.54 billion for mitigation and USD 9.1 billion for adaptation.

Mitigation measures focus on agriculture, forestry and energy. The NDC mentions the following concrete measures for mitigation:

- In agriculture (43% reduction, USD 3.53 billion):
- smallholders and subsistence farmers, e.g. professional organization of farmers (cooperatives), promotion of settlement in eroded areas, introduction of Good Agricultural Practices, improving access to finance;
- development of intensive agriculture and agribusiness, e.g. planning land for intensive agricultural use, promoting integration of livestock for fertilizer production, recovery of waste and by-products.
- In forestry (31% reduction, USD 5.1 billion):
- afforestation, e.g. reforestation and afforestation of degraded forests or deforested land, improved management of protected areas, financial incentives for deforestation reduction;
- lumber, e.g. diversify use of forest species, implement low-impact forest management, fighting fraud;
- mine and oil sites rehabilitation, e.g. set up monitoring system of mining and oil, mandatory implementation of Environment Management Plans;
- bush fires, e.g. education on fighting bushfires, implement monitoring systems and bushfires management plans.
- In energy (26 % reduction, USD 3.91 billion):
- fuel wood reduction and enhancing access to electric power: rural and urban hydro-electrification; promotion of efficient cook stoves and improvement of carbonization techniques; large-scale afforestation to cover fuelwood needs;
- improving urban and intercity transport.

49 Gonzalez, G. (2014): *As DRC Emerges from Civil War, Government Seeks $50 Million per Year to Protect Forests from Surging Development.* http://www.forestcarbonportal.com/news/as-drc-emerges-from-civil-war-government-seeks-50-million-per-year-to-protect-forests-from-surging-development

50 Friends of the Congo (2008): *The Democratic Republic of the Congo: Rainforests and Climate Change.* http://friendsofthecongo.org/pdf/congo_rainforest.pdf

51 Friends of the Congo (2008)

52 Gonzalez (2014)

53 Nakhooda, S.; Norman, M. (2014): *Climate Finance: Is it making a difference? A review of the effectiveness of Multilateral Climate Funds.* ODI. http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9359.pdf

54 Gonzalez (2014)

55 http://www.forestcarbonpartnership.org/sites/fcp/files/2014/MArch/DRC%20Summary%20English.pdf

56 Forest Carbon Partnership website: https://www.forestcarbonpartnership.org/er-pins-fcpf-pipeline

57 Republique Democratique du Congo (2015). Soumission de la contribution nationale prevue determinee au niveau national au titre de la convention des nations unies sur les changement climatique. Available via http://www4.unfccc.int/Submissions/INDC/Published%20Documents/Democratic%20Republic%20of%20the%20Congo/1/CPDN%20-%20R%C3%A9p%20D%C3%A9m%20du%20Congo.pdf

The NDC specifies the following **adaptation** measures, per sector:

- agriculture (USD 1.56 billion): implementation of the adaptation component of DRCs National Agricultural Investment Plan, integration of climate change resilience into development strategies and climate risk planning, investment in research and innovation, integration of early warning systems;
- energy, water, and transportation (USD 7.35 billion): improving access to drinking water, used-water sanitation and sustainable waste management, improved infrastructure, institutional capacity building;
- forestry (USD 50 million)
- coastal management (USD 118 million): fighting erosion, supporting income generating activities, early warning systems and capacity building.

Climate finance

As noted above, climate finance is primarily related to forest-based mitigation activities.
Of the Climate Investment Funds, the Forest Investment Program (FIP) is the most active fund in the country, funding projects with a total of USD 67.83 million most of which is to support DRC's REDD+ Investment Plan. In late 2015/ early 2016, DRC received a small readiness Green Climate Fund (GCF) grant of USD 300,000 to strengthen the capacity of its National Designated Authority[58], which is anticipated to open up funding opportunities from GCF in the future. The GCF support for REDD+ pilots initiative approved in 2017 (USD 500 million) was strongly championed by the DRC (which sits on the GCF Board), and could potentially provide additional funding to REDD+ related actions. The DRC has also received a large grant (USD 200 million) from CAFI (Central African Forest Initiative) for the support of DRC's REDD+ Investment Plan.

