Netherlands Commission for Environmental Assessment
Dutch Sustainability Unit

Climate Change Profile: BURUNDI

This profile is part of a set that was developed in a cooperation between:
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Advisory Report by the Dutch Sustainability Unit

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Climate Change Profile: Burundi

Burundi is a small, landlocked country with abundant natural resources, especially minerals and hydropower potential[1]. Agriculture (mainly rain-fed) is its primary economic sector, employing 90 % of its inhabitants[2]. The country is densely populated, has a high population growth, and yet only 36 % of the country is arable[3]. In order to realise its food security objectives, it must boost its agricultural productivity, which is the lowest in the region. The projected impact of climate change will further threaten food security and water availability. The risks are highest in the north and northeast of the country which are already vulnerable to rainfall shortages and in some zones soil erosion, and in the western Imbo plains which experience both rainfall shortages and floods (see Map 1). Food security risks are highest during the 'long dry season', which has increasingly extended during past decades (May-September) and will be getting drier and hotter due to climate change. Extreme floods and droughts are estimated to result in a yield decline of 5-25 % in coming decades[4] and reduce long-term growth by 2.4 % of GDP per year[5].

Overall ranking

Burundi ranks 174 out of 180 countries in the ND-GAIN index[6] (2014), which is slightly better than in 2013 (rank 175). It is the 4th most vulnerable country and is the 20th least ready country- meaning that it is extremely vulnerable to, yet very unready to combat climate change effects. *Vulnerability* measures the exposure, sensitivity, and ability to cope with climate related hazards by accounting for the overall status of food, water, environment, health, and infrastructure within a country. *Readiness* targets those portions of the economy, governance and society that affect the speed and efficiency of adaptation.

Biophysical vulnerability

Current climate. Annual **rainfall** and average **temperature** differ per location and per season. Lowlands of the Imbo zone and the Ruzizi Plain in the west and northeast receive least rainfall (below 900 mm/year), while Imbo is also Burundi's warmest zone (23-25 °C). Highlands in the Congo-Nile watershed receive most rainfall (over 1600 mm/year) and are much colder (16-18 °C)[7]. Total rainfall and average temperature in the other parts of the country are between these extremes. Four seasons are distinguished:

- the long wet season (February-May, 300-700 mm);
- the long dry season (June-August, below 50 mm);
- the short wet season (September-December, 300-750 mm);

[1] NABC (2013): *Burundi Business Fact Sheet*

[2] Baramburiye, J.; Kyotalimye, M.; Thomas, T.S.; Waithaka, M. (2013): Chapter 3: Burundi. In: IFPRI (2013): *East African Agriculture and Climate Change.* http://www.ifpri.org/sites/default/files/publications/rr181ch09.pdf

[3] Baramburiye et al. (2013)

[4] Baramburiye et al. (2013)

[5] DFID (2011): The economic impacts of climate change in Burundi. http://weadapt.org/knowledge-base/economics-of-adaptation/economics-of-adaptation-burundi

[6] The 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/burundi

[7] Ministry for Land Management, Tourism and Environment (2007): National Adaptation Plan of Action (NAPA). http://unfccc.int/resource/docs/napa/bdi01e.pdf

- the short dry season (mid-January to mid-February, 300-600 mm; lower rainfall in the west and northeast)[8].

See Map 2 for information on the length of the seasons per area.

Burundi has a history of **extreme events** that are considered climate-related. Historically, various zones experienced frequent famines and destructive hailstorms. The regions that are struck hardest by such events are (see Map 1):

- BI01 (Buragane): droughts and erosion[9];
- BI03 (eastern depressions) north, BI04 (northern depressions) and BI09 (dry eastern plateaus) north:
  - frequent and severe droughts and famines (several per decade) – in BI04 combined with regression of lake levels;
  - since 1999, frequent violent rains, causing erosion, combined with thunder and lightning.
- BI07 (Imbo plains) north:
  - frequent excessive rains, causing floods and occasionally significant increases in the water level of Lake Tanganyika;
  - frequent rainfall shortages.

Nationwide, Burundi has alternatively experienced severe droughts, resulting in crop failure and a 35 % livestock mortality (1998-2005) and severe floods, with similar effects (2006-2007). Such events have been estimated to result in a loss of 5-17 % GDP per event[10].

Current trends. Changes in the duration of wet and dry seasons have recently been observed. Total precipitation has declined, the long wet season ends sooner (often ending in April) while the short wet season starts later (in October)[11]. This means that the 'long dry season' is further prolonged and can now be considered to last from May to September. Moreover, an increase in average temperature of ca. 0.8 °C has been observed between 1930 and 2000[12]. This intensification of dry and wet seasons results in more severe droughts and floods.

Climate change. Projections for future changes in temperature due to climate change estimate an increase of 0.4°C per decade[13] and a 1.9°C increase by 2050[14]. For both **temperature and rainfall**, projected changes differ per season:

- in the long wet season (January-May) precipitation will increase slightly by 3-10% by the year 2100;
- in the long dry season (specifically May-October), precipitation will decrease by 4-16% and temperature will increase most significantly (up to 5°C) by the year 2100;
- in the short wet season and the short dry season (specifically November-February), precipitation will increase by 0-25% by the year 2100[15].

[8] DFID (2009): Economic Impacts of Climate Change: Kenya, Rwanda, Burundi – 1. Burundi. http://static.weadapt.org/placemarks/files/790/506054d92b52bburundi-download.pdf

[9] FEWS NET and USAID (2009)

[10] Baramburiye et al. (2013)

[11] Baramburiye et al. (2013)

[12] DFID (2009)

[13] Ministry for Land Management, Tourism and Environment (2007), in Baramburiye et al. (2013)

[14] Climate Change Knowledge Portal. Available via: http://sdwebx.worldbank.org/climateportal/countryprofile/home.cfm?page=country_profile&CCode=BDI&ThisTab=ClimateFuture

[15] DFID (2009)

This suggests that the long dry season is not only being prolonged as a consequence of climate change, but also receives less rainfall and faces the most significant temperature increase resulting in acute problems for food security and water availability.

