

Climate Change Profile RWANDA

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Climate Change Profile: Rwanda

Rwanda is a landlocked country with a moderate climate and relatively high rainfall. Climate change is expected to result in increased temperatures, intensified rainfall, and prolonged dry seasons. This presents different challenges for different regions: the mountainous west of the country will be subject to erosion, parts of the central north and south will experience severe floods, and the east and southeast will suffer from droughts and desertification. In terms of food security, the four most vulnerable regions (out of twelve) are the Eastern Agro-Pastoral Zone, the Eastern Semi-Arid Agro-Pastoral Zone, the Bugesera Cassava Zone in the south, and parts of the Eastern Congo-Nile Highland Subsistence Farming Zone¹ (see [Map 1](#)). Some climate change effects, such as the lowering level of lakes and water flows and forest degradation, are expected to occur throughout the country².

Overall ranking

Rwanda ranks 131 out of 178 countries in the ND-GAIN index³ (2013), which is slightly better than in 2010 (rank 135). It ranks 13th on vulnerability and 95th on readiness – meaning that it is highly vulnerable to climate change effects, yet its readiness to combat these effects is moderate. *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. The current **rainfall** pattern of Rwanda shows high annual average precipitation above 1500 mm in mountainous western regions of the country and just below 700 mm in eastern regions⁴. The country's rainfall pattern is characterized by four **seasons**: a short wet season (September–November), a short dry season (December–February), a long wet season (March–May) and a long dry season (June–August)⁵. Rwanda's average annual **temperature** is between 15–17°C in high altitude areas and up to 30°C in lowlands in the east and southwest⁶.

Current trends. Analysis of **rainfall** trends has shown an increasing occurrence of extremes over time and in various regions of the country. Rainy seasons are becoming shorter and more intense, especially in the northern and western provinces, which increases erosion risks in these mountainous parts of the country. Eastern regions have experienced serious rainfall deficits in a number of years over previous decades, alternated with rainfall excesses in other years⁷. At the same time, there has been a trend over

¹ USAID and FEWS NET (2011): *Livelihoods zoning 'plus' activity in Rwanda*.

http://www.fews.net/sites/default/files/documents/reports/RW_livelihood%20descriptions%202011.pdf

² Ministry of Land, Environment, Forestry, Water and Mines (2006): *NAPA Rwanda*.

³ 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/rwanda>

⁴ REMA (2011a): *Atlas of Rwanda's Changing Environment: Implications for Climate Change Resilience*.

<https://na.unep.net/siouxfalls/publications/REMA.pdf>

⁵ REMA (2009): Chapter IX: Climate change and natural disasters. In: *Rwanda state of environment and outlook report*. <http://www.rema.gov.rw/soe/chap9.php>

⁶ REMA (2009)

⁷ REMA (2009)

the past decades towards a higher **temperature**: increases up to 2.0°C have been measured between 1970 and 2009⁸.

Climate change. Current trends in rainfall and temperature are expected to continue in the future. **Temperature** predictions suggest that the country's temperature will increase another 1–2.5°C between 2000 and 2050⁹, and 1–6°C by 2100¹⁰. The increase is expected to be consistent across the country and across seasons – although the increase in the long dry season may be slightly higher than in other seasons¹¹. Besides influencing on crop yields (see below), this will make previously malaria-free highlands more susceptible or even highly suitable for malaria in several decades¹², with populations at risk increasing by 150% by 2050¹³. Average annual **rainfall** models predict a change between –100 mm and +400 mm for the period 2000–2050¹⁴. Rwanda perceives itself as a water-rich country and therefore does not see climate change planning on water resources as a priority. Although these predictions seem to support that perception, they do not account for regional and seasonal differences:

- Frequent rainfall deficits are expected in parts of the eastern province (Bugesera, Nyagatare, Gatsibo, Kayanza, Ngoma, Kirehe) and the southern province (Nyanza, Gisagara), while increased rainfall is expected in parts of the western, northern and southern provinces;
- Rainfall is expected to be more intense in the rainy seasons while dry seasons will be longer and dryer, which brings new challenges for water management, storage and drainage.

Some of these challenges are extreme events including severe **droughts** and **floods**, which will occur more often due to climate change. Droughts have already resulted in famine, population displacement, conflicts, and biodiversity loss. Seasonal droughts are expected to be prolonged, which will cause problems especially in the east and southeast of the country (Bugesera, Mayaga, and Umutara)¹⁵. The Ministry of Land, Environment, Forestry, Water and Mines made an inventory of the most current environmental risks due to climate change. It concluded that prolonged seasonal drought, dry spells in rainy seasons, and recurrent droughts for three or more years are among the most pressing problems¹⁶. At the same time, the country has experienced major floods in a number of consecutive years (2006–2009), resulting in serious health problems, displacement, large scale erosion, and damages to infrastructure¹⁷. Droughts and floods are region-specific problems, with droughts occurring mainly in the east of the country (see [Map 2](#)) and floods in the western/central north and south (see [Map 3](#)). Some regions are also prone to erosion (see [Map 4](#)).

⁸ REMA (2011a); REMA (2011b): *Guidelines for Mainstreaming Climate Change Adaptation and Mitigation in the Health Sector*. http://rema.gov.rw/rema_doc/DNA/CCmainstreamingguide-Health-finaldraft-Aug02.doc#_Toc300054349

⁹ Tenge, N.G., Alphonse, M., Thomas, T.S. (2013): Chapter 9: Rwanda. In: IFPRI (2013): *East African Agriculture and Climate Change*. <http://www.ifpri.org/sites/default/files/publications/rr181ch09.pdf>

¹⁰ Mitchell, T.D. (2003): *Rwanda: 21st century climate changes*. http://www.cru.uea.ac.uk/cru/data/hrg/timm/climate/ateam/TYN_CY_3_0.html

¹¹ Mitchell (2003)

¹² Boko, M., Niang, I., Nyong, A., et al. (2007): *Africa: Climate Change 2007: Impacts, Adaptation and Vulnerability*. Cambridge University Press, Cambridge UK, 433–467.

