Burkina Faso

INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC) IN BURKINA FASO

September 2015

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List of acronyms

COP	Conference of Parties
INDC	Intended Nationally Determined Contribution
UNFCCC	United Nations Framework Convention on Climate Change
APSF	Anti-Poverty Strategic Framework
GGE	Greenhouse Gas Effect
HDI	Human Development Index
INDC	Intended Nationally Determined Contributions
LAME	Laboratoire d'Analyse Mathématique des Equations
UNO	United Nations Organisation
NAPA	National Adaptation Program of Action
GDP	Gross Domestic Product
NAP	National Adaptation Plan
NRSP	National Rural Sector Program
SAGSD	Strategy for Accelerated Growth and Sustainable Development
SP/CONEDD	Permanent Secretariat of the National Environment and Sustainable Development Council
TOR	Terms of Reference

Section 1. Introduction

France will host the 21st Conference of Parties of the United Nations Framework Convention on Climate Change (COP21/CMP21), which will take place in Paris in December 2015 and should result in a new international agreement on the climate that is applicable to all countries. The entire international community expects this agreement to be universal and lasting. It should give the economic and political signals for our planet's economic development model to set out on a new path leading to carbon neutrality before the end of the century and to observance of the 2°C objective (i.e. keeping global warming at temperatures below +2°C).

The principal goal of COP21, from November 30 to December 11, 2015, is to conclude an agreement that will commit 195 countries to reduce their greenhouse gas (GHG) emissions. The end objective is for the contributions by these countries (which vary from country to country) to make it possible to stabilise climate warming due to human activities below 2°C between now and 2100 (in comparison to the pre-industrial era). Each country will renew its commitments to the Climate Change Convention (UNFCCC) in a document called **Intended Nationally Determined Contributions** or **INDC** (CPDN in French) between now and the end of October 2015.

Section 2. Context and institutional framework

2.1. Institutional context

The national objectives encompass two types of objectives:

- The **mitigation objectives**, the aim of which is to reduce greenhouse gas emissions, for example by modifying the production techniques that are used. The Burkina Faso INDC gives quantifiable factors and notes the reference year, the period of commitment and the implementation schedule and specifies the methodologies used to estimate GHG emissions.
- The **adaptation objectives**, the aim of which is to reduce the vulnerability of natural and human systems to the effect of current or expected climate changes.

The contribution to this second part of the objectives is voluntary, but important to Burkina Faso, and thus is to be presented in a separate scenario: **Integrated Adaptation.**

Insert #1

According to the ministry in charge of sustainable development, the principles on which the national contributions are based are:

Ambition: The contributions will have to go beyond the countries' current national commitments. The current commitments are part of the second commitment period of the Kyoto Protocol – notably the case of the European Union -- or correspond to voluntary national actions under the Copenhagen agreement and the Cancun accords.

Fairness and differentiation: The contributions are examined in light of the national circumstances of each country. The least developed countries (LDCs) and the small island developing states (SIDS) benefit especially from a certain degree of flexibility in preparing their INDC in view of their limited capabilities.

Transparency: The contributions reported by the countries are published as they are readily available on the UNFCCC site. A synthesis report of all the parties' contributions will be presented by the UNFCCC secretariat on November 1, 2015, on the basis of the INDC's received as of October 1st.

2.2. National strategies and policies, a sustainable development framework

Burkina Faso's National Assembly on the Environment and Sustainable Development, held in November 2011, strongly recommended the development of a National Sustainable Development Policy (NSDP) accompanied by a law. Prepared in 2013, the NSDP was an effective framework for the Strategy for Accelerated Growth and Sustainable Development (SAGSD). This economic framework document, together with "Outlook Burkina 2025" and policy framework instruments, contribute to place the concept of sustainability at the heart of public action and the activities of other non-state actors (technological and financial partners, civil society organisations, non-governmental organisations and the private sector) in a socioeconomic development drive that generates growth and fairly distributes revenues in the medium and long term in climatically high-vulnerability sectors such as those identified in National Communication 2.

2.3. Organisations and programs put in place for adaptation and mitigation

Burkina Faso ratified the UNFCCC in 1993 and the Kyoto Protocol in 2005. Up to now, in response to the provisions of these protocols, it has developed and adopted a number of policy and strategy documents relating to climate change. These include:

- The National Strategy for implementing the Climate Change Convention adopted in 2001.
- The National Action Program for Adaptation to Climate Change (NAPA) in 2007.
- The development of a framework NAMA (2008).
- The National Adaptation Plan (NAP, 2014).

To address and follow up climate change issues, a Permanent Secretariat of the National Council for Management of the Environment (SP/CONAGECE) was created within the ministry responsible for the environment and which will subsequently be transformed into the National Council for the Environment and Sustainable Development (SP/CONEDD) with expanded responsibilities.

In 1995, Burkina Faso established the Inter-Ministerial Committee to Implement the Actions of the United Nations Framework Convention on Climate Change (IMCIAC). This committee has been fully involved in the preparation of the first National Communication on climate change.

2.3.1 From NAPA to NAP

Faced with the degradation of the ecosystems, the recurrence of food crises and the adverse impacts of climate change on the environment, populations and livestock, the Government of Burkina Faso, with the support of the UNDP as the executive agency for the World Environmental Fund (WEF), initiated in 2005 the formulation of its National Action Program for Adaptation to climate change and variability. The NAPA was adopted at the national level in 2007. In this context and under the leadership of SP/CONEDD, three adaptation projects were developed and carried out between 2008 and 2013 with the support of Denmark and Japan and the World Environmental Fund (WEF). Thus, NAPA responded to an urgent situation in which adaptation was principally directed to those who are most vulnerable, particularly rural populations.

Building on the achievements of the NAPA, on the one hand, and, on the other, to initiate a comprehensive medium- and long-term approach to adaptation to climate change and expand the national process to all of the stakeholders in development, Burkina embarked on the process to develope a National Adaptation Plan (NAP) structured around the results of analysing the vulnerability to climate change of the sectors identified as priority (agriculture, livestock breeding, water, forests and natural ecosystems, energy, infrastructure and housing, health etc.) and climate change scenarios in the 2025-2050 time period.

2.3.2 The need for a NAMA framework

The need for quantitative evaluation of the mitigation potential led Burkina Faso to develop a NAMA framework in 2008, in this case the National Rural Sector Program (NRSP). The NRSP is part of the drive for short, medium and long-term development programming carried out through the Outlook Burkina 2025 study, the development of the National Land-Use Planning Scheme (NLUPS) and, more recently (2010), the adoption of the Strategy for Accelerated Growth and Sustainable Development (SAGSD), which replaced the Anti-Poverty Strategic Framework (APSF).

The NRSP, which targeted the year 2015, is a federation of sectoral programs of the departments of agriculture, livestock raising, water, the environment and quality of life. Within this framework, the mitigation potential for the period 2008-2015 was estimated at 9,174,816 eq.t.CO2 of GHG, or 1,200,000 eq.t.CO2 per year.

The proposed mitigation measures contribute to the achievement of the Government's objective, i.e. the restoration of degraded land at the rate of 30,000 ha/yr, the increase of natural forests from 170,00 to 500,000 ha, the reduction of forest areas burned by wildfires from 30% of the national territory to 20%, the development of village hunting areas through the awareness and training of the population, and the spread of knowledge regarding techniques for sustainable management of natural resources.

2.3.3 The Second National Communication

Pursuant to article 4 and 12 of the United Nations Framework Convention on Climate Change (UNFCCC), Burkina Faso developed a National Communication containing the measures aimed at mitigation or appropriate adaptation to climate change. In this context, a Second National Communication was developed in 2014 in accordance with the directives of decision 17/CP 8 adopted by the eighth session of the Conference of Parties to the UNFCCC. Since the process of its development began after 2006, the inventory data was based on the data for **2007 as the reference year**. Pointing out the changes in climate, the Second National Communication completes and updates certain data already brought to the attention of the international community in the initial Communication of 2001, which the UNFCCC web site refers to May 2002.