Projected changes and their influences also differ per geographical zone:

- northern and eastern provinces, that already suffer from frequent droughts, are likely to see a decrease in annual precipitation of 50–100 mm;
- potential increases in total rainfall (of 200 mm annually) or in rainfall intensity are likely to cause floods in the western Imbo plains and erosion in the southern zone and central plateau[16].

See also the attached maps for information on changes in precipitation (Map 3), erosion vulnerability (Map 4) and drought vulnerability (Map 5).

Changes in rainfall and temperature will influence both **food security** and **water availability**:

- Food security in Burundi is already extremely fragile: 61% of the country's households risk food insecurity at some point during the year. Heavier rainfall is expected to result in floods that damage crops, soil and infrastructure, while it can also increase the presence of pests or diseases that affect food crops and livestock. Increased temperatures will result in bush fires and increased water consumption/requirements; the latter especially since a temperature increase in Burundi's tropical humid climate will result in high evapotranspiration rates[17]. Simultaneously, prolonged periods of drought will lead to lower water levels and therefore decreased crop and livestock productivity, as well as increased livestock mortality[18]. Also, the 2016 harvest is expected to be low, which will result in further increase of food insecurity[19].
- Water availability for agricultural activities will be influenced by the decrease of Lake Tanganyika's water level, which is already resulting in desertification of the area and salinization problems in the Ruzizi Plain. Water quality of river and lake systems is decreasing due to increased temperature and sediment load. On the long term though, rainfall peaks may result in an increase of ca. 40% in the average flows of the Ruzizi and Ruvubu rivers between 2000 and 2050[20]. This poses challenges both in terms of protecting the country against extreme rainfall events and in terms of using such peak rainfalls to compensate for decreased water availability elsewhere in the country.

[16] DFID (2011); FEWS NET and USAID (2009)

[17] Baramburiye et al. (2013)

[18] Ministry for Land Management, Tourism and Environment (2007), in Baramburiye et al. (2013)

[19] World Food Program (WFP), food security analysis 2016. Available via http://vam.wfp.org/CountryPage_overview.aspx?iso3=BDI

[20] Ministry for Land Management, Tourism and Environment (2007), in Baramburiye et al. (2013)

Socio-economic vulnerability

Key facts:

GDP (PPP) per capita (2015)[21]:	USD 736
Population (June 2016)[22]:	11,541,901
Projected population (2050)[23]:	28, 668,150
Population density per km^2 (2014)[24]:	421
Human Development Index (2014)[25]:	184 out of 188 countries
Corruption Perception Index (2015)[26]:	150 out of 168 countries
Gender Inequality Index (2014)[27]:	109 out of 188 countries
Adult literacy (2015)[28]:	85.6 % (male 88.2%; female 83.1%)

As a result of its economy, poverty, high population growth, high population density, conflict, gender inequalities and relatively low levels of education, Burundi is very vulnerable to the biophysical impact of climate change. The country and its people are strongly dependent on climate sensitive economic sectors such as agriculture and animal husbandry. Agriculture contributes 39,2% to the country's GDP, occupying almost 94% of the working population[29]. Agriculture exports (coffee, tea, cotton) constitute 70-85% of the export revenues[30]. The transport system in Burundi is poor, due to a limited feeder road network, hilly terrains and no direct access to the sea. One of the most vulnerable groups, internally displaced persons (as result of the war), is unable to produce its own food and is therefore dependent on humanitarian assistance.

Burundi's annual population growth, 3.3%[31], is one of the highest in the world. The country's population is projected to increase by almost 250% by 2050. With an average density of more than 400 people per square kilometre, Burundi is one of the most densely populated countries in Africa. Population densities vary across the country[32]. In recent years there has been a surge in the rural-urban exodus in response to widespread poverty in rural areas. The eastern part of the country has the lowest density, while population densities of 500-2,000 inhabitants per square kilometre occur in the capital, Bujumbura, and the main cities, such as Ngozi and Kayanza in the north, Gitega in the midlands, and Rumonge in the south[33].

Poverty in Burundi is widespread, with 90-95% of the population living on less than USD 2 per day, particularly in rural areas. Most rural households have less than 0.5 hectares of farmland,

[21] World Bank Data - GDP per capita, PPP. http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD
[22] World Population Review - Burundi. http://worldpopulationreview.com/countries/burundi-population/
[23] UNDESA (2015): *World Population Prospects: The 2015 Revision.* http://esa.un.org/wpp/
[24] World Bank Data - Population density. http://data.worldbank.org/indicator/EN.POP.DNST
[25] UNDP (2015). http://hdr.undp.org/en/content/table-1-human-development-index-and-its-components
[26] http://www.transparency.org/cpi2014/results
[27] http://hdr.undp.org/en/content/table-4-gender-inequality-index
[28] CIA World Factbook (2015), available via https://www.cia.gov/library/publications/the-world-factbook/geos/by.html
[29] CIA World Factbook (2015). Available via https://www.cia.gov/library/publications/the-world-factbook/geos/by.html
[30] Burundi Ministry for Land Management, Tourism and Environment (2007), in Baramburiye et al. (2013)
[31] World Bank Data - Population growth. http://data.worldbank.org/indicator/SP.POP.GROW/countries
[32] Burundi Ministry of Finance, 2007 in Baramburiye et al. (2013)
[33] Baramburiye et al. (2013)

due to the combination of high population growth with a land tenure system that favours fragmentation of plots among siblings[34]. Rural households cope by expanding into environmental protection areas, cultivating on steep slopes without recourse to sustainable practices for highlands, and draining marshes for agricultural use. This further worsens land degradation and soil erosion in mountainous areas. Coupled with intermittent droughts, this has led to food shortages and urbanisation. Under current climate change trends there will be a significant impact on some of the principal food crops in Burundi. Maize, beans and sweet potato yields are expected to decrease gradually, with maize yield decreases of 5-25% predicted for the next decades. Farmers may attempt to cope with climate change by switching to other crop types such as peas that have a shorter growth cycle and are therefore suitable for the shortening rainy seasons[35].