¹³ SEI (2009): *Economics of Climate Change in Rwanda*.

¹⁴ Tenge et al. (2013)

¹⁵ REMA (2009)

¹⁶ Ministry of Land, Environment, Forestry, Water and Mines (2006): *NAPA Rwanda*.

¹⁷ Tenge et al. (2013)

Changes in rainfall and temperature with an increase in floods and droughts will impact **food security** and **water availability**. An assessment of the influence of climate change on crop productivity in African countries has concluded that Rwanda may be a hotspot of food insecurity in the future, along with many of its neighbouring countries (which limits opportunities for import)¹⁸. Food security will be influenced because of the vulnerability of some crops to increasing temperatures and/or water stress (see below). The most food insecure regions of the country are in the west and central south (see [Map 5](#)).

Rwanda has not experienced serious water availability problems due to its relatively high precipitation rate, despite the lowering level of lakes and waterways. However, climate change – combined with rapid population growth, urbanisation, environmental degradation and pollution – will raise new challenges. More attention to water management and options for water storage, irrigation infrastructure and water monitoring¹⁹ is needed to cope with future water demands in all region of the country (see [Map 6](#)).

Socio-economic vulnerability

Key facts:

| | |
|---------------------------------------------------------------|----------------------------------|
| GDP (PPP) per capita (2013) ²⁰ : | 1,474 international \$ |
| Population (October 2014) ²¹ : | 12,100,049 |
| Projected population (2050) ²² : | 25,378,000 |
| Population density per km ² (2013) ²³ : | 477 |
| Human Development Index (2013) ²⁴ : | 151 out of 187 countries |
| Corruption Perception Index (2014) ²⁵ : | 55 out of 174 countries |
| Gender Inequality Index (2013) ²⁶ : | 79 out of 187 countries |
| Adult literacy (2014) ²⁷ : | 71.1% (male 74.8%; female 67.5%) |

Rwanda is highly vulnerable to climate change because of its dependence on agriculture, accounting for 33% of GDP in 2013 and employing 90% of the country's inhabitants (directly or indirectly)²⁸. Almost all agricultural activities are rain-fed, which makes the country very vulnerable to changes in rainfall patterns. Strong dependency of agriculture on natural resources further increases vulnerability to climate change: an evaluation of social vulnerability to climate change ranks Rwanda first among all African countries in terms of *natural resource dependency*, which it considers to be one of three indicators for social vulnerability to climate change²⁹. Vulnerability is further increased by Rwanda's high population

¹⁸ Liu, J., Fritz, S., et al. (2008): A spatially explicit assessment of current and future hotspots of hunger in Sub-Saharan Africa in the context of global change. *Global and Planetary Change* 64(3–4), pp 222–235.

¹⁹ Government of Rwanda (2011): *Green Growth and Climate Resilience: National Strategy for Climate Change and Low Carbon Development*. <http://www.uncsd2012.org/content/documents/364Rwanda-Green-Growth-Strategy-FINAL.pdf>

²⁰ World Bank Data – GDP per capita, PPP. <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>

²¹ World Population Review – Rwanda. <http://worldpopulationreview.com/countries/rwanda-population/>

²² UNDESA (2012): *World Population Prospects: The 2012 Revision*. <http://esa.un.org/wpp/>

²³ World Bank Data – Population density. <http://data.worldbank.org/indicator/EN.POP.DNST>

²⁴ UNDP (2014). <http://hdr.undp.org/en/content/table-1-human-development-index-and-its-components>

²⁵ <http://www.transparency.org/cpi2014/results>

²⁶ <http://hdr.undp.org/en/content/table-4-gender-inequality-index>

²⁷ Index Mundi (2014). <http://www.indexmundi.com/rwanda/literacy.html>

²⁸ Index Mundi (2013): *Rwanda Economy Profile 2013*. http://www.indexmundi.com/rwanda/economy_profile.html

²⁹ Nabalamba, A., Mubila, M., Alexander, P. (2011): *Climate Change, Gender and Development in Africa*. African Development Bank.

density – with 321 persons per square kilometre among the highest in the world³⁰ – which will increase further due to its annual population growth rate of 2.7%. Population density is especially high in the central/western north and south³¹, areas which are also characterized by high flood risks. Adaptive capacity of people in these areas is low because high population density decreases people's options of relocation in the case of an extreme event.

Climate change has different effects for the production of different crops. Cassava, once the main food and income-generating crop, was reported in 2009 to be 'a rare commodity' because of declining yields due to low soil moisture³². Yields only picked up since the onset of the Crop Intensification Program, which claims to have led to tripled cassava production in Rwanda between 2009 and 2012³³.

Expected future effects for the country's main staple crops – in order of importance – are:

- Bananas (35% of productive area): productivity is unlikely to change as they grow well in higher temperatures.
- Beans (22–30% of cultivated land): yields will seriously decrease because they require cooler temperatures (14–18°C) that will no longer exist. Low soil moisture will further decrease yields³⁴.
- Sorghum: will become suitable for some areas in the (north) west which are currently too cold³⁵.
- Potatoes: yields are expected to increase (25–90% between 2010 and 2050), which will make Rwanda able to meet all domestic demand and supply to an export market by 2050.

Coffee and tea are the most important cash crops of the country. Coffee especially is very sensitive to climatic factors: temperatures above 25°C as well as atypical rainfall patterns have adverse effects on the plants³⁶. Higher temperatures due to climate change will force coffee producers to cultivate higher lands that are more prone to erosion, simultaneously leading to possible conflicts with small-scale farmers in such areas³⁷. Rwanda's 'persistent lack of economic diversification' beyond these crops³⁸ thus makes it more vulnerable to climate change.