In April 2014, DRC drafted an Emission Reduction Programme Idea Note (ER-PIN) to apply for emissions reduction funds of about USD 60 million up to 2020 under the Forest Carbon Partnership Facility (FCPF)'s Carbon Fund program. DRC received a readiness preparation grant to prepare a proposal and is now waiting for a grant from the fund[59] [60].

Climate change projects

A large number of climate change-related projects are implemented in DRC, funded through international funds, donors and/or bilateral relations. Reflecting the global importance of the Congo Basin forests the majority focus on forest conservation and reducing deforestation, with relatively little funding for other thematic or geographic areas.

There are, however, several climate change projects targeting agriculture or food security, including:

- 'Addressing climate change in the DRC: support for training and reforestation' (2012-2017), funded by the Global Climate Change Alliance (GCCA), which has specific objectives for not only mitigation but also adaptation, and primarily targets the east of the country[61];
- Climate Resilient Altitude Gradient (CRAG): Birdlife International initiated this project, aiming to enhance climate change resilience in Great Lakes Region Watersheds (the Lake Kivu Catchment and Rusizi River). The project is estimated to run until 2017[62].

For projects in the DRC funded through international and multilateral climate funds, see the Annex.

Climate contribution of the Netherlands

The Netherlands supports climate-relevant projects in the Great Lakes region (including eastern DRC) through a variety of channels and in cooperation with range of actors with a focus on integrated water management and food security. See the Climate Change Profile 'Great Lakes Region and Ruzizi Plain' for more information.

58 http://www.greenclimate.fund/documents/20182/140177/Democratic_Republic_of_Congo_-_Inception_Report.pdf/e37c2963-33b9-4d95-8a66-3d22008e6ea2

59 Gonzalez (2014)

60 World Bank (2016). Taking climate action from Paris to the rainforests. Available via http://www.worldbank.org/en/news/feature/2016/06/22/taking-climate-action-from-paris-to-the-rainforests

61 http://www.gcca.eu/national-programmes/africa/gcca-democratic-republic-of-congo

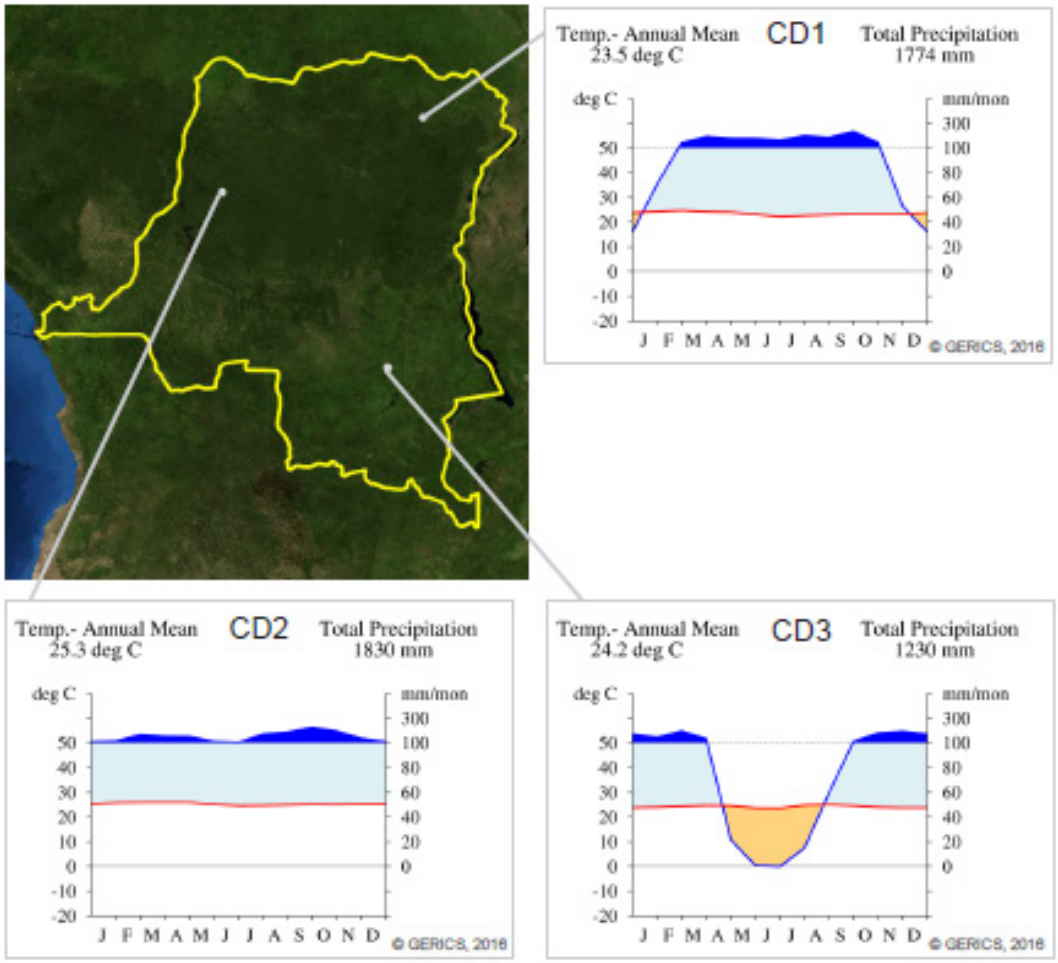
62 http://www.birdlife.org/sites/default/files/attachments/CRAG-project_0.pdf