The Social Vulnerability Index identified Burundi as the third most vulnerable African country. Focusing solely on 'natural resource dependency' (rather than other social and economic factors), Burundi is the second-most vulnerable country (after Rwanda). In the 'Institutional Strength and Public Infrastructure' index, Burundi ranks first[36]. There exists a vicious cycle of land shortage and environmental degradation, which leads to food shortage, unemployment and social conflict. This deepens instability which disrupts production systems and marketing channels by displacing the local farm population. Although this situation is present throughout the country, it is profound in Cibitoke, Bubanza and Bujumbura Rural provinces, which are the targeted provinces of the Dutch bilateral food security program[37].

In Burundi, women make up for 56% of the agricultural workforce. Although rural women and men may play complementary roles in farming activities, women tend to play a greater role in natural resource management and ensuring nutrition in the household. Responsibility for climate change adaptation is likely to fall on their shoulders, including finding alternative ways to feed and provide water for their families[38]. Moreover, in terms of public health, the Burundian population faces high vulnerability. Increased rainfall and floods can increase the vegetation density, which provides suitable breeding pools for mosquito larvae and can result in an increase in malaria[39].

Climate-smart agriculture has the potential to both increase production and build resilience for climate change. However, there are significant challenges including the increasing fragmentation of farms, uncertainty in land tenure (especially concerning women's access to land), and access to credit, inputs, and markets.

[34] Burundi Ministry of Finance, 2007 in Baramburiye et al. (2013)

[35] Baramburiye et al. (2013)

[36] Vincent 2004, pp. 31, 44, in Nabalamba, A., Mubila, M., Alexander, P. (2011): *Climate Change, Gender and Development in Africa*. African Development Bank

[37] Multi Annual Strategic Plan, EKB Burundi

[38] Brody et al., 2008, p. 4, in Nabalamba, A., Mubila, M., Alexander, P. (2011): *Climate Change, Gender and Development in Africa*. African Development Bank

[39] Baramburiye et al. (2013)

National government strategies and policies

Burundi has been characterised as one of the countries in the region that are 'less actively engaged' in climate change adaptation (in comparison with highly engaged countries such as Ethiopia, Rwanda, Kenya and Uganda). This is caused by both national priorities and national capacities[40]. Nevertheless, there are some developments concerning national strategies and policies for climate change.

Burundi has ratified the UN Convention on Biological Diversity (CBD) for which it elaborated a Biological Diversity National Strategy and Plan of Action, the Convention to Combat Desertification (CCD) for which it elaborated a National Plan of Action to Combat Desertification, the Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. It has prepared two National Communications for the UNFCCC and a National Action Plan for Adaptation (NAPA)[41]. In the NAPA (2007), priority areas are:

- reinforce the management of existing protected areas and include in protected areas the natural ecosystems identified as being threatened and vulnerable;
- safeguard existing woodlots and reforest the stripped areas;
- install mechanisms to control erosion in sensitive areas;
- control the river dynamics of watercourses and torrents in Mumirwa, including the city of Bujumbura;
- popularise short cycle and dryness resistant food crops;
- popularise rainwater harvesting techniques for agricultural or domestic use;
- identify and popularise improved techniques for use of wood and new renewable energies;
- increase the number of hydropower micro stations;
- establish and protect strategic buffer zones in Lake Tanganyika floodplain and around the lakes of Bugesera;
- identify and popularise the breeding of species adapted to local climate conditions;
- popularise zero-grazing techniques;
- identify and popularise dryness resistant forest species;
- train and inform the decision makers and other partners, including the local communities on the methods of adaptation to climate variability;
- improve seasonal early warning climate forecasts.

However, only one of the priority areas has been implemented (improve seasonal early warning climate forecasts). All others remain unfunded so far, leaving a number of vulnerable sectors without action on the identified priorities (including agriculture, freshwater and forestry)[42].

While climate change is not explicitly addressed in Burundi's Poverty Reduction Strategy Paper (PRSP-II), one of its four pillars, 'Promoting development through sustainable environmental and space management' will contribute to increased adaptive capacity[43].

[40] Hove, H.; Echeverría, D.; Parry, J.E. (2011): *Review of Current and Planned Adaptation Action: East Africa*. Adaptation Partnership / International Institute for Sustainable Development. https://www.iisd.org/pdf/2011/East_Africa_Adaptation_Action.pdf

[41] Burundi Ministry for Land Management, Tourism and Environment (2007), in Baramburiye et al. (2013)

[42] Hove et al. (2011)

[43] Republic of Burundi (2012). Poverty Reduction Strategy Paper (PRSP-II). Available via https://www.imf.org/external/pubs/ft/scr/2012/cr12224.pdf

In 2012, Burundi finalised its National Climate Change Strategy and Action Plan[44]. It is also developing a national policy on climate change adaptation as part of the project "Enhancing Climate Risk Management and Adaptation in Burundi" funded in part by the Least Developed Countries Fund (LDCF).

Early 2015, Burundi published a report on its progress on activities under the Hyogo framework for action. These primarily concern disaster risk reduction, but also include climate change relevant activities. The report concluded that Burundi is relatively well on track in reaching its objectives, because:

- early warning systems are in place and information on extreme climate events is available;
- strategies and policies concerning climate change are in place;
- disaster risk reduction is an integral objective for climate change adaptation policies;
- potential risk scenarios are developed taking into account climate change projections.