2.4. The peculiarities of Burkina Faso's INDC

The INDC of Burkina Faso, a weak emitter country, is one of the few that have both characteristics of the INDCs, namely an outcomes approach and an actions/projects/activities approach.

This results in a ***Mitigation*** component that has taken into consideration only the activities that lead to credited emission results, the objectives of which have been oriented from the start toward the reduction of greenhouse gas emissions and in particular the carbon equivalent. One example of these initiatives is represented by the REDD + / FIP, the NAMA initiative and the potential CDM projects in the growth sectors such as mining. These initiatives, dedicated principally to the reduction of greenhouse gas, make up the Conditional Hybrid Mitigation / (Adaptation) scenario.

Furthermore, Burkina's INDC contains an ***Adaptation*** component that makes this INDC somewhat unique and ambitious since the analysis of the adaptation options with their special investments and "vulnerable" sectors to the search for resilience has led to an Integrated Adaptation Scenario. It is from this component that the projects/activities/actions approach emerges. It is strongly justified by the fact that the "rural sector", consisting of the water-agriculture-forest-land use subsectors, is at the same time the principal engine of the Burkina economy (it provides the livelihood of more than 80% of the population) and the sector most vulnerable to the effects of climate change.

Thus, this component consists of projects whose objective is not PRINCIPALLY the reduction of GHG (mainly through carbon sequestration), but the enhancement of environmental services such as food security, water and soil conservation, sustainable agriculture, the development of non-ligneous forest products, including medicinal plants, the promotion of wood and metal free architecture ("Nubian

vaults"), etc. As a bonus to the mitigation component, these projects result in the medium and long term in considerable reductions of GHG, which even exceed the results of mitigation efforts.

Section 3. Mitigation projections and options

3.1. Methodology

The "Mitigation" team carried out its work on the basis of the following methodology:

- Use of the 2007 GHG inventory by sector (i.e. agriculture; energy, including the transportation sector; waste; industrial processes; land use; land use changes and forestry (LULUCF).
- Determination of the socioeconomic indicators for the "Business as Usual (BaU)" scenario for the GHG emissions projection at the 2030 horizon.
- Construction of GHG emissions projection scenarios by sector.
- Identification of mitigation actions that is underway or scheduled, by sector.
- Analysis of the impacts of adaptation actions (if any) in order to integrate their indirect emission reductions in the mitigation outcome.
- Evaluation of the Burkina Faso contribution in terms of mitigation.
- Recommendations for mitigation actions by sector.
- Coverage level of the contribution: the scenarios are based on data covering the entire national territory.

This methodology is reflected in the report as follows:

- A *GHG outcome* approach offering the greatest flexibility in the way of reaching the GHG reductions, without necessarily specifying all of the actions the emissions reduction will entail. This approach permits transparency in the calculations and projections and assures that the progress achieved with regard to the actions will be better monitored since the GHG targets generally take into consideration the baseline (2014) national GHG inventory and more specifically the most detailed possible sector data.
- As a result of point 1, the Government could commit itself to quantified results capable of providing better understanding of the future emissions reductions and the emissions levels associated with the contributions, which, when combined, facilitates an evaluation of future emissions (conditional mitigation and adaptation scenario). These global results also permit progress in carrying out INDC follow-through and offer greater credibility for the purpose of receiving financing and accessing markets, as well as improving comparison between the INDC's. It is also simpler to estimate the effects and co-benefits under the GHG outcome approach and/or the GHG actions approach.
- In the Burkina Faso INDC, both approaches have been used: outcomes in most cases for mitigation and outcomes and projects (actions) for adaptation.
- Thus, this results in three scenarios: one BaU scenario, one unconditional scenario and one conditional scenario that includes the adaptation project whose main objective is the reduction of "credited" GHGs.
- The Mitigation section presents these three scenarios and their descriptions by key sectors with respect to GHG contributions, while at the same time attempting to keep the same key sectors throughout the analysis of the three scenarios and also in the Adaptation section and the socioeconomic section. The rest of the sectors are used only to provide an investment cost if the secondary projects/actions are asked to contribute to an even greater GHG reduction at different horizons up to 2030 (compared to 2015).
- The sectors identified are: agriculture, waste and energy, including electricity production, transportation, residential and tertiary, as well as manufacturing industries, housing etc. In terms of representation in the report, each of these sectors will show:
    - Its projections as to emissions amounts in the BaU, unconditional and conditional scenarios.

- Graphs of the three scenarios.
- A summary table/matrix collecting all of the data + investment cost (cost of reducing one ton of CO2).

The following table summarises the mitigation scenarios.

Table 1. Reduction of emissions and associated investment costs under the mitigation scenarios

Scenarios / sectors	Reduction of emissions at the 2030 horizon		Investment cost (in US$)
	In numbers (GgCO2 eq.)	In % of reduction	
BaU (subtotal):	118,323		
Unconditional			
Agriculture	7,236.3	6.1%	21,646,581
Waste	-		
Energy	572.0	0.5%	1,063,272,580
Subtotal Unconditional	7,808.3	6.6%	1,084,919,161
Conditional			
Agriculture	10,560	8.9%	64,939,743
Waste	76.30	0.1%	81,228,000
Energy	3,130.00	2.6%	609,866,667
Subtotal Conditional Hybrid	13,766.30	11.6%	756,034,410
Subtotal Mitigation	21,574.63	18.2%	1,840,953,571

Source, Authors' compilation, July 2015.

3.2. Objective: Burkina Faso contribution level

Three Mitigation scenarios have been considered in order to evaluate the emissions trends and the possible reductions on the basis of a reference situation and the potential for financing:

- A "trend" scenario (Business as Usual - BAU), which corresponds to continuation of the past under the assumption that economic development continues without interruption.
- An "unconditional" scenario taking into account all the public policies adopted after 2007, technological developments and recent studies, with financing that has been acquired or is being acquired.
- A "conditional" scenario that takes into account all the mitigation projects that have been developed and/or are being developed, but without any acquired financing.

3.2.1 Analysis of the reference situation for GHG and identification of the reference year

The chosen reference year is 2007, the date when the second report on greenhouse gas inventories in Burkina Faso was completed. The future projections under the various scenarios are made on the basis of this reference year and the appropriate parameters resulting from the previous development of the socioeconomic situation (trend-based) or the forecast-based assumptions (unconditional and conditional scenarios).

3.2.2 Determination and justification of the target year

Burkina has chosen 2030 as the target year, given that this date coincides with the second Millennium Development Goals meeting. In addition, the government of Burkina Faso has adhered to the "Sustainable Energy for All (SE4ALL)" initiative of the United Nations Secretary General, which aims to achieve three major objectives between now and 2030:

- Assure universal access to modern energy services.
- Double the rate of improvement of energy efficiency.
- Double the share of renewable energy in the world energy mix.

3.2.3 Choice of the projection parameters

The parameters that can influence the trends have been reviewed. In cooperation with the agency responsible for statistics, the National Institute of Statistics and Demography (INSD), the following parameters have been selected as relevant.

Table 2. Types of GHG emissions by sectoral trends

Sectors	GHG	Projection parameters used
Agricultural soils trend	NO_2	Development of importation of products for soils and crops
Agricultural waste burned in the field + controlled burning of savannah trend	NOX CO CO_2	Historical INSD trend
Enteric fermentation trend	CH_4	Rate of increase of cattle
Manure use trend	CH_4	Rate of increase of cattle
Land use change and forestry trend	CO_2 CH_4 N_2O NOX CO	Historical INSD trend
Liquid waste management trend	CH_4	Rate of population growth
Solid waste management trend	CH_4	Rate of population growth
Transportation trend	CO_2	Development of fuel imports
Electricity production trend	CO_2	Development trend
Manufacturing industries trend	CO_2	Rate of growth of industrial GDP
Residential trend	CO_2	Rate of growth of butane gas and kerosene
Industrial processes trend	CO_2	Historical INSD trend

Source: Authors, July 2015.