Maps

Map 1 Provinces of DRC

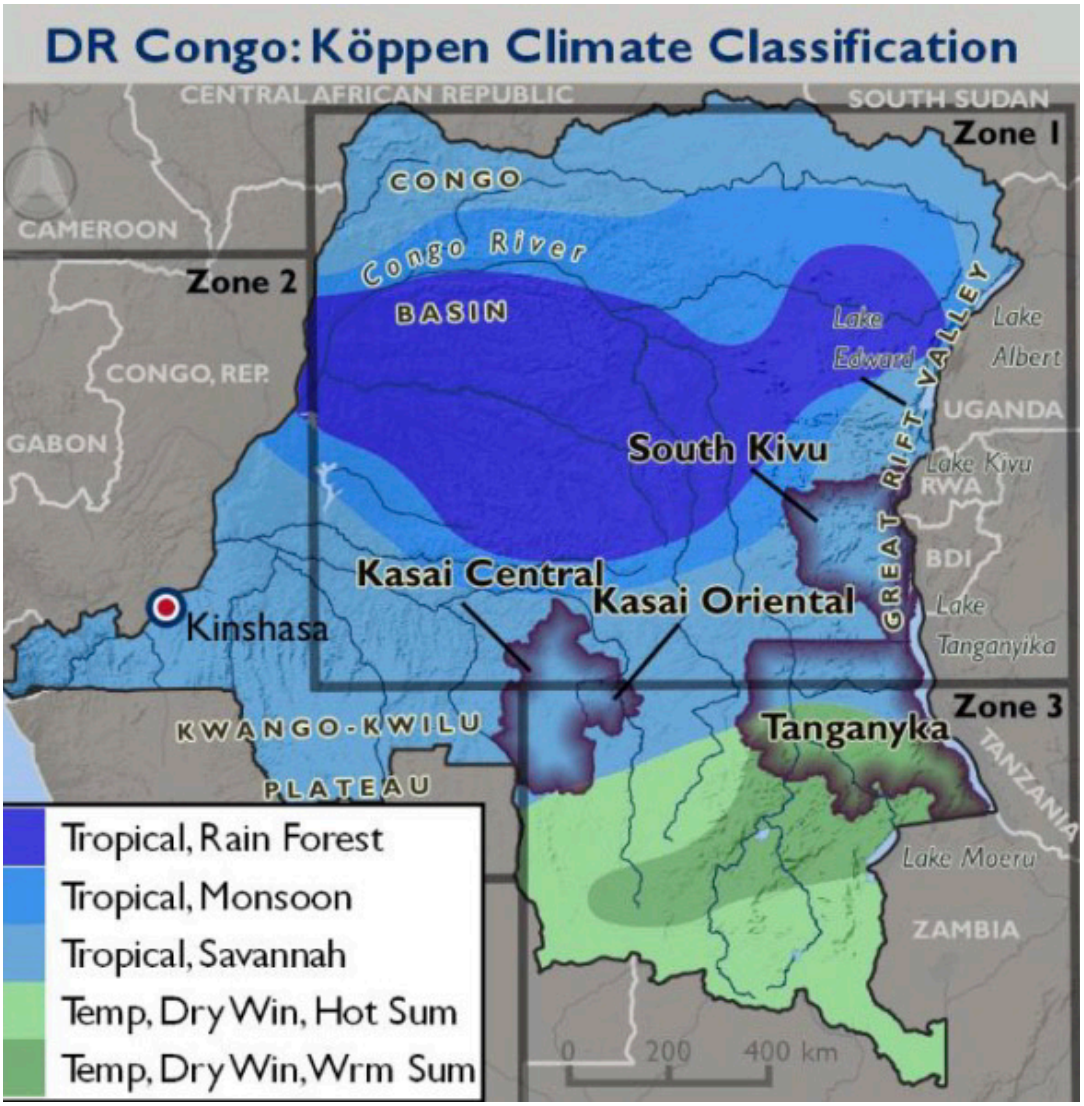
Source: http://monusco.unmissions.org/Default.aspx?tabid=10702&language=en-US