Rwanda's energy security may be at risk due to climate change, as hydropower contributes 50% of electricity, making it vulnerable to variation in rainfall and evaporation. Droughts reduce generating capacity of hydroelectric dams, and floods increase soil erosion and siltation which can damage dams. A good example of this is the drought in 2004 in Rwanda which reduced hydropower capacity so much that the government was forced to rent diesel power plants to meet domestic demand.³⁹

³⁰ Tenge et al. (2013)

³¹ Tenge et al. (2013)

³² REMA (2009)

³³ Ministry of Agriculture (2012): *About Crop Intensification Program – CIP*.

http://www.minagri.gov.rw/fileadmin/user_upload/documents/CIP/MORE_INFORMATION_ABOUT_CROP_INTENSIFICATION_PROGRAM.pdf

³⁴ REMA (2009)

³⁵ Tenge et al. (2013)

³⁶ Ngabitsinze, J.C., Mukashema, A., Ikirezi, M., Niyitanga, F. (2011): *Planning and costing adaptation of perennial crop systems to climate change : Coffee and banana in Rwanda*. <http://pubs.iied.org/pdfs/G03174.pdf>

³⁷ Republic of Rwanda (2011): *Green Growth and Climate Resilience: National Strategy for Climate Change and Low Carbon Development*. <http://www.uncsd2012.org/content/documents/364Rwanda-Green-Growth-Strategy-FINAL.pdf>

³⁸ Tenge et al. (2013)

³⁹ Republic of Rwanda (2011): *Green Growth and Climate Resilience*.

<http://www.uncsd2012.org/content/documents/364Rwanda-Green-Growth-Strategy-FINAL.pdf>

A 2009 study on the economics of climate change in Rwanda found that climate change is likely to cost 1% of GDP per year by 2030⁴⁰.

Accessibility of markets in Rwanda is reasonable – most urban centres can be reached within 1–3 hours⁴¹ – but it is too poor to encourage private sector development beyond agriculture⁴². Moreover, the fact that Rwanda is a landlocked country isolates it from global trade and information networks while simultaneously making it vulnerable to climate change effects from neighbouring countries.

More than half of Rwanda's population lives below the USD1 poverty line, with women, disabled, widowed, and rural populations disproportionately affected. Moreover, Rwanda's traditional social networks are eroded by recent trends including migration, but also by the impact of the 1990's genocide⁴³. This implies poverty not only in an economic sense, but also in a social sense – which limits people's opportunities for adapting to climate change. It is also important to note that Rwanda ranks 6th of 53 African countries in terms of the female share of the agricultural workforce (57%)⁴⁴. Women's often unfavourable situation in terms of land tenure security and access to options for climate change adaptation suggests that they may be disproportionately affected by climate change⁴⁵. Moreover, existing power imbalances between men and women cause women to bear most negative effects of (climate change–induced) disasters. The fact that women are primarily responsible for households' water availability and food security moreover suggests their burdens will increase disproportionately due to climate change⁴⁶.

National government strategies and policies

Rwanda 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. Rwanda prepared a National Strategy for Climate Change and Low Carbon Development (2011) and was one of the first countries in Africa to submit a NAPA (2006)⁴⁷. The NAPA identified six priority adaptation actions:

- IWRM (integrated water resource management);
- Early warning systems/ rapid intervention;
- Promotion of income–generating activities;
- Promotion of intensive agriculture and animal husbandry;
- Introduction of varieties resistant to environmental conditions;
- Development of energy sources alternative to firewood.

The first and second actions have been taken up by a programme under the Least Developed Country Fund, approved in 2010.

⁴⁰ CDKN (2013a): *Climate and Development Outlook Rwanda: Pioneering steps towards a climate resilient green economy*. http://cdkn.org/wp-content/uploads/2013/09/CDKN-Outlook-8_Rwanda_WEB.pdf

⁴¹ Tenge et al. (2013)

⁴² The World Bank (2014): *Rwanda Overview*. <http://www.worldbank.org/en/country/rwanda/overview>

⁴³ REMA (2011b)

⁴⁴ Nabalamba et al. (2011)

⁴⁵ NCEA–DSU (2014): *Integrating Gender Equality in Climate–Smart Development: Quick Reference Guide*. <http://dsu.eia.nl>

⁴⁶ NEPAD (2012): *African Gender, Climate Change and Agriculture Support Program (GCCASP) – Rwanda Consultation Report*. <http://www.nepad.org/system/files/Rwanda%20National%20Consultation%20Report.pdf>

⁴⁷ Republic of Rwanda (2011)

Rwanda finalized its 'Green Growth and Climate Resilience Strategy – National Strategy for Climate Change and Low Carbon Development' (GGCRS) in 2011. The Strategy presents three strategic objectives:

- To achieve energy security and a low carbon energy supply that supports the development of green industry and services;
- To achieve sustainable land use and water resource management that results in food security, appropriate urban development and preservation of biodiversity and ecosystem services;
- To achieve social protection, improved health and disaster risk reduction that reduces vulnerability to climate change.

The associated Programmes of action planned under these objectives are 14 in total, including 'sustainable intensification of small-scale farming', 'agricultural diversity of markets', 'sustainable land use management', and 'integrated water resource management'. For financing the implementation of this strategy, the government has suggested (but not yet accessed) various funds, including the Green Climate Fund and the Clean Development Mechanism⁴⁸.

In May 2013, the second Economic Development and Poverty Reduction Strategy (2013–2018) (EDPRS 2) was approved by cabinet. The strategy forms the centrepiece of Rwanda's medium-term plan for development and the framework within which the Government of Rwanda will focus efforts on transforming the economy and realising Vision 2020. Pursuing a 'green economy approach' to development is one of five economic priorities in the EDPRS 2. Climate change and the environment have been integrated into EDPRS 2 as a 'cross-cutting issue' with the focus on mainstreaming environmental sustainability into productive and social sectors and reducing vulnerability to climate change. The EDPRS 2 identifies both the GGCRS and FONERWA (see under 'Climate finance') as strategic tools for guiding specific interventions within national sector strategic plans and their implementation⁴⁹.