Three areas were identified as priorities for the future:

- integrate disaster risk reduction into policies and plans for sustainable development;
- develop and strengthen institutions, mechanisms and capacities to build resilience to hazards;
- systematically consider risk reduction in emergency preparedness/response/recovery activities[45].

Recently, the government of Burundi has drafted a roadmap to move Burundi's NAP process forward. Formal support to support the NAP process was requested in March 2016. Discussions about how to operationalize this support are still ongoing[46]

Intended Nationally Determined Contribution (INDC)[47]

In its Intended Nationally Determined Contribution (INDC) Burundi presents itself as being vulnerable to climate change. It projects that climate change affects every economic sector in the country, but will particularly impact agriculture. The INDC describes the population's perception of climate change related risks as 'reactive' and identifies communication and education on climate change risks as one of the important targets of adaptation measures.

The INDC details adaptation and mitigation measures, with a total cost of USD 1,493,589. The larger part of this budget is allocated to mitigation measures (development of hydroelectricity, solar, reforest programs, see below).

Mitigation. Burundi plans to reduce its GHG emissions by approximately **23%** before 2030, compared to the Business-as-Usual (BAU) scenario. Of this 23% emission reduction **3% is unconditional** (through national funding and efforts) and **20% is conditional** on international finance. The unconditional (national) objective of 3% reduction is to be achieved by: (i) a 15-year reforestation program (annual reforestry rate of 4,000 hectares) under the National Reforestation Programme and (ii) increasing electrification rate by 35% by building

[44] Nile Basin Initiative (2013): Climate Change Strategy. www.nilebasin.org/index.php/media-center/publications/doc_download/104-nbi-climate-change-strategy

[45] HFA (2015): *Burundi - Rapport national de suivi sur la mise en oeuvre du Cadre d'action de Hyogo (2013-2015) - Interim*

[46] http://adaptation-undp.org/explore/eastern-africa/burundi

[47] Republic of Burundi (2015). Intended Nationally Determined Contribution. Available via http://www4.unfccc.int/Submissions/INDC/Published%20Documents/Burundi/1/Burundi_INDC-english%20version.pdf

three hydroelectric power plants. The conditional objectives are to be realized by (i) forestry schemes – aiming to reforest 8,000 hectares per year, and (ii) agricultural development – mainly replacement of mineral fertilizers with organic fertilizer.

Adaptation. To successfully adapt to climate change, Burundi's INDC proposes to implement the following measures:

1. Human and institutional capacity building:
   a. inform, educate and communicate about risks of climate change and adaptation technologies; development of the population's reactivity;
   b. strengthening the aptitude of actors (especially women and farmers) on new techniques to intensify sustainable agricultural production;
   c. Encourage transfer of technology between research institutes and agro-sylvo-pastoral actors;
   d. support institutions in defining adaptation priorities by socioeconomic sector and foster inter-sectoral consistency (during the development of the National Adaptation Plan).
2. Technology transfer:
   a. development of access to water while enhancing the efficiency of use (e.g. hydro-agricultural developments; rain-fed crops; small and large scale irrigation development);
   b. promotion of intensified water-efficient agriculture (e.g. intensify and diversity agricultural production and development of agro-ecological approach);
   c. security of animal and fishing production, and promotion of associations (e.g. diversification, genetic diversity of animals, rain-fed fish farms, conserve fishing resources while further developing the fishery sector);
   d. support facilities that use renewable energy sources;
   e. communications on climate risk and adaptation scenarios (e.g. track weather forecasts, prevent and fight bio-aggressors, use information networks).

Currently, Burundi's National Adaptation Plan is still under preparation[48].

Climate finance

According to an ODI report (2014), Burundi is lagging behind its neighbouring countries in terms of finance approved from international climate funds. It has been reported that no mitigation finance has been approved, while the amount approved for adaptation is USD 12 or 14 million by 2014 (according to different sources)[49] [50]. Burundi has expressed interest in becoming one of the countries in the REDD project of the Forest Carbon Partnership Facility (FCPF), and requested financial support to prepare its Readiness Plan Idea Note (R-PIN) that is needed to request FCPF support.

These low figures are caused in part by the country's low readiness to access and absorb climate finance. Crucial institutional and legal policy frameworks were only recently developed or are still being prepared. There are only few climate-change experts in the country. Overall

[48] http://www.adaptation-undp.org/projects/supporting-burundi-advance-their-nap-process

[49] 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

[50] Climate Funds Update website: http://www.climatefundsupdate.org/country-pages

weak technical and financial management adds to the balance and hinders the preparation of proposals and implementation of projects[51]. For the Green Climate Fund, in contrast to Rwanda and Kenya, Burundi does not yet have a designated authority (only a 'focal point', which is the Ministry of Finances and Economic Development Planning)[52], nor an accredited entity (AI) that would enable direct access to the Green Climate funds.

Climate change projects

The relatively limited amount of climate change projects in Burundi can be explained at least partly by its recent period of conflict – which encourages other priorities. The country has a very low number of adaptation projects currently being carried out in comparison with other countries in the region. Yet, some initiatives exist to raise awareness through capacity building and joint learning[53]. Some climate change projects with a link to water and/or food security that are being implemented in the country (either bilaterally or through international climate funds) are the following:

- 'ACCES' (2013-2018), entailing various projects for reconstruction and rehabilitation of the area north of the capital that suffered during the floods of February 2014, commissioned by GIZ and implemented by the World Bank, EU, AfDB and the Government of Burundi (ca. USD 25 million)[54];
- two regional projects of which Burundi is one of the targeted countries: 'Lake Tanganyika Integrated Environmental Management Programme' and 'Mainstreaming Groundwater Considerations into the Integrated Management of the Nile River Basin', implemented by UNDP and funded by GEF[55];
- 'Climate Change Adaptation project for water and soil resources protection' (2013-2018), funded by GIZ (ca. USD 10 million)[56];
- a research project on the economic impacts of climate change in Burundi, funded by DFID[57].