3.2.4 Reference situation for emissions

The reference situation is that of the second Burkina Faso National Commission of 2014 (in which the GHG inventories refer to the data for 2007) within the framework of the UNFCCC. Table 3 below provides an indicative summary of the reference situation (total and relative emissions by emissions source).

Table 3. Reference situation for GHG emissions

Category	Principal gases emitted	GHG emissions (GgCO2 eq.) 2007	As a percentage of total emissions

Agricultural soils	N_2O	8,239	37.6%
Enteric fermentation	CH_4	9,517	43.4%
Agricultural waste burned in the field + controlled burning of savannah	CO_2, NO_X, CO	189	0.9%
Manure use	CH_4	1,196	5.5%
Land use change and forestry	CO_2, CH_4, N_2O, NO_X, CO	250	1.1%
Solid waste management	CH_4	667	3.0%
Liquid waste management	CH_4	245	1.1%
Transportation	CO_2	782	3.6%
Electricity production	CO_2	350	1.6%
Residential	CO_2	60	0.3%
Manufacturing industries trend	CO_2	118	0.5%
Industrial processes	CO_2	303	1.4%
GHG total for country		**21,916**	**100%**

Source: Burkina Faso National Communication, 2014.

Analysis of the current trend scenario shows that Burkina's GHG emissions are going to continue to grow significantly. At the 2030 horizon, the emissions level will increase by a factor of five compared to 2007 and by a factor of almost 1.6 compared to 2015 (table 4 below).

Table 4. Overall trend evaluation of GHG status from 2007 to 2030

GHG emissions by category (Gg of CO2 eq)	2007	2015	2020	2025	2030
Agriculture sector, forestry and land use trend	19,391	71,436	85,545	95,561	103,424
Solid waste management	667	852	993	1,156	1,347
Liquid waste management	245	313	364	424	494
Transportation trend	782	1,447	2,439	4,110	6,925
Electricity production trend	350	648	1,476	2,487	4,191
Residential trend	60	96	128	172	230
Manufacturing industries trend	118	175	223	285	363
Industrial processes trend	303	667	894	1,121	1,348
Total	**21,916**	**75,633**	**92,062**	**105,316**	**118,323**

Source: Authors, July 2015.

3.2.5 Results of scenarios and analyses

With regard to the projects and programs selected in the unconditional and conditional scenarios, the results of the projections shown below give the portion of reductions that occur in comparison to the current trend scenario, which is also called "Business as Usual" (BAU). It should be recalled that, like several developing countries, the low level of ownership and mastery of technologies goes hand in hand with the very low level of development of countries such as Burkina Faso and the low level of

their GHG emissions. Despite all efforts, the urgency of dealing with recurrent crisis situations in several sectors requires the use of low-cost technologies available in the market, which are quite often less appropriate for local or global environmental protection (emergency thermal power plants very frequently financed at the time of large-scale load shedding and social movements, dependence on obsolete means of transportation, agricultural techniques with little technological input that consume space and manpower, poor waste management etc.). Hence there is a preference to think of GHG reductions in comparison to a possible trend rather than in comparison to a reference year that we see as unrealistic.

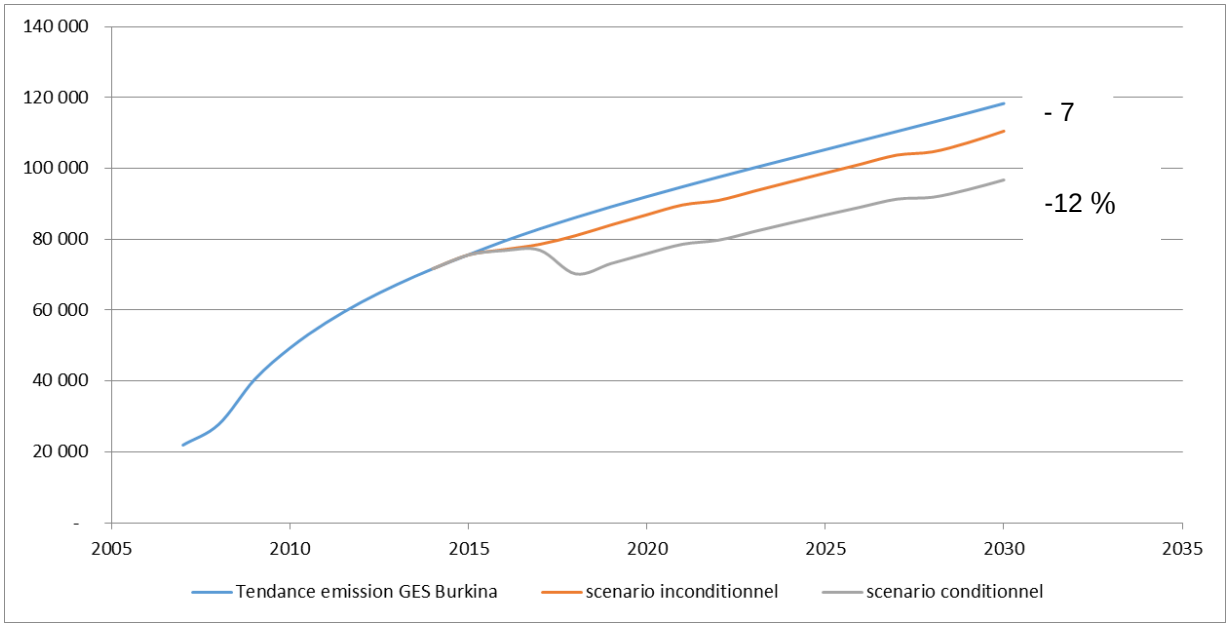
Table 5. Change in emissions (BaU) and percentage of reduction by scenario

	2007	2015	2020	2025	2030
BaU (in Gg)	21,916	75,633	92,062	105,316	118,323
Unconditional scenario (reduction in Gg)		–	5,133	6,608	7,808
Unconditional scenario (reduction in %)		0%	5.58%	6.27%	6.60%
Conditional scenario (reduction in Gg)			10,953	11,829	13,766
Conditional scenario (reduction in %)		0%	11.9%	11.2%	11.6%

Source: Authors, July 2015.

The curve below better illustrates these scenarios.

Figure 1. Illustration of GHG emissions trends in different scenarios



Key: Blue line: Burkina GHG emission trend; orange line: Unconditional scenario; grey line: Conditional scenario

Table 6 below gives a breakdown of the reductions in the unconditional scenario. It may be seen that the sectoral mitigation is principally due to projects and programmes in agriculture, forestry and changes in land use (between 6 and 7% from 2020 to 2030), technology choices in the electrical industry (between 20 and 12% from 2020 to 2030) and energy efficiency in the manufacturing industries (3% in both 2020 and 2030). These reductions are relative to the BAU trend in the sector.