There are still institutional and financial challenges for the Government of Rwanda to develop its activities on climate change, but over the past decade it has demonstrated a keen awareness of the economic risks and opportunities of climate change for sustainable socio-economic development⁵⁰. The development of a strategy (GGCRS) and a fund (FONERWA) for climate change action put it ahead of many neighbouring countries.

Climate finance

One of the recommendations of the GGCRS was the creation of a national fund through which international and domestic climate finance can be managed. This fund has now been established under the name FONERWA (Fund for Environment and Climate Change). Its development was supported by CDKN, which will also remain involved in operationalization of the fund and in capacity building in the private sector, civil society and government agencies. In 2013, FONERWA obtained financing from the British International Climate Fund (ICF) to the value of £22.5 million, making it the largest demand-

⁴⁸ Republic of Rwanda (2011): *Green Growth and Climate Resilience – National Strategy for Climate Change and Low Carbon Development*. <http://www.uncsd2012.org/content/documents/364Rwanda-Green-Growth-Strategy-FINAL.pdf>

⁴⁹ CDKN (2013a): *Climate and Development Outlook Rwanda: Pioneering steps towards a climate resilient green economy*. http://cdkn.org/wp-content/uploads/2013/09/CDKN-Outlook-8_Rwanda_WEB.pdf

⁵⁰ CDKN (2013a): *Climate and Development Outlook Rwanda: Pioneering steps towards a climate resilient green economy*. http://cdkn.org/wp-content/uploads/2013/09/CDKN-Outlook-8_Rwanda_WEB.pdf

based climate fund in Africa. FONERWA can be accessed only for projects in Rwanda, through four thematic windows:

- Conservation and sustainable natural resource management;
- R&D, technology transfer and implementation;
- Environment and climate change mainstreaming;
- Environmental impact assessment monitoring and enforcement⁵¹.

Almost 700 applications were submitted during FONERWA's first application round. Most proposals came from government ministries' departments – both national and sub-national – with some further applications from civil society and private sector institutions⁵².

FONERWA ensures that Rwanda is well lined up to coordinate, manage and disburse climate finance. But the country is also in a good position to receive funding from international climate funds. It is one of few African countries with a National Implementing Entity (NIE) for the UNFCCC's Adaptation Fund – next to Benin, Kenya, Morocco, Namibia, Senegal and South Africa. Rwanda's NIE is the Ministry of Natural Resources (MINIRENA)^{53,54}. It also has a designated authority to receive funding from the Green Climate Fund (opposed to neighbouring countries such as Burundi and DRC), which is the Rwanda Environmental Management Authority (REMA)⁵⁵.

A reasonable amount of climate finance from international funds has been approved for Rwanda so far. Accounts range from 28 million USD approved for adaptation and no finance for mitigation⁵⁶ to 55 million USD approved for adaptation and mitigation combined⁵⁷. It has recently been approved as a pilot country for the Climate Investment Fund (CIF)'s Scaling Up Renewable Energy in Low Income Countries Program (SREP) and is preparing an Investment Plan which is planned to be submitted to the SREP Committee in September 2015⁵⁸.

⁵¹ CDKN (2013a): *Climate and Development Outlook Rwanda: Pioneering steps towards a climate resilient green economy*. http://cdkn.org/wp-content/uploads/2013/09/CDKN-Outlook-8_Rwanda_WEB.pdf

⁵² CDKN (2013b): *Climate and Development Outlook – Stories of change from CDKN*. <http://cdkn.org/wp-content/uploads/2013/11/ClimateandDevelopmentOutlookNov2013financeFINAL.pdf>

⁵³ Schaeffer, M; Baarsch, F.; Munang, R.; Baxter, C. (eds) (2015): *Africa's Adaptation Gap 2 – Technical Report*. AMCEN, UNEP, Climate Analytics and African Climate Finance Hub. http://apps.unep.org/publications/pmtdocuments/-Africa%E2%80%99s_Adaptation_Gap_2_...pdf

⁵⁴ Otiende, B. (2014): *EAC Climate Change Financing Options: Finance Readiness Activities and EAC Climate Change Fund*. East African Community. http://www.acadfacility.org/downloads/climate_finance_and_investment_forum_29-30_sept_2014/presentations/session-2/EAC%20Climate%20Change%20Financing-%20CIF-29-30%20Sept%202014_EAC.pdf

⁵⁵ 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

⁵⁶ 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>

⁵⁷ Climate Funds Update website: <http://www.climatefundsupdates.org/country-pages>

⁵⁸ Government of Rwanda (2014): *Aide-Memoire for Scaling-Up Renewable Energy Program in Low Income Countries (SREP) Joint MDB Scoping Mission to Rwanda*.

Climate change projects

Rwanda is reported to have a ‘moderate’ number of climate projects underway compared to its neighbours (such as Uganda, implementing a large number of projects, and Burundi, implementing very few)⁵⁹. Some climate change with relevance for food security and/or water that are currently being implemented in the country are:

- ‘Reducing Vulnerability to Climate Change in North West Rwanda through Community Based Adaptation’, for which Rwanda requested and received funding from the Adaptation Fund (10 million USD grant approved in 2013)⁶⁰;
- USAID’s programming to address land use management and climate-related water stress;
- ‘Climate Change Adaptation and Development Initiative’ (CC-DARE, implemented by UNDP) with a focus on land and biodiversity;
- ‘Africa Adaptation Programme’, implemented by UNDP;
- ‘Alliance for a Green Revolution in Africa’, ‘Africa Rice Centre’, and Red Cross/Red Crescent Climate Centre programmes, focusing on risk reduction, land use, IWRM and agriculture⁶¹.

For a complete list of all projects in Rwanda funded through bilateral/multilateral climate funds, see the list in the [Annex](#).