Map 2 Climatic variation in and around equator zones in DRC



Source: CSC (2016). Climate-fact-sheet Democratic Republic of the Congo. Update version, 2015.
Available via http://www.climate-service-center.de/036238/index_0036238.html.en

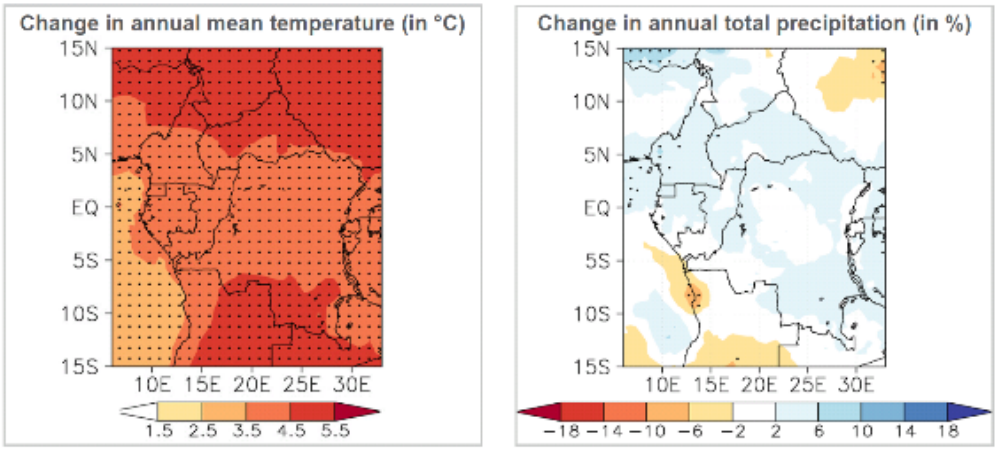
Map 3 Climate Classification



Source: USAID (2017) from CSC 2013 Climate Change Scenarios for the Congo Basin.