Table 6. Breakdown of GHG reductions (GgCO2 eq. and %) in the unconditional scenario compared to the current trend scenario

Years	2015		2020		2025		2030	
Sector	Gg	%	Gg	%	Gg	%	Gg	%
Agriculture, forestry and land use	–	0%	- 4,809	-6%	- 6,209	-6%	- 7,236	-7%
Solid wastes	–		–		–		--	
Transportation	-5.86	-0.40%	29.3	-1.20%	29.3	-0.71%	29.3	-0.42%
Electricity production	22.18		284.30	-19.26%	344.40	-13.85%	493.04	-11.76%
Residential	0.36	-0.37%	10.38	-8.10%	25.62	-14.93%	49.71	-21.65%
Energy in the manufacturing industries	5.24	-3.00%	6.69	-3.00%	8.54	-3.00%	10.90	-3.00%

Source: Authors, July 2015

Similarly, table 7 below gives a breakdown of the reductions under the conditional scenario. It may be seen that in 2030, again in comparison to the BaU scenario, the sectoral mitigation would come principally from projects and programmes in agriculture, forestry and changes in land use (10% reduction in comparison to the sectoral trend), reduced consumption of hydrocarbons in transportation (42%), technology choices in the electrical industry (4%) and efficiency in residential and tertiary (21%) due to mass replacement of traditional lighting with low-consumption light bulbs. The reductions mentioned here are in relation to the BAU trend of the sector.

Table 7. Breakdown of GHG reductions (GgCO2 eq. and %)in the conditional scenario compared to the current trend scenario

Years	2015		2020		2025		2030	
Sector	Gg	%	Gg	%	Gg	%	Gg	%
Agriculture, forestry and land use	–	0%	- 10,560	12%	- 10,560	11%	- 10,560	10%
Solid wastes	–		- 60	-4%	- 75	-5%	- 76.3	-4%
Transportation			244	-10%	1069	-26%	2911	-42%
Electricity production	22.18	-3%	73.87	-5%	94.10	-4%	162.80	-4%
Residential			10.02	-8%	25.26	-15%	49.35	-21%
Energy in the manufacturing industries	3.53	-2%	4.49	-2%	5.72	-2%	7.30	-2%

Source: Authors, July 2015

Over the last 15 years, Burkina has been at the head of the countries of the West African Economic and Monetary Union (WAEMU) with an average annual growth of 5.5%, despite a number of exogenous shocks. The Burkina economy is heavily dominated by agriculture, which employs close to 80% of the active population. Cotton is the country's most important cash crop. The bulk of the greenhouse gas emissions in the agricultural sector come from the categories of enteric fermentation and agricultural land.

In 2007, the agricultural sector contributed 88% of the national GHG emissions. Animal husbandry, in the form of enteric fermentation activity, is the category that contributes the most the GHG emission (almost half annually). Agricultural land occupies second place in terms of contributions to these emissions.

Section 4. Adaptation projections and options

4.1. Burkina's long-term adaptation strategy

Globally, development planning is based on the Strategy for Accelerated Growth and Sustainable Development (SAGSD). From the beginning, Burkina Faso's economy has been based on the primary sector, the sector most exposed over the past 40 years to the effects of climate variability and the sector that is now considered the one to be most vulnerable to climate change. This is why the government of Burkina Faso has become engaged specifically with issues of climate change since the great droughts of the 1970's, through a sustained action against the desertification that severely impacts the rural world.

In 2014, within the National Partnership Program for Sustainable Land Management, Burkina Faso has developed and validated a **Strategic Framework for Investment in Sustainable Land Management (SFI-SLM)**. The vision in regard to Sustainable Land Management (SLM), which takes the year 2025 as its projection horizon, is as follows: "*Sustainable rural production systems which, by taking into consideration local knowledge and know-how, (i) preserve the fertility of the soil, (ii) increase plant and animal productivity per unit of area in use and/or by volume of water consumed, (iii) improve the well-being of the people living on the land and (iv) restore preserve the integrity and functioning of ecosystems."*

Considered as an action plan of the NRSP in the area of Sustainable Management of Natural Resources (SMNR), the SFI-SLM is supported by all of the programmes and actions within the NRSP that are financed or are seeking financing.

The objectives, results and outputs expected from the SFI-SLM broadly coincide with the themes classified as priority within the National Adaptation Plan (NAP). Because it has defined quantitative goals for the country at the 2025 horizon in the sectors of the GDRN, as well as their costs, the SFI-SLM may be considered as an operational action plan for adaptation in the sectors of agriculture, animal husbandry, forests and land use, water management and biomass energy.

4.2. Strategic adaptation objectives

The greatest concern for Burkina Faso, as for any other country, is that the climate changes foreseen for the next 50 years are now inevitable. Hence, the primary interest of Burkina Faso, which is not a large GHG emitter, must necessarily be improvement of the people's capability to adapt to the conditions that will exist from now to 2025, 2030 or 2050: a significant rise in the average temperature, more severe dry seasons, strongly and less predictable rainy seasons, a growing problem of drought, lowering of the groundwater table and an increase in the frequency of certain diseases. The only scenario to be prepared for is the trend situation, "*business as usual*", because the climate effects which Burkina must confront have already begun and the positive effects of the possible mitigation actions to be envisaged from this point forward, either at the local or global level, will not be felt until after the period of applicability of the INDC (2030).

The objectives of the adaptation measures foreseen in the country's NAP (National Adaptation Plan) are to (i) reduce the vulnerability to the impacts of climate change on the development of adaptation and resilience capabilities, (ii) facilitate the coherent integration of adaptations to climate change in policies, programmes or activities, new or already existing, in the specific processes of development planning and in the strategies of the relevant sectors at different levels.

4.3. Sectors involved in adaptation projects

On the basis of the adaptation actions identified in the National Adaptation Plan for the principal sectors vulnerable to climate change, national experts (from the public sector, the civil society and the private sector) participating in a kick-off and consultation workshop for the present study were asked to classify those actions that they consider of high priority in view of their knowledge of the country's

environmental and socioeconomic context. Since the classification exercise is at the same time individual and collective, it is assumed that an action receiving the support of more than 50% of the participants could be considered to be of significant importance. The results of this exercise are presented in the following table.

Table 8. Priority actions within the framework of adaptation projects.

Sector	Suggested adaptation measures	Applicability over the short, medium or long term			% of participants giving priority to this action
1. SLM – Sustainable Land Management					
A3	Promotion of sustainable land management (SLM) – Improving access to climate information		M		88%
	Includes:				
A1	Cultivation of early or drought-resistant varieties	S			50%
A2	Implementation of water and soil conservation techniques (stone barriers, levees, filtering levees, terraces, half-moons, agroforestry, dune stabilisation, etc.)	S			50%
A4	Practice of integrated soil fertility management		M		50%
	All of this through:				
EA7	Development of master plans for water development and management	S			50%
EA2	Development of water reservoirs: construction of modern wells, high-flow boreholes, dams; development of ponds; stream diversion			L	75%
E3	Development of grazing water sources and points			L	69%
E2	Delimitation and development of grazing zones		M		50%
EA3	Combating the silting of water sources			L	63%
A6	Implementation of water-efficient irrigation techniques	S			56%
ECO8	Development of research programmes on the resilience of forest, wildlife and fish species			L	56%
ECO7	Rehabilitation and preservation of wet areas			L	44%
2. Forestry					
F1	Implementation of good forestry and agroforestry practices (selective cutting of firewood, assisted natural regeneration, controlled land clearing, etc.)	S			88%
F6	Protection of water courses and water sources		M		69%
F4	Practice of agroforestry for sustained management of natural resources		M		56%
	Through:				
F2	Community and participative management of forest, wildlife and fish resources			L	56%

Sector	Suggested adaptation measures	Applicability over the short, medium or long term			% of participants giving priority to this action
3. Energy					
N3	Diversification of energy sources (solar, wind, biogas)		M		88%
N6	Promotion of energy-saving technologies in industry and construction			L	63%
4. Environmental education					
Eco1	Development of environmental education in both formal and informal teaching systems		M		63%
5. Food					
SA10	Improvement of food processing and preservation methods		M		56%

Source: Authors, July 2015.