Climate contribution of the Netherlands Embassy: Pitch & Bid

In 2014, the Netherlands Embassy in Rwanda prepared a ‘Pitch & Bid’ to describe how it aims to contribute to climate change adaptation and mitigation in its food security and water activities. It used Rio Markers to assess the portion of these activities’ budgets that can be counted as a ‘climate contribution’. The resulting climate contribution for 2015–2017 is equal to 13.47 million euros (9.86 million for 2015; 3.61 million for 2016; 0 for 2017). Of this, 5% concerns *mitigation* and 95% *adaptation*. The Embassy’s Pitch & Bid indicates the following focus areas for its climate contribution:

- **Integrated water resources management (IWRM):** sustainable access to water for people, agriculture and livestock will be increased through enhanced capacity of government and communities to properly use water resources;
- **Rural infrastructure:** improved roads, markets, electrification, etcetera will stimulate local economic development and thereby increase resilience of communities;
- **Improved land registration:** a land tenure programme will contribute to improved land management and higher resilience of farmers;
- **Private sector development:** development of the agri-business sector in particular will create youth employment and increase farmers’ incomes;
- **Potato sector:** a modern and climate-smart potato sector will be developed through use of multiple varieties, modern techniques, and an efficient control and certification system.

<https://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/AM%20Rwanda%20SREP%20scoping%20mission%20Final%20ver%2012-19-14.pdf>

⁵⁹ Adaptation Partnership (2011): *Review of Current and Planned Adaptation Action: East Africa*

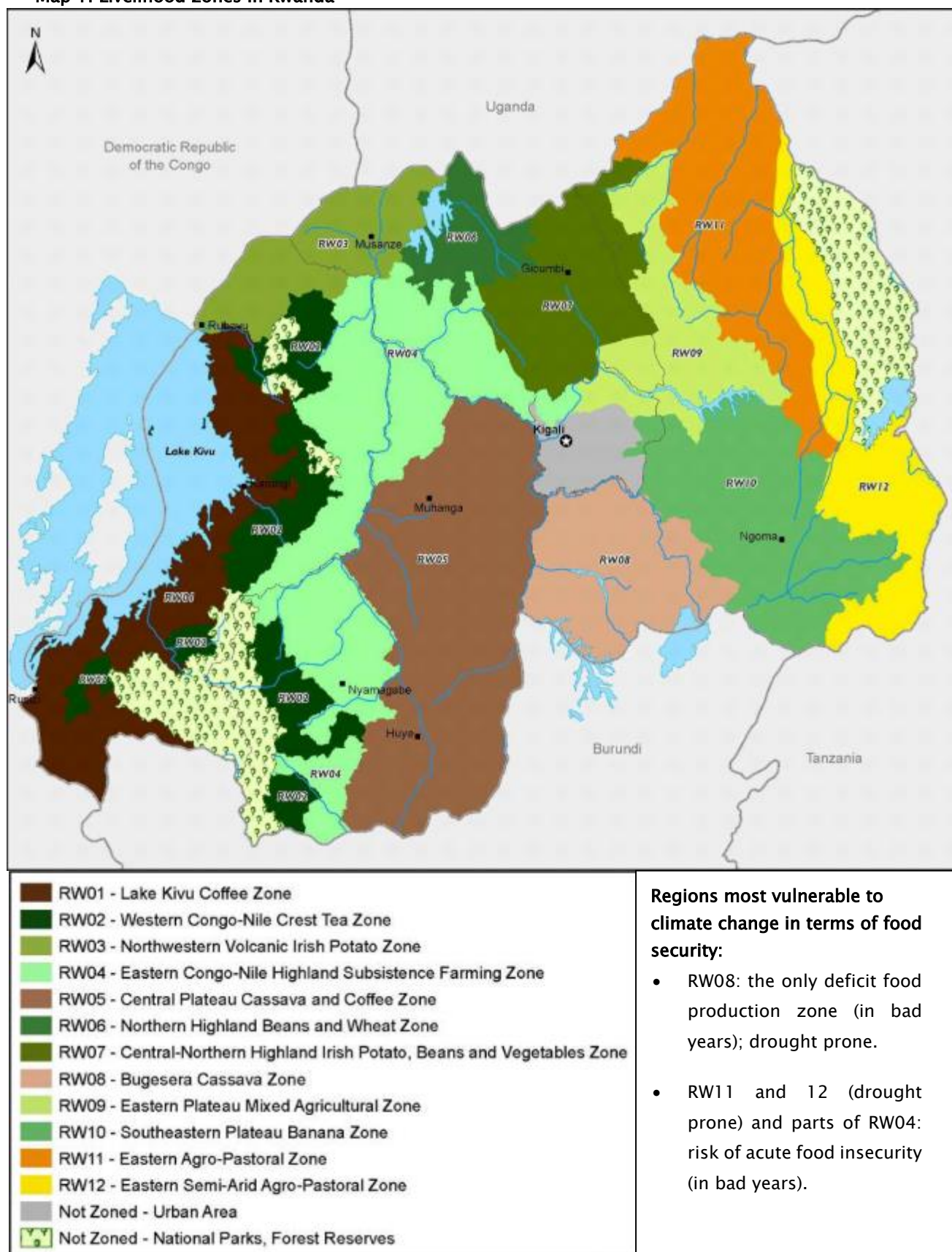
⁶⁰ <https://www.adaptation-fund.org/project/reducing-vulnerability-climate-change-north-west-rwanda-through-community-based-adaptation>

⁶¹ ALM UNDP (no year): *country profile Rwanda*. <http://www.adaptationlearning.net/rwanda/profile>

The following Embassy activities were identified as 'climate contributions' for these focus areas:

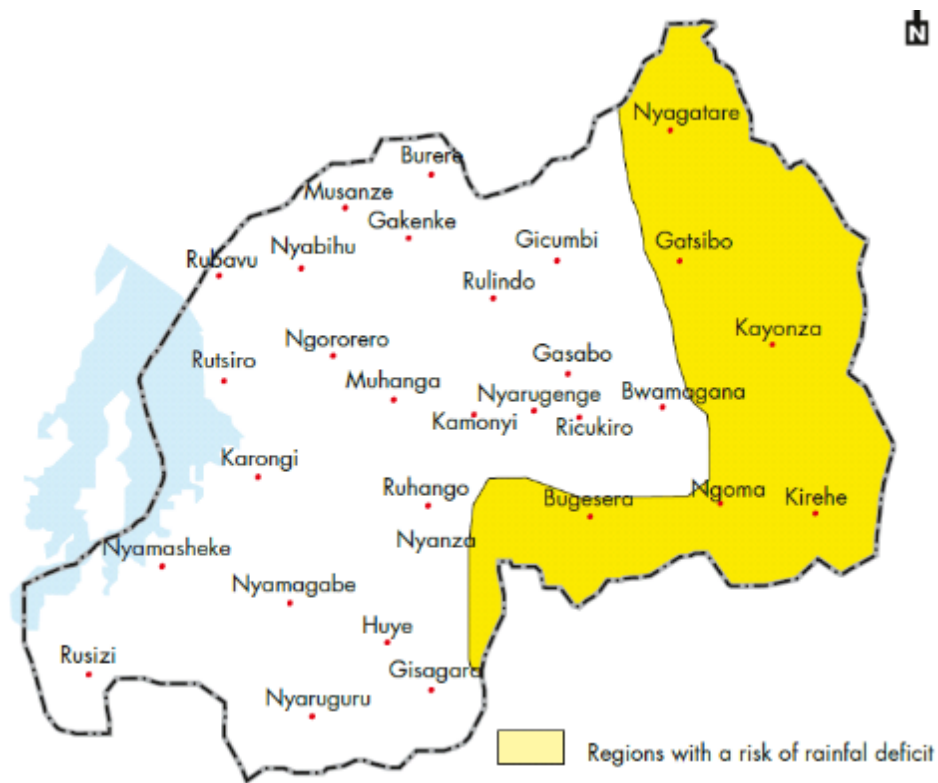
- LTR (food security; 23214);
- Linking farmers to markets (food security; 24730);
- PSCBS (food security; 24871);
- Consolidation marshlands WHH (food security; 25059);
- PAREF NL-2 (food security; 25812);
- Improving Market Access programme (food security; 25491);
- RLDSF (food security; 25542);
- EARP (food security; 25978);
- ASDF (food security; 25673);
- Enhancing seed potato reform in Rwanda (food security; newly planned activity).

Map 1: Livelihood zones in Rwanda

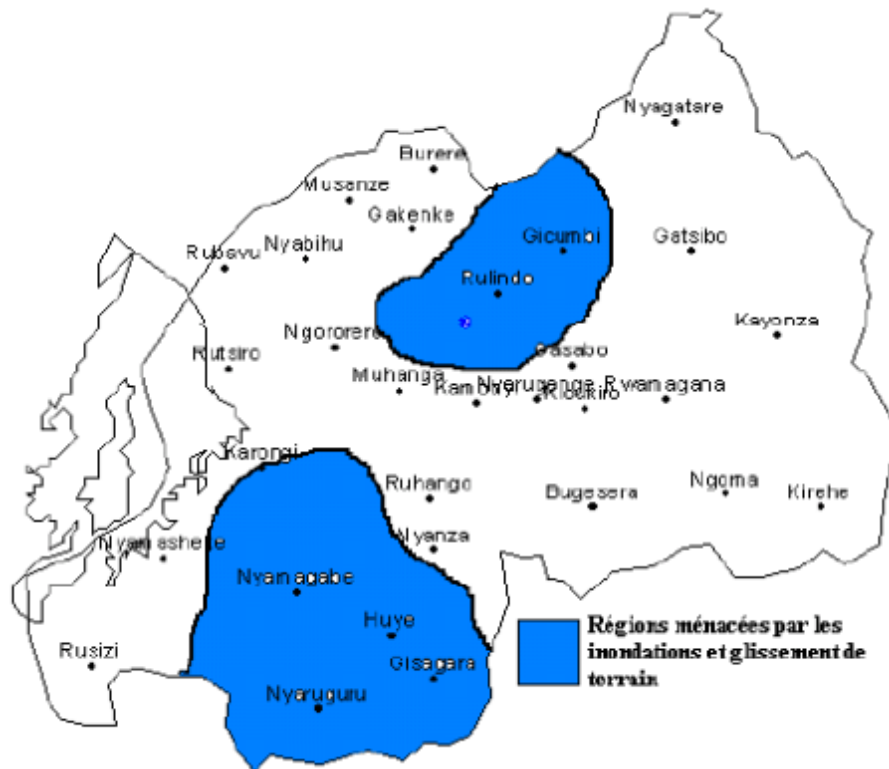


Source: USAID and FEWS NET (2011)