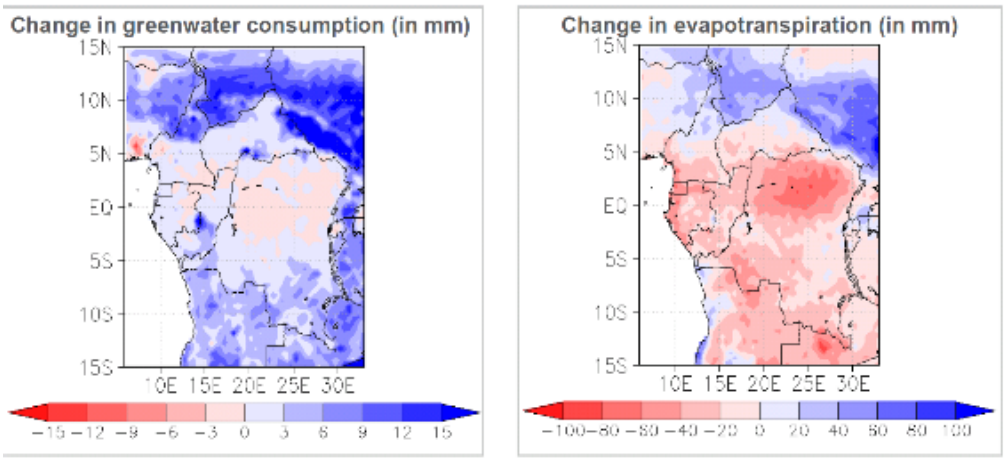
http://www.climate-service-center.de

Map 4 Projected changes in temperature and precipitation, 1975–2050



Source: GIZ, WUR, CSC (2013a)

Map 5 Projected changes in green water consumption and evapotranspiration, 1975-2085



Source: GIZ, WUR, CSC (2013b)

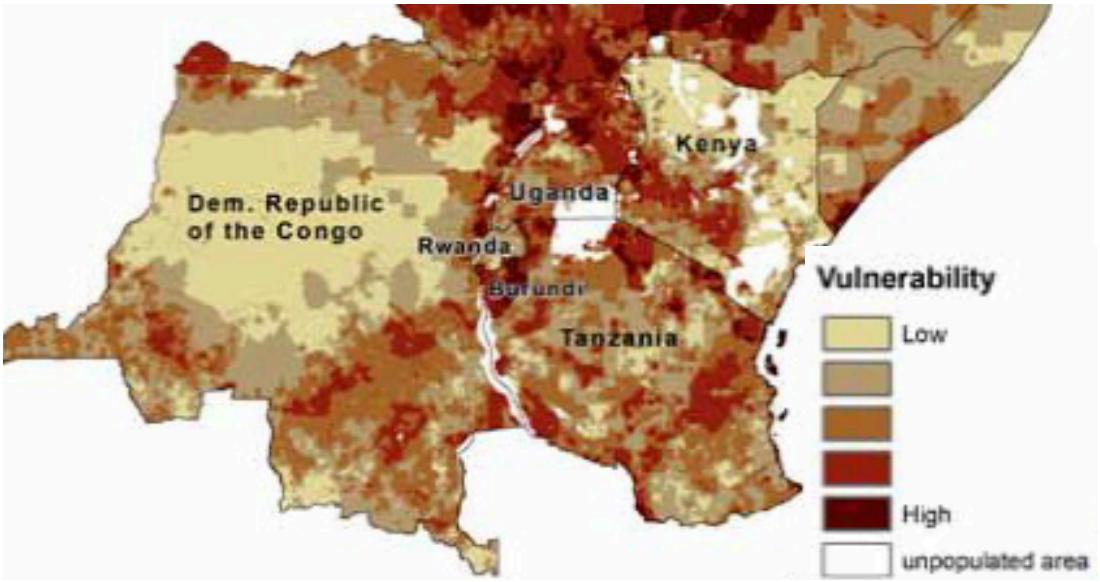
Table 1 Projected changes in temperature and precipitation, short-term and long-term, for DRC northeast (Haut-Congo, Kivu, Maniema)