For a complete list of all projects in Burundi funded through bilateral/multilateral climate funds, see the list in the Annex.

[51] Tippmann, R.; Agoumi, A.; Perroy, L.; Doria, M.; Henders, S.; Goldmann, R. (2013): *Assessing Barriers and Solutions to Financing Adaptation Projects in Africa*. IDRC

[52] Green Climate Fund (2015): *National Designated Authority (NDA) and focal point designations.* http://www.gcfund.org/fileadmin/00_customer/documents/Readiness/2015-4-12_NDA_and_Focal_Point_nominations_for_the_Green_Climate_Fund.pdf

[53] Adaptation Partnership (2011): *Review of Current and Planned Adaptation Action: East Africa*

[54] HFA (2015)

[55] UNDP/GEF: http://web.undp.org/gef/document/Projects%20Under%20Implementation%20-%20AFRICA.pdf

[56] HFA (2015)

[57] https://www.weadapt.org/knowledge-base/economics-of-adaptation/economics-of-adaptation-burundi

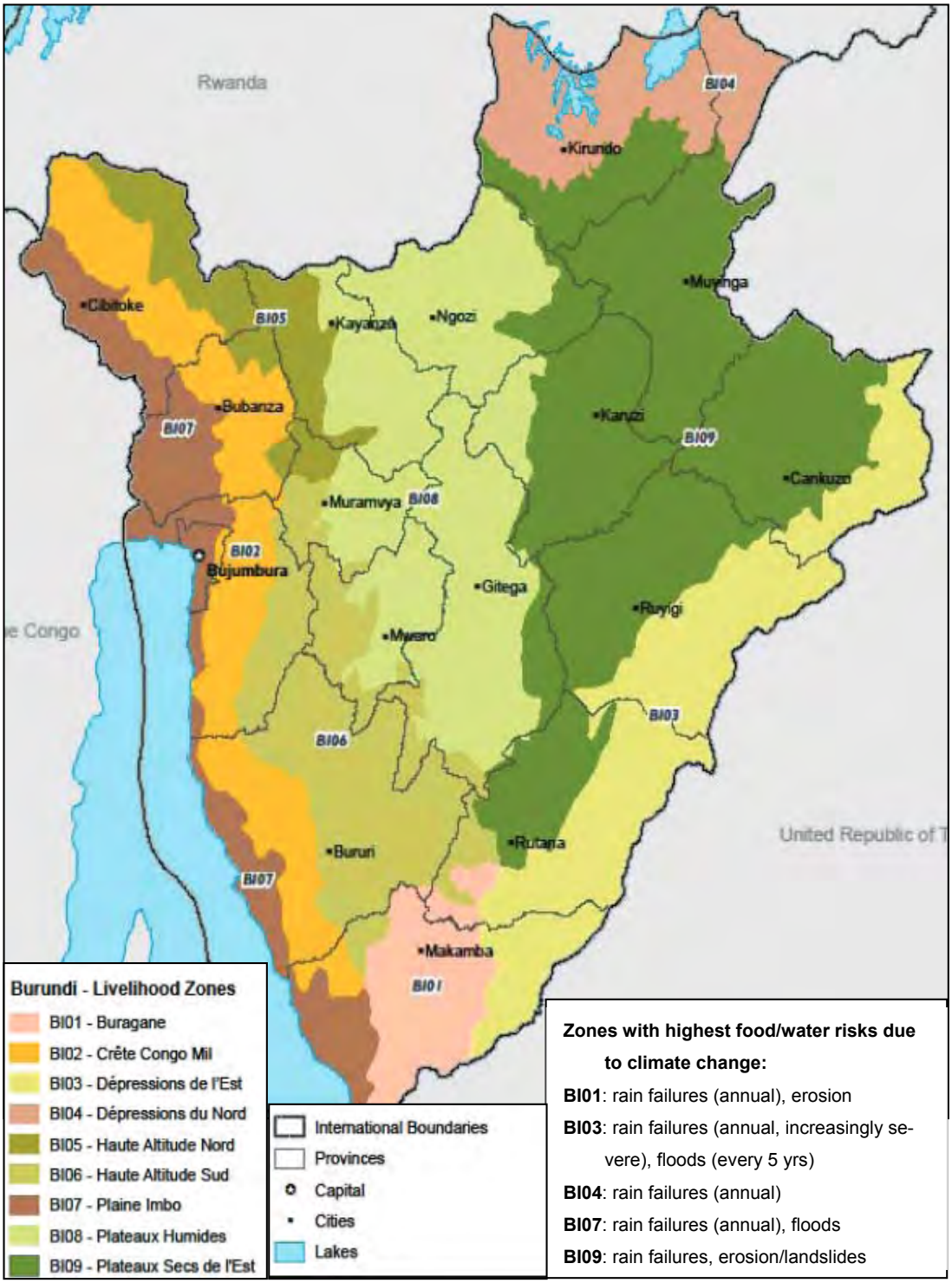
Climate contribution of the Netherlands Embassy: Pitch & Bid

Beginning in 2014, embassies with development programs have annually been preparing a climate Pitch & Bid. The *Pitch* communicates the embassy's climate-smart actions that will address climate change. Based on the actions described in the Pitch, assignment of the Rio Markers and budget information, the embassy prepares a *Bid*, which is an estimate of how much is likely to be spent on projects that will contribute to climate in the coming three years. For Burundi the Bid estimates a climate contribution for 2016-2018 of €16.3 million (4.45 million for 2016; 6.20 million for 2017; 5.66 million for 2018), mainly focusing on *adaptation* and to a lesser extent on mitigation:

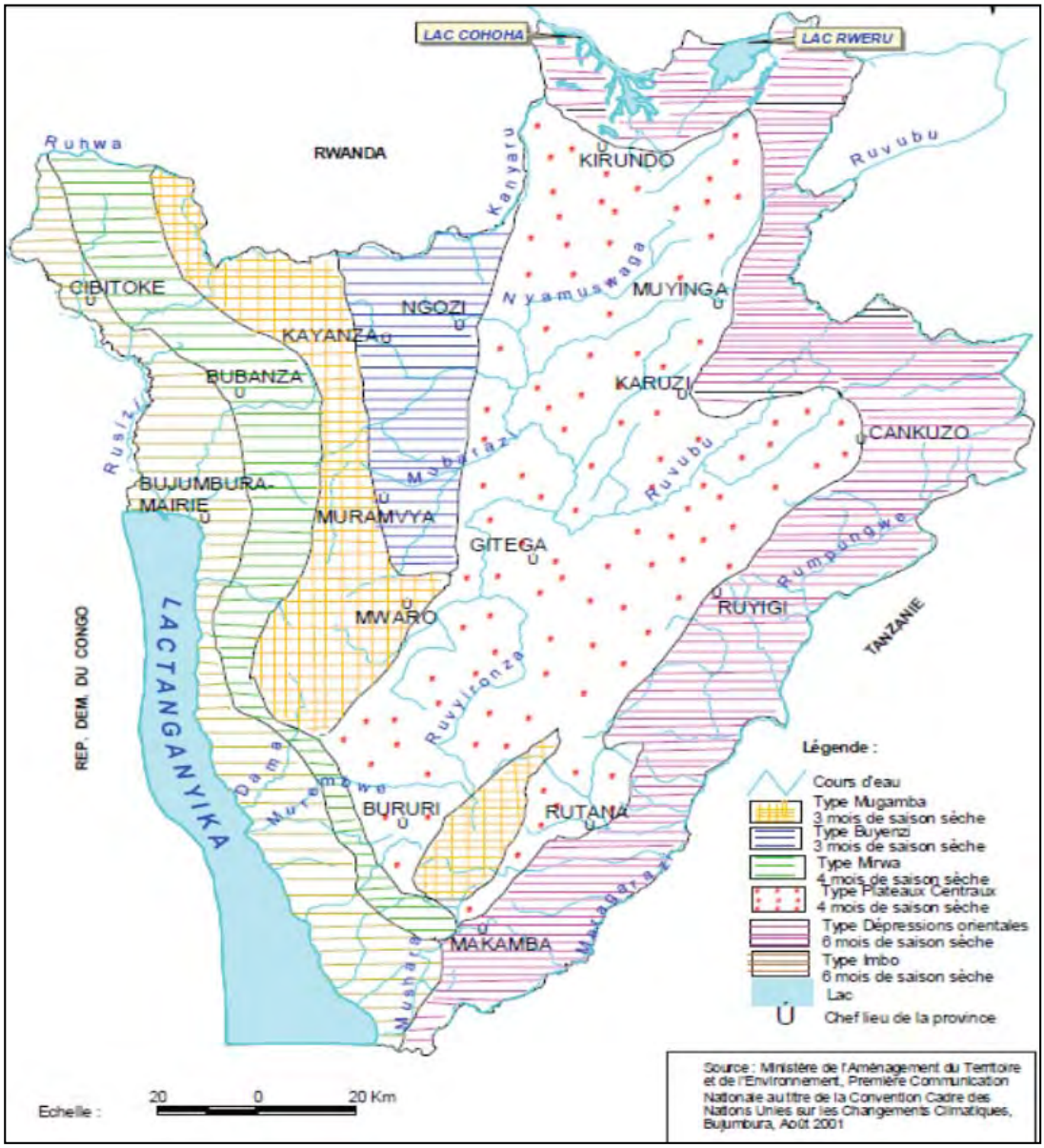
- PAPAB program: the program aims to increase food security of at least 480,000 farming families, by promoting market-oriented, climate resilient and sustainable agricultural techniques, supported by fertilizer subsidies. PAPAB is the follow-up program of previous soil fertility programs (ISFM), integrated farm planning projects (PIP) and fertilizer subsidy programs;
- nutrition, school feeding and agricultural production program (P4P). The program focuses on reversion of deforestation and to make a contribution to regreening of the environment. The production component of P4P is linked to PAPAB. Nutrition and school feeding refers to climate smart agricultural practices (including planting of trees);
- financial services for farmers (Agri finance): a project aims to increase access to smallholder credit – including a pilot on climate risk insurance, the first in Burundi- will enable them to invest in new technologies and build their adaptive capacity.

Map 1: Zones most at risk due to climate change

Adapted from FEWS NET and USAID (2009): Livelihoods zoning "plus" activity in Burundi