Map 2: Regional risks of rainfall deficits/droughts

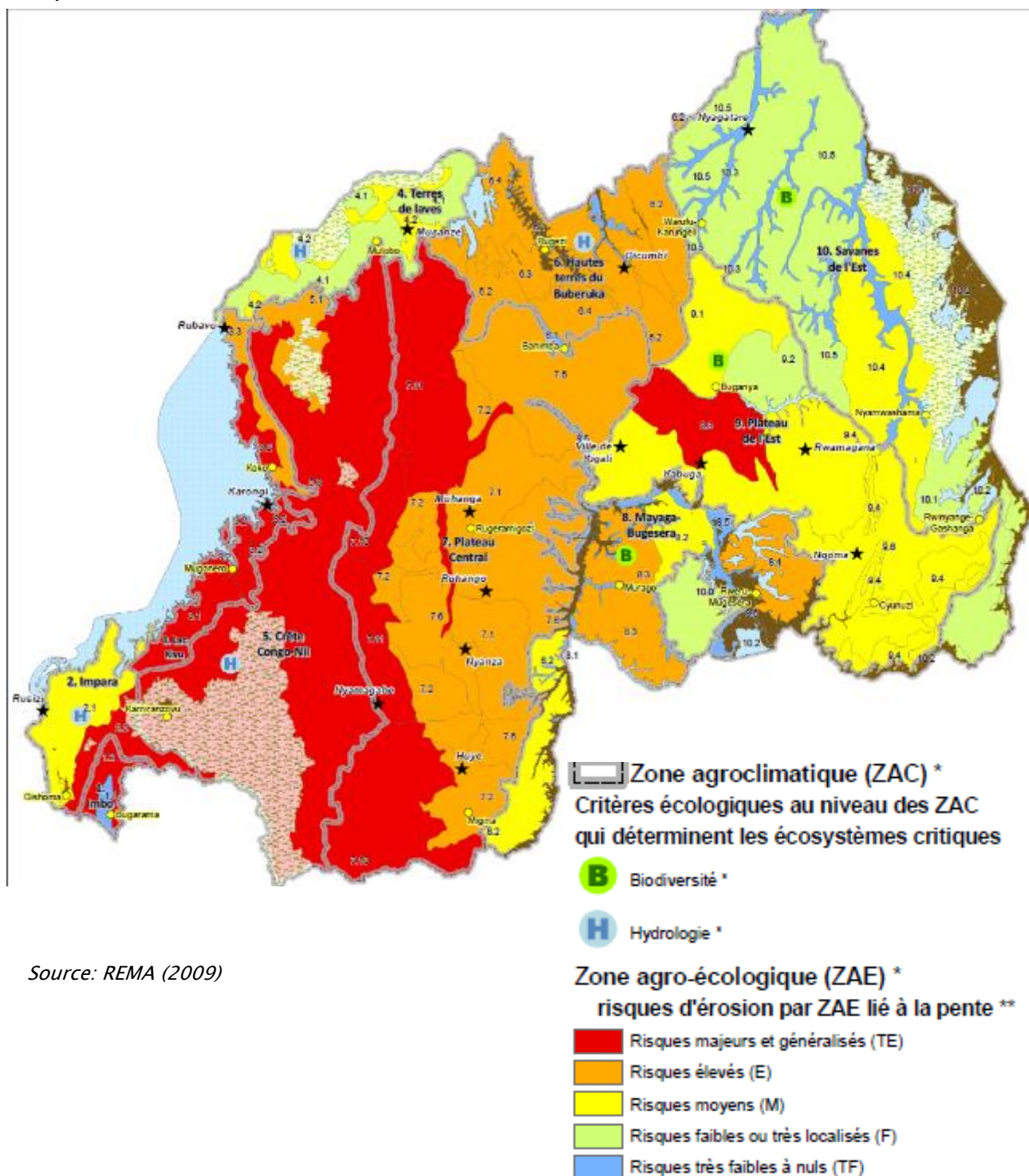


Map 3: Regional risks of floods and landslides



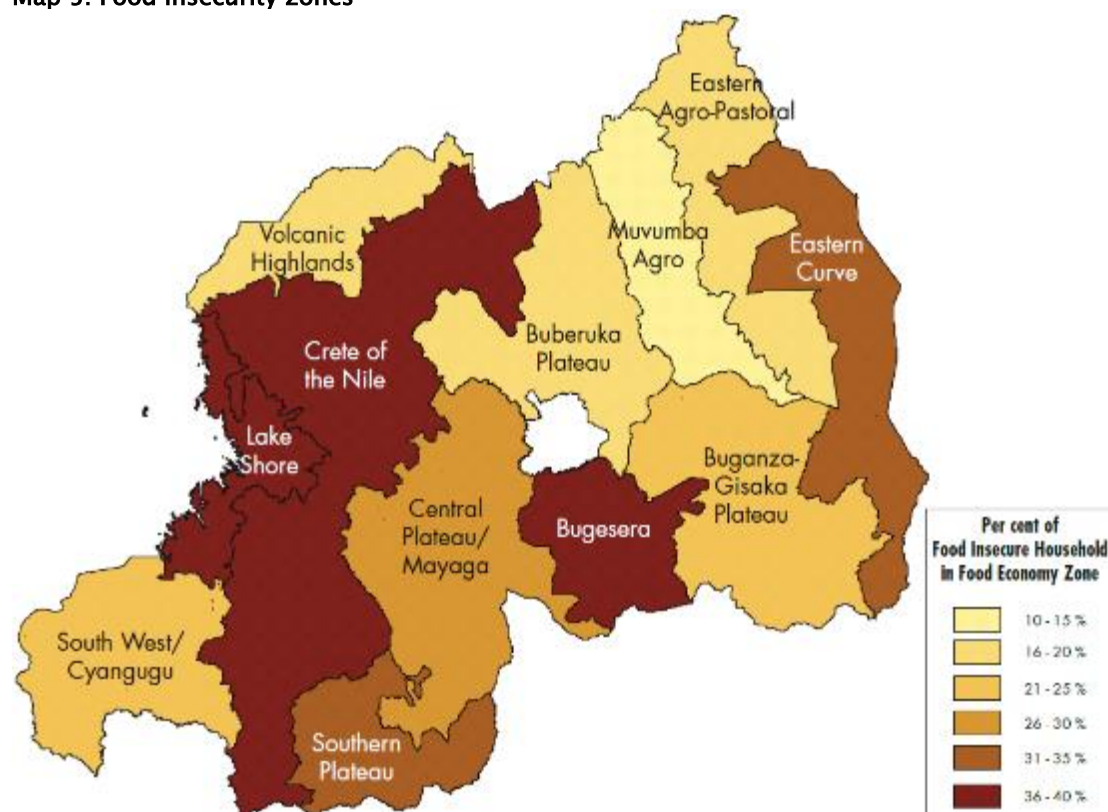
Source: Ministry of Land, Environment, Forestry, Water and Mines (2006)