Observed mean values and projected changes of temperature based variables (Note: if below two units are mentioned the 1st refers to the observations and the 2nd to the changes)	Observed	Projected changes			
		Low emission scenario		High emission scenario	
	1961-1990	2036-2065	2071-2100	2036-2065	2071-2100
Surface air temperature (in °C) YEAR	24.1	+1.4 to +2.1	+1.5 to +2.7	+1.8 to +2.7	+3.6 to +5.1
DJF	24.1	+1.4 to +2.0	+1.5 to +2.6	+1.9 to +2.5	+3.6 to +4.8
MAM	24.6	+1.4 to +2.2	+1.6 to +2.8	+1.9 to +2.7	+3.7 to +5.4
JJA	23.4	+1.4 to +2.3	+1.7 to +3.0	+2.0 to +2.9	+3.8 to +5.6
SON	24.1	+1.4 to +2.0	+1.5 to +2.5	+1.7 to +2.4	+3.6 to +4.6
Cold nights (in %)	-	-9 to -8	-10 to -8	-10 to -9	~ -10
Cold days (in %)	-	-8 to -5	-9 to -6	-9 to -6	-10 to -9
Hot nights (in %)	-	+31 to +52	+33 to +67	+47 to +64	+75 to +86
Hot days (in %)	-	+12 to +23	+13 to +31	+17 to +31	+33 to +58

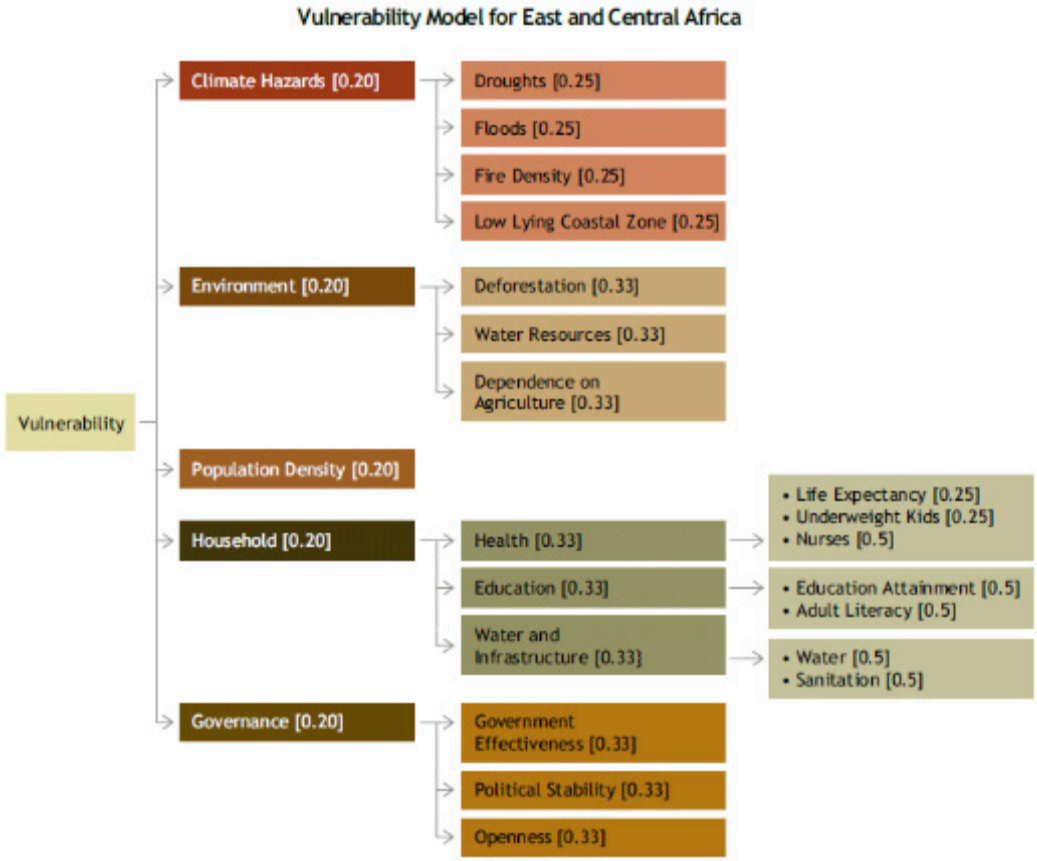
Observed mean values and projected changes of precipitation based variables (Note: if below two units are mentioned the 1st refers to the observations and the 2nd to the changes)	Observed	Projected changes			
		Low emission scenario		High emission scenario	
	1961-1990	2036-2065	2071-2100	2036-2065	2071-2100
Total precipitation (in mm and %) YEAR	1716	0 to +6	-1 to +8	-1 to +6	0 to +11
DJF	336	-5 to +14	-4 to +16	-5 to +9	-7 to +26
MAM	489	-2 to +8	-3 to +8	-3 to +6	-1 to +13
JJA	339	-10 to +11	-10 to +14	-9 to +11	-10 to +13
SON	549	-2 to +6	-3 to +9	-1 to +7	-1 to +17
Rainfall during rainy season (in mm and %)	1086	-1 to +6	-2 to +8	-4 to +8	-4 to +15
Dry spells during rainy season (number and %)	2.4	-2 to +61	0 to +66	+5 to +78	+10 to +108
Duration of rainy season (in days and %)	159	-3 to +1	-4 to +2	-4 to +2	-6 to +1
Intensity of heavy rain events (in mm/d and %)	31	+3 to +10	+3 to +14	+4 to +13	+6 to +27
Frequency of heavy rain events (in % of all days)	1.9	0 to +1	0 to +2	0 to +2	+1 to +3
Maximum 10day rainfall sum (in mm/10d and %)	278	0 to +12	+4 to +18	+3 to +14	+12 to +36