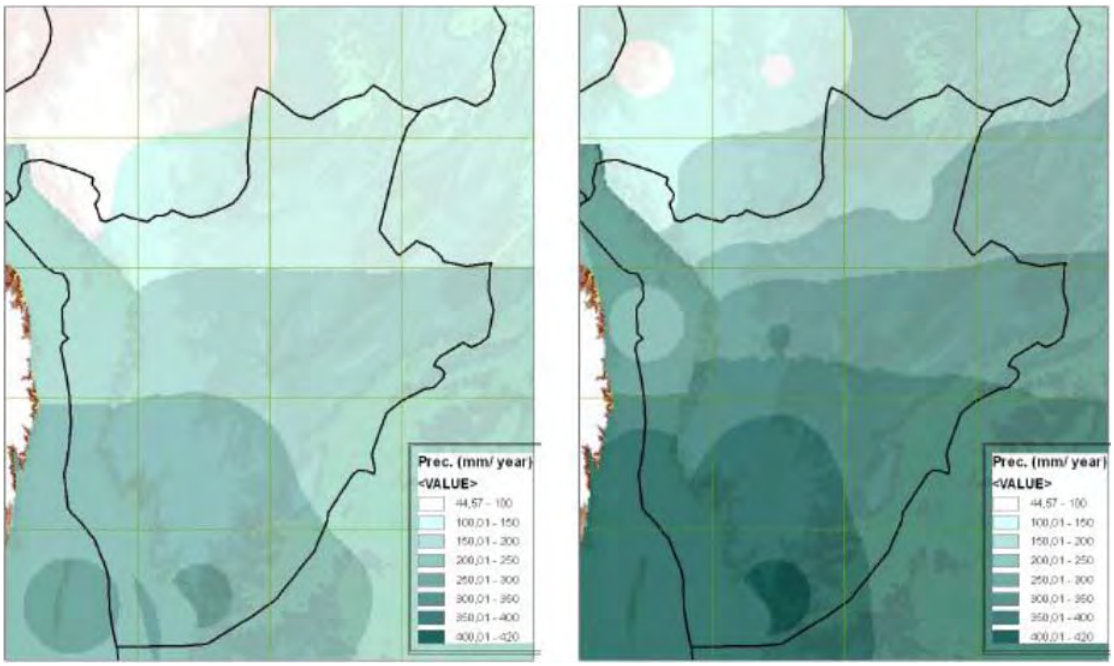


Map 2: Climatological zones in Burundi



Source: NAPA 2007 / DFID 2009

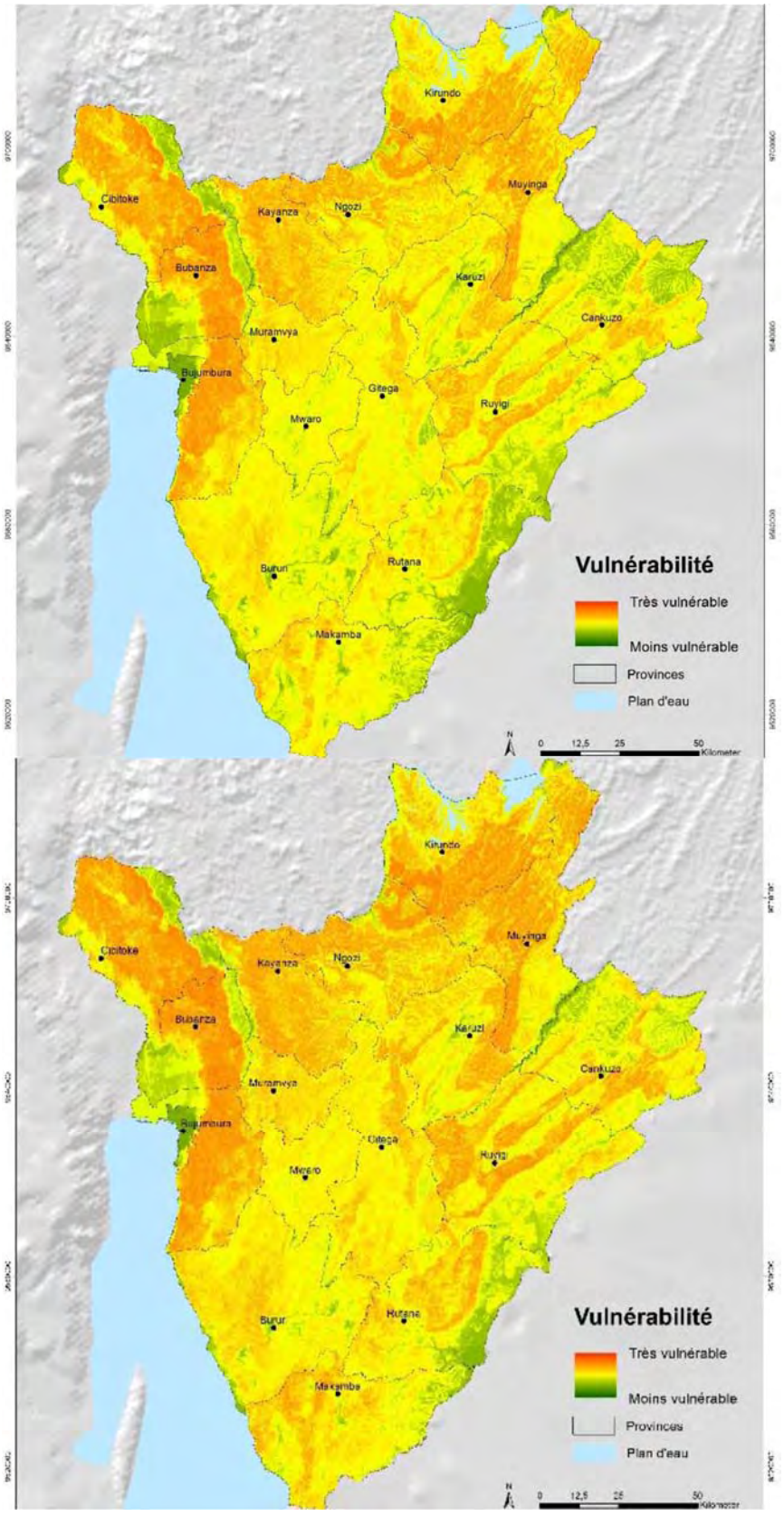
Map 3: Projected annual rainfall, 2031-2060 (left) and 2071-2099 (right)



50-100 mm
100-150 mm
150-200 mm
200-250 mm
250-300 mm
300-350 mm
350-400 mm
400-450 mm