Map 4: Erosion risks



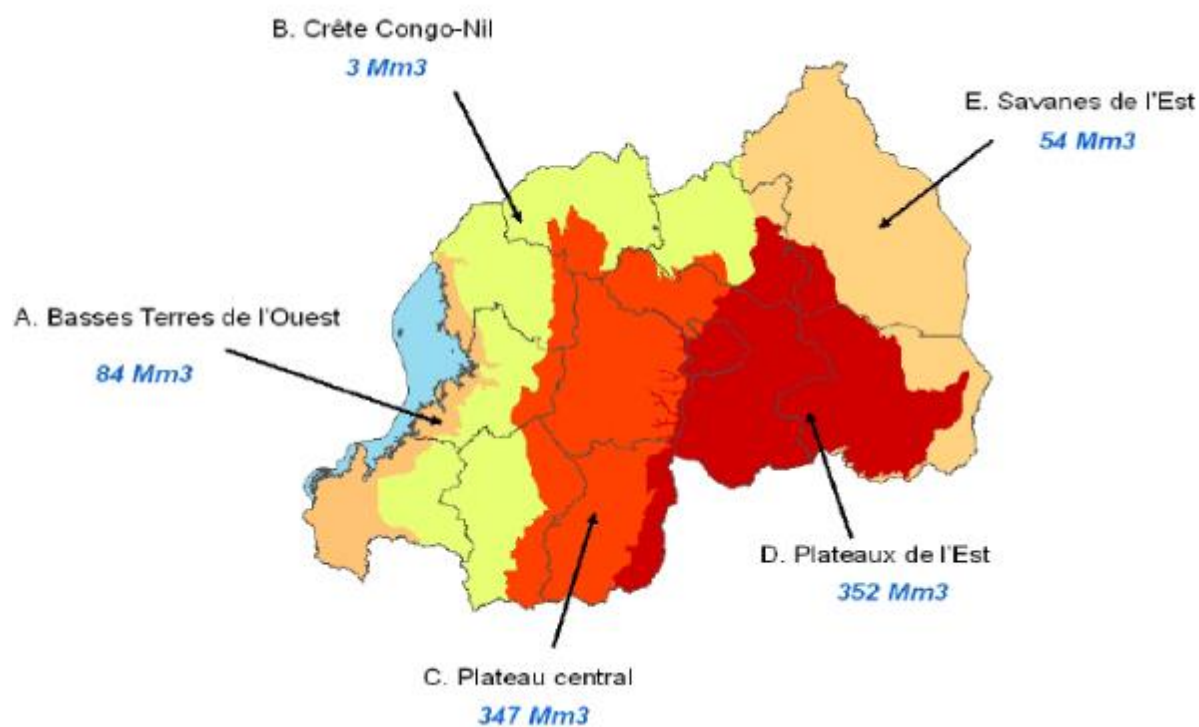
Source: REMA (2009)

Map 5: Food insecurity zones



Source: REMA (2009)

Map 6: Total water requirements in 2020 (units unspecified)



Source: REMA (2009)

Annex: List of projects in Rwanda under bilateral and multilateral climate funds

Source: Climate Funds Update (2014): <http://www.climatefundsupdate.org/data>

| Name of Project | Name of Fund | Implementing Agency | App- roved (USD mil- lions) | Dis- bur- sed (USD mil- lions) | Con- cessi- onal loan | Grant |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|----------------------------|-----------------------------------------|-----------------------------------------------|--------------------------------|-------|
| Pilot study examining the feasibility of investment in forest and landscape restoration in Rwanda | Germany's International Climate Initiative | IUCN | 0.248 | | | 0.248 |
| Preserving Biodiversity in the Nyungwe Forest | Germany's International Climate Initiative | Universität Koblenz-Landau | 2.289 | | | 2.289 |
| Drafting a National Climate Change and Low Carbon Development Strategy – 647 – 780 | UK's International Climate Fund | World Bank | 0.37 | | | 0.37 |
| Sustainable afforestation and reforestation management of the natural forests of Rwanda " | Congo Basin Forest Fund (CBFF) | | 5.237 | 2.026 | | 5.237 |
| Enabling Activities to Facilitate the Preparation of a National Adaptation Plan of Action (NAPA) | Least Developed Country Fund (LDCF) | UNEP | 0.195 | | | 0.195 |
| Budget Support from the Global Climate Change Alliance (GCCA) for Environment and Natural Resources in Rwanda: Ensuring food security through a land tenure reform | Global Climate Change Alliance (GCCA) | | 5.72 | 1.24 | | 5.72 |
| Reducing Vulnerability to Climate Change by Establishing Early Warning and Disaster Preparedness Systems and Support for Integrated Watershed Management in Flood Prone Areas | Least Developed Country Fund (LDCF) | UNEP | 3.31 | | | 3.31 |
| Post-harvest Agribusiness Support Project | Adaptation for Smallholder Agriculture Programme (ASAP) | | 7 | | | 7 |
| Building Resilience of Communities Living in Degraded Forests, Savannas and Wetlands of Rwanda Through an Ecosystem Management Approach | Least Developed Country Fund (LDCF) | UNEP | 5.6 | | | 5.6 |
| Increasing the adaptive capacity of natural systems and rural | Adaptation Fund (AF) | MINIRENA | 10 | 3.25 | | 10 |

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| communities, living in exposed areas of North Western Rwanda, to climate change impacts | | | | | | |
| Sector Reform Contract (SRC) to promote climate-proof investments by farmers through improved land administration and land use monitoring capacities at central and local government level | Global Climate Change Alliance (GCCA) | | 4.55 | | | 4.55 |
| Increasing the Capacity of Vulnerable Rwandan Communities to Adapt to Adverse Effects of Climate Change: Livelihood Diversification and Investment in Rural Infrastructures | Least Developed Country Fund (LDCF) | AfDB | 9.02 | | | 9.02 |
| Sustainable Energy Development Project (SEDP) | Global Environmental Facility (GEF4) | | 4.5 | | | 4.5 |