4.4. Selected adaptation actions by concerned sector

It is useful to note that the themes given a priority classification by the experts participating in the consultation workshop almost completely match the objectives and actions developed and proposed in the Strategic Investment Framework for Sustainable Land Management (SIF-SFM) (see 4.1).

Table 9 below, based on the scaling model of Sustainable Land Management technologies (CILSS, 2015), summarises the adaptation actions proposed in the INDC for the sectors of agriculture, water management, animal husbandry, biomass energy, forests and land use changes in general (AFOLU).

They incorporate the transversal actions associated in particular with adaptive research within these sectors.

As to table 10, it shows adaptation actions in sectors or areas such as:

- Housing and urban development.
- Health.
- Management of extreme climatic events.

The basic data serving as the input for the model come from the reviewed relevant documentation that is available or has been provided by the national experts of the competent ministries.

Annex 2 provides details on the adaptation projects proposed for the INDC.

Table 9. Adaptation actions in the AFOLU sectors

Adaptation actions/projects	Corresponding technologies	INDC targets				Potential target regions	Total population involved (2015)	Tons of CO2 sequester-ed/saved per year, 2030 horizon	Investment cost in US$, taking into consideration an additional 40% for implementation costs (IEC, administration, capacity enhancement, follow-through and evaluation.) (Constant 2015 cost)			ROI for national economy (%)
		Unit	2020	2025	2030				2020	2025	2030	
Agriculture and water management sector									**385,350,000**	**770,700,000**	**1,156,050,000**	
105,000 ha of CES development each year for the restoration or maintenance of crop land fertility	Only zai	Ha cumul	75 000	150,000	225,000	Nord; Centre-Nord; Sahel; north of Boucle du Mouhoun; north of Est	2,250,000	666,000	31,500,000	63,000,000	94,500,000	67
	Zai + stone barriers	Ha cumul	175,000	350,000	525,000	Nord; Centre-Nord; Sahel; north of Boucle du Mouhoun; north of Est	5,250,000	1,554,000	122,500,000	245,000,000	367,500,000	45
	Plant covered stone barriers	Ha cumul	225,000	450,000	675,000	All regions except Cascades	6,750,000	1,998,000	81,900,000	163,800,000	245,700,000	31
	Stone barriers + zai + assisted natural regeneration	Ha cumul	50,000	100,000	150,000	Nord; Centre-Nord; Sahel; north of Boucle du Mouhoun; north of Est	1,500,000	444,000	40,250,000	80,500,000	120,750,000	39

10,000 ha of micro watersheds (half moons) each year for the restoration of crop land fertility	Agricultural half moons (with addition of manure)	Ha cumul	50,000	100,000	150,000	All regions with rainfall less than or equal to 600 mm/year	1,500,000	444,000	21,000,000	42,000,000	63,000,000	100
1,000 ha per year of bottom lands are developed and enhanced, associated with the system of rice intensification (SRI)	SRI	Ha cumul	5,000	10,000	15,000	Grand-Ouest + all other regions with irrigated rice cultivation	500,000	44,400	2,800,000	5,600,000	8,400,000	188
1,000 drip irrigation kits are distributed each year to irrigate 250 ha of high-value crops (in this case onions)	Drop irrigation	Ha cumul	1,250	2,500	3,750	All regions	20,000	0	35,000,000	70,000,000	105,000,000	25
10 agricultural production intensification units based on high-flow boreholes and using innovative irrigation techniques are created each year for young agricultural entrepreneur groups (based on potatoes or melons)	Drop irrigation	Ha cumul	1,000	2,000	3,000	Regions with large underground aquifers	12,000	0	50,400,000	100,800,000	151,200,000	42

Animal husbandry sector									**171,493,396**	**342,986,792**	**490,680,189**	
75,000 ha of degraded land are rehabilitated each year for forestry and pastoral uses	Micro watersheds (half moons) Delfino ploughed + herbaceous and ligneous seedlings	Ha cumul	375,000	750,000	1,125,000	Nord; Centre-Nord; Sahel; north of Boucle du Mouhoun; north of Est	5,922,637	3,330,000	78,750,000	157,500,000	236,250,000	147
10,000 tons of gross fodder (hay and crop residues) are collected and stored each year	Mowing and storage of hay	Cumul tons MS	50,000	100,000	150,000	Nord; Centre-Nord; Sahel; north of Boucle du Mouhoun; north of Est	1,500,000	NA	5,943,396	11,886,792	17,830,189	45
5 livestock breeding intensification zones are established within the country	Establishment and equipment of strategic areas to respond to needs during critical periods	Each	1	2	2	Est, Sud-Ouest; Hauts-Bassins, Cascades; Centre-Ouest, Boucle du Mouhoun	3 586 000	300 000	23 800 000	47 600 000	47 600 000	67
25,000 households in 2020 are equipped with operating biodigesters in at least 10 regions of Burkina Faso	Biodigesters	Each	25,000	50,000	75,000	All regions	1,500,000	300,000	45,500,000	91,000,000	136,500,000	104
Compost from the biodigesters is used to fertilise 750,000 ha of cultivable land (one biodigester	Organic fertilisation of crop land	Ha	250,000	500,000	750,000	All regions	3,750,000	1,500,000	17,500,000	35,000,000	52,500,000	450

makes it possible to fertilise 10 to 12 ha)												
Biomass energy sector									**29,232,000**	**41,440,000**	**87,696,000**	
540,000 improved cook stoves are produced and distributed, at least 50% in urban and semi-urban areas	Improved household cook stoves	Each	180,000	350,000	540,000	All regions	2,700,000	610,200	4,032,000	7,840,000	12,096,000	166
80% of dolo beer brewers use an improved cook stove, 95% of which are in rural areas and 100% in urban and semi-urban areas. This contributes to a reduction of YY% in the demand for firewood	Improved dolo cook stoves	Each	60,000	80,000	180,000	All regions except Sahel	1,000,000	610,200	25,200,000	33,600,000	75,600,000	92
Forests/change in land use sector									**345,800,000**	**588,000,000**	**903,000,000**	
2000 ha (200 km) of stream banks are rehabilitated and access-protected each year	Hedge-rows; access protection; assisted natural regeneration; Delfino trenches	Ha	10,000	20,000	30,000	All regions	1,200,000	60,000	4,200,000	8,400,000	12,600,000	

12 regions (CT) or 180 communes, in cooperation with grassroots communities, create and organise one biodiversity conservation area each with a commune or regional focus, at least 5,000 ha in area.	Reforestation / Conservation	ha	150,000	450,000	900,000	Est; Boucle du Mouhoun, Sud-Ouest, Cascades, Centre-Ouest; Hauts-Bassins	8,441,000	9,360,000	84,000,000	252,000,000	504,000,000	
The development plans of X classified forests are audited and updated for the purpose of diversifying the development objectives and making the local river communities more responsible (ecobased approach)	Development / management of local forests	Ha	400,000	450,000	450,000	Est; Boucle du Mouhoun, Sud-Ouest, Cascades, Centre-Ouest; Hauts-Bassins; Centre-Nord	1,200,000	4,680,000	224,000,000	252,000,000	252,000,000	109
200 rural communes develop and implement, with the support of the government or NGO's, assisted natural regeneration projects with the participation of at least 5 village communities each	Assisted natural regeneration	Ha	200,000	450,000	800,000	All regions	2,000,000	1,600,000	33,600,000	75,600,000	134,400,000	83

Adaptive research in the sectors of water, agriculture, animal husbandry and forests								**22,680,000**	**45,500,000**	**63,840,000**	
R&D in the area of water, water use and impacts of climate change		mill CFA francs	1,000	2,000	3,100	All regions		NA	2,800,000	5,600,000	8,680,000	
Improvement in the protection of water resources against filling and invasive aquatic plants		mill CFA francs	3,850	7,750	9,950			NA	10,780,000	21,700,000	27,860,000	
Participative development of sustainable land management technologies / R&D on adaptive climate change		mill CFA francs	3 250	6,500	9,750	All regions		NA	9,100,000	18,200,000	27,300,000	
SUBTOTAL AFOLU SECTORS								**27,500,800**	**954,555,396**	**1,788,626,792**	**2,701,266,189**	