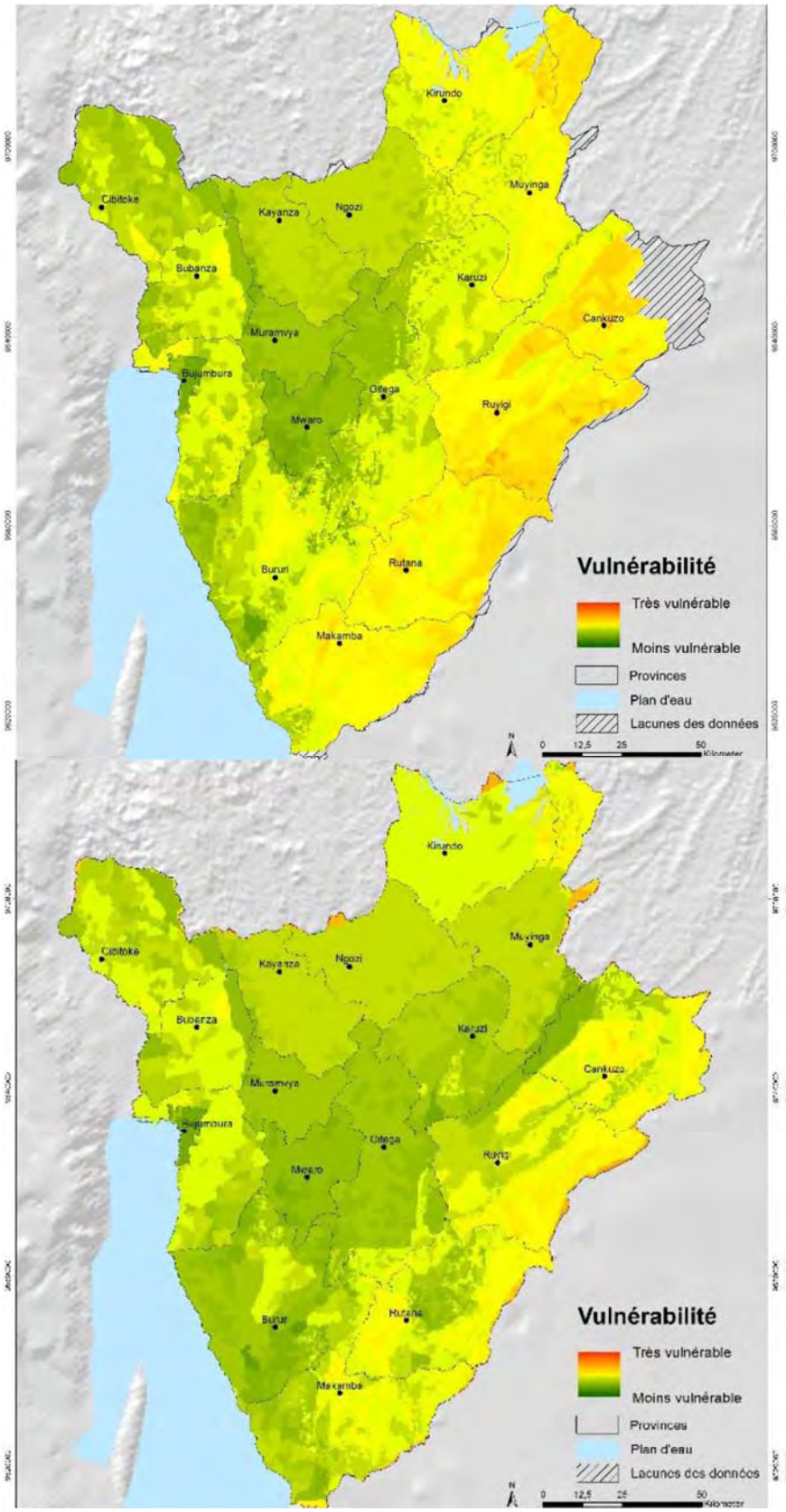
Source: Bollin, C.; K. Fritzsche; S. Ruzima; S. Schneiderbauer; D. Becker; L. Pedoth; S. Liersch (2014): Analyse intégrée de la Vulnérabilité au Burundi, *GIZ and MEEATU & MINAGRIE*

Map 4: Vulnerability to erosion in 2014 (top) and 2071-2099 (bottom)



Source: Bollin et al. (2014)

Map 5: Vulnerability to drought in 2014 (top) and 2071-2099 (bottom)



Source: Bollin et al. (2014)

Annex: List of projects in Burundi under multilateral climate funds

Source: Climate Funds Update (2016): http://www.climatefundsupdate.org/data

Multilateral funds

Name of Project	Fund	Amount of Funding Approved (USD millions)	Disbursed (USD millions)
Promotion of Small Hydro Power (SHP) for Productive Use and Energy Services	Global Environment Facility (GEF6)	1,6	
Restructuring of the Value Chain Development Programme (PRODEFI)	Adaptation for Smallholder Agriculture Programme (ASAP)	5	0
Community Disaster Risk Management in Burundi	Least Developed Countries Fund (LDCF)	8,8	8,8
Préparation du Plan d'Action National d'Adaptation du Burundi aux changements climatiques	Least Developed Countries Fund (LDCF)	0,2	0,2
Enhancing Climate Risk Management and Adaptation in Burundi (ECRAMB)	Least Developed Countries Fund (LDCF)	3,2	3,2
SPWA-CC Energy Efficiency Project	Global Environment Facility (GEF4)	1,8	1,8
Infrastructure resilience emergency project[58]	Worldbank	25	
BI-Jiji and Mulembwe Hydropower[59]	Worldbank	100	
Sustainable Coffee Landscape project[60]	Worldbank	4,2	

[58] http://www.worldbank.org/projects/P150929?lang=en

[59] http://www.worldbank.org/projects/P133610?lang=en

[60] http://www.worldbank.org/projects/P127258/sustainable-coffee-landscape-project?lang=en