Source: GIZ, WUR, CSC (2013)

Map 6 Composite vulnerability to climate change

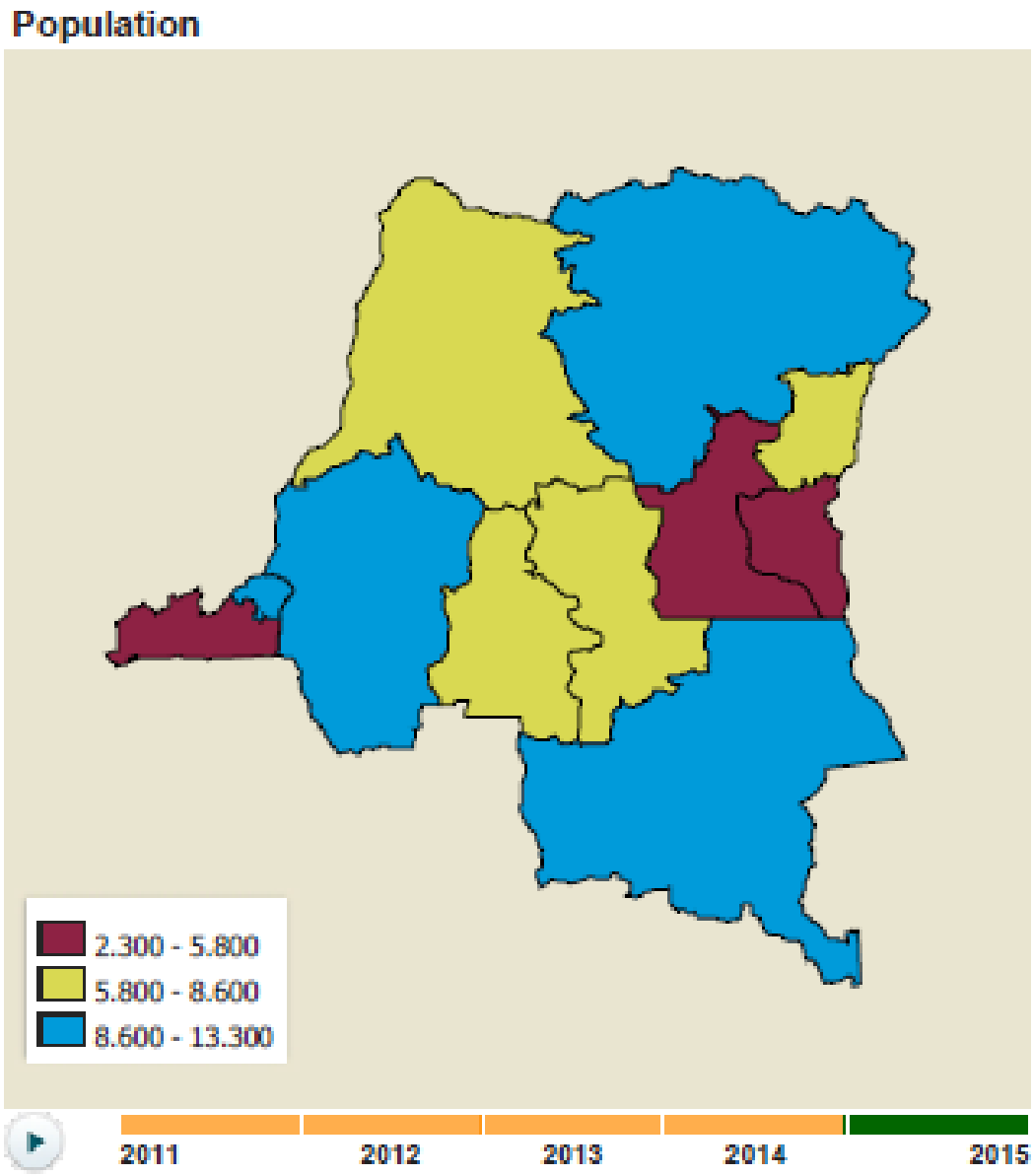


Indicators used:



Source: Doty et al. (2011)

Map 7 Population in DRC, specified per county



Source: Democratic Republic of the Congo, Regional Statistics, 2017

Annex

International and multilateral climate projects (since 2012)

Sources Climate Funds Update (2017)[63] and World Bank (2017)[64]

Name of Project	Fund	Amount of Funding Approved (USD millions)	Disbursed (USD millions)	Dates
Resilience of Muanda's Communities from Coastal Erosion, Democratic Republic of Congo	Least Developed Countries Fund (LDCF)	5.5	5.5	2013
Improving Women and Children's Resilience and Capacity to Adapt to Climate Change in the Democratic Republic of the Congo	Least Developed Countries Fund (LDCF)	4.8	4.8	2013
Strengthening Hydro-Meteorological and Climate Services	Least Developed Countries Fund (LDCF)	5.5		2013
Readiness program support	Green Climate Fund (GCF)	0.3		2015/2016
Promotion of Mini and Micro-hydro Power Plants in Congo DR	Global Environment Facility (GEF5)	3.2		2013