Source: Authors' estimates based on CILSS model, July 2015

Table 10. Adaptation actions in other vulnerable sectors

Adaptation action/project	INDC targets				Unit cost (in US$)	Potential target regions, provinces, cities	Total population involved in the project or action (2015)	Tons of CO2 sequest-ered/ saved per years, 2030 horizon	Investment cost in US$, taking into consideration an additional 40% for implementation costs (IEC, administration, capacity enhancement, follow-through and evaluation.) (Constant 2015 cost)			ROI for national economy (%)
	Unit	2020	2025	2030					2020	2025	2030	
Housing and urban development									**757,709,778**	**1,019,351,592**	**1,178,447,326**	
Mapping and marking of flood risk areas in population centres with more than 5000 inhabitants as an adaptation to climate change	Population centre	149	250		300,000	All population centres of urban and rural communes of Burkina Faso	14,016,646	0	62,580,000	105,000,000		
Emphasis on local materials and promotion of wood and metal-free housing as an adaptation to climate change in rural and semi-urban areas of Burkina Faso	Cumulative housing units (90%) Average: 27m² / housing unit	1432	5,806	19,152	100 us$ /m2	Outreach to 5 rural communities per province (225 sites. 1 outreach in 30% of the villages, 80% of the communes	16,676	906,178	7,393,778	29,960,392	98,828,926	233

	Cumulative community buildings (10%): 64 m² / building	172	697	2,298	130 us$ /m2							
Management of flood waters and flood prevention in Burkina Faso's 13 regional capitals	Km of channels and culverts	700	900	1100	700,000	13 regional capitals	2,466,608	0	686,000,000	882,000,000	1,078,000,000	
Energy efficiency in urban and rural housing	KWh/m²	200	180	160	1,600	Administrative buildings of the 13 regional capitals	2,466,608	0	448,000	403,200	358,400	
R&D for climate change adaptation in architecture and construction technologies	Unit of research	2	3	3	300,000	49 urban communities	3,181,351		840,000	1,260,000	1,260,000	
Restoration and development of the Ouagadougou green belt	ha	800	1300		400	City of Ouagadougou	2,000,000	6,500	448,000	728,000	0	
Health sector									**1,327,200**	**18,536,000**	**18,466,000**	
Strengthening of capabilities to forecast and respond to phenomena associated with climate change: total of 9 activities	mill CFA Francs	360	540	810	2000	Entire country			1,008,000	1,512,000	2,268,000	248

Development of research on health and climate change: total of 3 activities	mill CFA francs	114	180	260	2000	Entire country			319,200	504,000	728,000	
Strengthening of personnel capabilities relating to diseases sensitive to climate change: training of 100 specialists	mill CFA francs		3400	5100	2000	Entire country			0	9,520,000	14,280,000	
Strengthening of capabilities to forecast and respond to phenomena associated with climate change: creation of a health monitoring centre	mill CFA francs		2500	5000	2000	Entire country			0	7,000,000	1,190,000	75,703
Strengthening of the early warning system for management of extreme climate events									**2,286,000**	**2,667,000**	**2,667,000**	
Transfer of technologies for climatic, meteorological and environmental monitoring	Training (equipment, rehabilitation of radar, training etc.)	1	1	1		Entire national territory	18,450,494	NA	1,568,820	1,830,290	1,830,290	

Hydrometeorological, meteorological and climatic data included in development plans and early warning systems	Project (strengthening of capabilities, communication, publication etc.)	1	1	1		Entire national territory			717,180	836,710	836,710	
TOTAL OF OTHER NAP SECTORS								**912,678**	**761,322,978**	**1,040,554,592**	**1,199,580,326**	

Source: Author's estimates, July 2015

Section 5. Socioeconomic analysis of INDC projects

5.1. Economic and financial options for mitigation and adaptation projects

The adaptation and mitigation options in the case of a developing country such as Burkina Faso are a complex function of multiple factors, the most important of which are: (i) the cost of technology, (ii) the ease of applying or adopting the technology, (iii) the social benefit and (iv) the abundance of the consumption factor (or raw materials that can be used by technology).

Since the financial factor is the constraining determinant, in particular for investment projects of a nature that is more social than economic, the analysis of the implementation of mitigation and adaptation projects places greater emphasis on cost factors (implementation of the technology) than on other factors.

Thus, a country such as Burkina Faso, so long as the mitigation constraints are not too high (as is the case for developed countries with high-intensity emissions), must gauge its projects by the order of increasing project implementation costs.

Hence, three options are possible:

- Option 1: Mitigation and adaptation projects that can be carried out at negative cost.
- Option 2: Policies/measures/projects that can be carried out at net negative or zero cost, taking into consideration the associated social, economic and environmental benefits.
- Option 3: Mitigation projects with a positive cost that are feasible on condition of receiving international assistance.

5.1.1 Mitigation and adaptation projects that can be carried out at a negative cost (BaU scenario)

Negative-cost projects are defined as investments that produce economies of scale sufficient to cover invested capital, maintenance, operating costs and interest charges throughout the life cycle of the project. ***This option is desirable in all the mitigation and adaptation scenarios, but especially in the BaU (Business as Usual) or unconditional scenarios, because of the certainty that each project that is invested in will give its investors a return, particularly where there is no outside support or where the investment is made through domestic borrowing.***

In the mitigation area, reforestation and stove improvement projects can generate negative costs. Indeed, association with the Carbon Fund can provide financial benefits that may compensate for or counterbalance the amounts invested to implement the projects, in such a way as to make the project costs negative.

5.1.2 Policies/measures/projects that can be carried out at net negative or zero cost, taking into consideration the associated social, economic and environmental benefits (equivalent to the Unconditional Scenario)

It is sometimes difficult to determine the quantitative and monetary benefits of a social policy. The difficulty of extrapolating social or environmental gains as financial gains explains the difficulty in understanding negative or zero costs. ***The projects within this option have an absolute financial value that is negative, but an overall absolute value that is zero or positive when one takes into account the economic and productive, public health and environmental effects that they produce. Their implementation is optional in the context of the unconditional and current trend (BaU) scenarios.***

The examples of obvious interest concern the “improved cook stove” and “advanced cook stove projects.

5.1.3 Mitigation projects with a positive cost that are feasible on condition of receiving international assistance (equivalent to the Hybrid Conditional Scenario)

These projects, the principal objective of which is generally the mitigation and reduction of GHG (MPD, REDD+ NAMA projects), are of two types and relate to investments that are feasible in the context of the conditional (external financing) scenario:

- The project is very costly and profitable at a certain scale because of the economies of scale it will generate, but external support would be needed because of its high investment cost.
- The project is not financially profitable, but its economic, public health and environmental benefits are significant and its implementation would almost necessarily require external financial assistance because of its high cost.

5.1.4 Relationships between economic options and mitigation and adaptation options

When investments in mitigation and adaptation projects are financially profitable, the country does not need an external contribution because the invested capital is going to be recovered and the investors will get back their investment. This type of project is to be financed and carried out in a BaU or unconditional scenario through financing provided by the central government along with its local partners (including the private sector in the context of domestic borrowing).

However, if a project is not financially profitable (but nevertheless has enormous socioeconomic impacts or co-benefits), or even profitable with enormous socioeconomic impacts or co-benefits, the investments will be made within the framework of a hybrid conditional scenario, i.e. the requirement for external or international support to finance the project.

An example of the type of project within the framework of a conditional scenario, where the financing requires external financial support, is the “improved cook stoves” project.