Indigenous Peoples and Local Communities: Forest Dependent Communities Support Project	Forest Investment Program (FIP)	6	0.5	2014
Consideration of climate change in the Democratic Republic of Congo (DRC) by the Global Climate Change Alliance (GCCA): support for training and reforestation	Global Cli-mate Change Alliance (GCCA)	15.7	10.6	2011-2017
Direct support to the design and implementation of UNREDD National Programmes	UNREDD Program	7.4	7.4	2009-2-16
Readiness preparation grant	Forest Carbon Partnership Facility (FCPF)	8.8	7.03	2011-2015
Integrated REDD+ Project in the Mbuji-Mayi/ Kananga and Kisangani Basins	Forest Investment Program (FIP)	21.5	3.15	2013-2018
Improved Forest Landscape Management Project	Forest Investment Program (FIP)	36.7	11.03	2014-2019
Mai-Ndombe REDD+ Integrated Project under CAFI	World Bank (for CAFI)	18.22		2017
Strengthening Hydro-Meteorological and Climate Services	World Bank	8.03		2017
Improved Forested Landscape Management Project	World Bank	36.9		2014

[63] http://www.climatefundsupdate.org/data

[64] http://projects.worldbank.org/search?lang=en&searchTerm=&countrycode_exact=ZR ; http://www-cif.climateinvestmentfunds.org/

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