Improved cook stoves for which the performance varies as a function of technological innovations (improved cook stove or advanced cook stove), will yield more or less positive financial profitability as a function of their use (households or producers). In the case of household use for domestic needs, the profitability is less, while in the case of use to produce dolo (sorghum beer), the profitability is much greater.

Nevertheless, in both modes of use, the impacts and co-benefits of using the improved cook stove are enormous:

- Use of the improved cook stove makes it possible to save 15% to 45% of the energy used in cooking, depending on the level of technology. This means that in the above cases, the destruction of biomass is 15% to 45% less, which is of broad large-scale significance.
- The cooking speed resulting from the use of an improved cook stove allows the user of the stove to save 50% to 75% of the original time devoted to cooking or producing dolo (depending on how much the improved cook stove is used). This means that the user of the cook stove can devote more than half of the original time to other profitable activities and thus increase his or her income.
- The use of improved cook stoves permits households and other users to reduce their exposure to respiratory diseases caused by smoke or the inhalation of carbon dioxide or carbon monoxide, as the case may be. Persons previously exposed increase their health “capital” and the income previously devoted to health care is saved.

Thus, because of the enormous associated benefits cited above, such projects are financed within the framework of a conditional scenario, with the need for external financial help.

5.2. Operational methodology of the analysis

5.2.1 Objectives

The aims of the socioeconomic analysis of the options and project within the INDC are to:

- Determine the feasibility of the projects.
- Perform an analysis of the total impact of the "green development" options on the overall economic growth of the country.
- Make it possible to prioritise projects that are already identified and are going to be implemented.
- Define the indicators of project relevance.
- Determine the socioeconomic benefits and costs inherent in their implementation.
- Evaluate the effects and impacts of the potential projects that have been identified.
- Validate the relevance of the identified projects for purposes of planning, financing and implementation.
- Prepare a relative analysis of the net cost-benefit ratios associated with optional project technologies.

The analysis is carried out in two phases and is based on all the projects identified in the mitigation and adaptation components:

- Definition of a general framework for assessing the projects, based on previously defined criteria and indicators.
- Analysis of the financial cost-benefit ratios and/or the socioeconomic and environmental co-benefits of the projects.

In the case at hand, the analysis of the projects will be based in the OECD-DAC principles: relevance, effectiveness, efficiency, sustainability and impacts. A cross analysis of INDC project sectors/OECD-DAC criteria will make it possible to identify a certain number of expected indicators for which the various viable and profitable projects should be significant.

5.2.2 General framework of socioeconomic analysis of the projects

The general framework for analysis of the projects emphasises their contributions to the country's overall development:

- In terms of the project's contribution to green growth and the maintenance and revitalisation of the stock of natural resources capital by facilitating the processes of mitigation of GHG emissions and the adaptation of the population to climate change.
- In terms of the contribution of the projects to the creation of wealth (growth), the multiplication of national income and the reduction of poverty.
- And in terms of the ease of acquisition and ease of adoption of the technology and other inputs of the projects.

For this purpose, the criteria identified in table 11 below will serve as analytical indicators of the overall contribution to development, evaluated on the basis of a weighted score of 0 to 100.

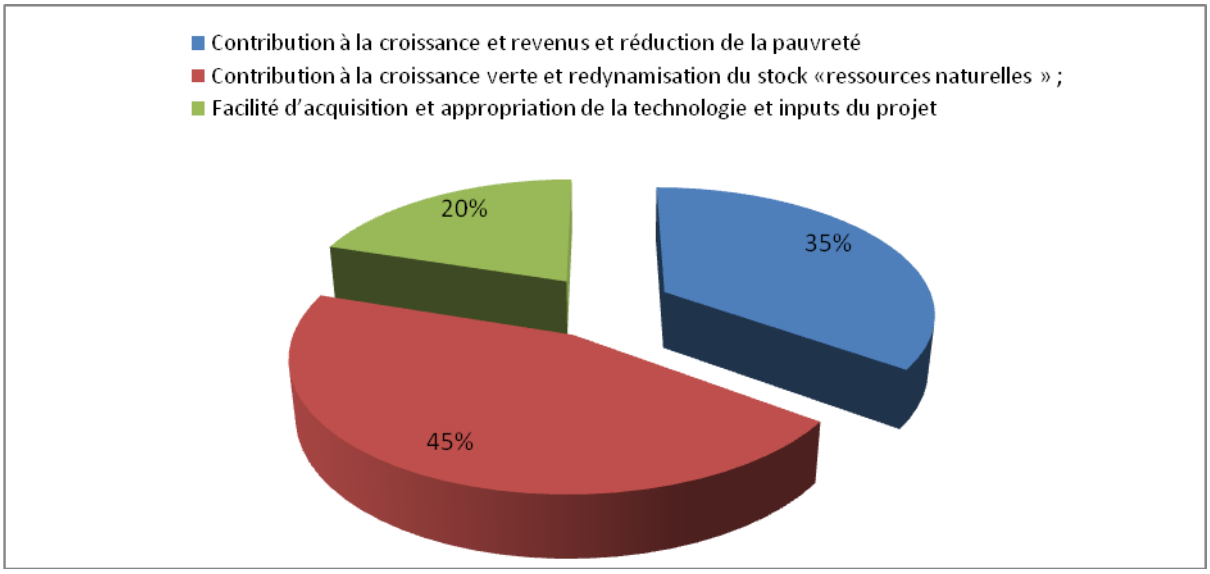
For each of the three contributions mentioned above, a project will be graded from 1 to 10 on the basis of its strength with respect to that contribution and will be given a weighted grade between 100 and 1000 on the basis of its relevance and effectiveness in terms of its overall contribution to development.

Table 11. Analytical criteria and prioritisation of INDC projects

Analytical criteria	Relevant associated indicators	Score/ 100 = overall contribution to development
The project's contribution to the creation of wealth (growth) and the multiplication of national income and the reduction of poverty	> Amount of additional production > Agricultural output > Internal rate of return > Number of additional persons benefited	35
The project's contribution to green growth and maintenance and revitalisation of the stock of natural resources capital	> Number of tons of CO_2 sequestered or saved per year > Degree of conservation of natural capital	45
Ease of acquisition and ease of adoption of the technology and inputs of the projects	> Financial cost of the technology > Availability of the raw material (input of the technology)	20

Source: Author, August 2015

Figure 2. Analytical criteria for INDC projects



Key: Blue – Contribution to growth and income and reduction of poverty; Red – Contribution to green growth and revitalisation of the stock of natural resources; Green – Ease of acquisition and adoption of the technology and inputs of the project

Operationally, the socioeconomic analysis of the projects will focus on linked evaluations:

- Of the rate of return on the financial investment in the projects.
- Of the projected social and economic benefits of the projects.
- Of the positive or negative environmental externalities associated with implementation of the projects.

5.3. Results of socioeconomic analyses and implementation of conditional projects within the INDC

5.3.1 Implementation costs and net co-benefits generated

In distinction to investment costs, which represent the costs of acquiring all of the productive capital (production factors, including raw materials) of the production units, the implementation costs of the projects represent expenses for the operation and follow-up of the production units.

The implementation costs of the project consist of:

- The costs of designing the projects (feasibility and design studies).
- The costs of operating the projects (administrative costs of operating the management unit of the various projects), including the costs of capacity building.
- The costs of supporting the implementation, including any costs for information, education and communication (IEC).
- The costs of project follow-up and evaluation.

Here we consider that the implementation costs represent around 40% of the costs of a project. Table 12 below provides an estimate of the implementation costs of the various projects by INDC sector.

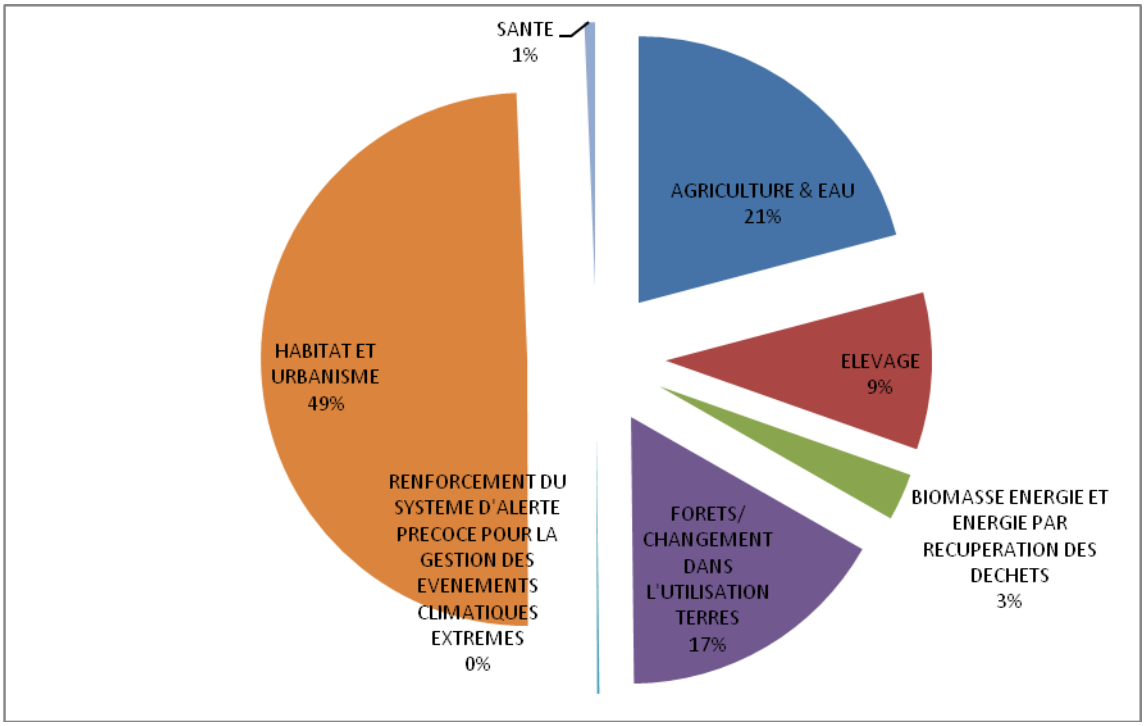
Table 12. Investment and implementation costs of conditional projects within the INDC (in US$)

Sectors	Investment costs of the sectoral projects	Implementation costs	Co-benefits associated with implementation of the sectoral projects
Agriculture & water	1,233,470,000	493,388,000	> Annual growth in agricultural production, more specifically the amounts of cereals produced, leading in turn to an improvement in the levels of food security and the levels of farmer income, which reduces the incidence of poverty. > The proposed actions make it possible to sequester carbon in the soil (more than 5,150 Gg eq CO2 sequestered at the 2030 horizon), contributing to the restoration of degraded land and mitigation of the effects of climate warming, with the end result of preserving ecosystems and water resources.
Animal husbandry	562,080,189	224,832,076	> The use of biodigesters makes it possible to produce compost for the fertilisation of agricultural land (things which increase agropastoral production and the income of the producers). This provides energy to rural households, contributing to an increase in their standard of living. > The use of biodigesters contributes to saving biomass energy because the stocks of wood used for the energy needed for cooking and lighting are saved. > Development of grazing areas will preserve biodiversity and the mobilisation of surface water, which up to now has been better developed in intensive animal production zones (IAPZ's).
Biomass energy and energy from recycling of wastes	168,924,000	67,569,600	> The use of improved cook stoves will make it possible to save the wood energy that is consumed (in comparison to traditional cook stoves), and the associated speedier cooking will permit the household or preparer of the meals to save time and use it for other income producing work, so much so that it could be double counted as a financial benefit. > The use of improved cook stoves permits local and rural populations to improve their health (because of the respiratory diseases caused by the inhalation of carbon monoxide that they avoid). The households, and principally the women, can then save the costs incurred for health care. > Transformation of methane waste is an additional source of energy (as well as a new source of regular jobs) and the cities will be able to get rid of their wastes for the good of the population.
Forests / change in land use	979,246,000	391,698,400	> Forest investment are an invaluable contribution to agroforestry and the preservation of biodiversity and a suitable response to environmental degradation and climate warming. > Forest projects, even in disadvantaged communities, make it possible to harmoniously combine preservation of the forests and agricultural development by emphasising agricultural crops in a dynamic of local income growth. > Projects to create forests and develop natural forests make it possible to conserve soil and water,

Sectors	Investment costs of the sectoral projects	Implementation costs	Co-benefits associated with implementation of the sectoral projects
			reduce erosion and air pollution and conserve biological diversity, to say nothing of providing ligneous and non-ligneous forest products, including those used for foods and medicines.
Strengthening of the early warning system for dealing with the management of extreme climate events	7,620,000	3,048,000	> Meteorological data enables producers to increase their opportunities for investment by providing them with important social and economic information that makes it possible to adapt their systems of production and protect their persons, their means of subsistence and their products. > Actions to transfer climatic, meteorological and environmental monitoring technologies make it possible to readjust production and consumption factors as a function of climate change and improve the producers cost-benefit ratio by preserving environmental benefits (saving of water resources).
Housing and urban development	2,918,154,526	1,167,261,810	> Investments in better understanding and definition of flood-risk zones make it possible to better develop living space and effectively prevent the effects of floods, thus contributing to safer and better living conditions. > They also make it possible to promote architecture that is adapted to climate change conditions, emphasis on local materials and savings of wood resources, which in turn strengthens conservation of forests and biodiversity. > Finally, investments in energy efficiency permit significant savings in the energy budgets of public entities and homes while improving overall comfort.
Health	38,329,200	15,331,680	> Investment in national capabilities to prevent, monitor and manage climate-related diseases undoubtedly improves the overall productivity of the economy and increases national production. > Healthy workers consume fewer resources for their care and produce better. > The government of Burkina Faso better controls the social costs of climate change.
Renewable energy	PM unconditional scenario	PM	> The use of alternative energy sources (solar, biofuels etc.) makes it possible to reduce energy costs for homes and business, which increases their productivity. > It makes it possible to mitigate the pollution generated by the use of fossil fuels in transportation and electricity production.
Transportation	PM unconditional scenario	PM	> Investments in biofuels make it possible to have alternative sources of energy available and to diversify renewable energy sources. > The modal transportation project makes it possible to diversify transportation methods and infrastructures.
Total cost	**5,907,823,915**	**2,363,129,566**	

Source: Author, August 2015, estimates from the table of adaptation and mitigation actions.

Figure 3. Graphic representation of the proportions of Adaptation Scenario projects by sector in investment and implementation costs



Key: Upper light blue – Health 1%; Dark blue – Agriculture and water 21%; Red – Animal husbandry 9%; Green – Biomass energy and energy from waste recycling 3%; Purple – Forests/changes in land use 17%; Orange – Housing and urban development 49%; Lower light blue – Strenthening of early warning systems for the management of extreme climate events 0%.

5.3.2 Classification of projects by order of priority for implementation

On the basis of the weighting based approach used earlier for the various conditional projects (consisting of attributing to them grades from 1 to 10 on the basis of their respective contributions to wealth creation (35%), green growth and maintenance of natural resources (45%) and ease of access/adoption of the technology (20%), the various conditional projects can be classified by order of priority using their weighted grades.

Table 13 below gives a classification of all the conditional projects by order of priority of financing and/or implementation.

Table 13. Classification of all projects of the Adaptation Scenario by order of priority for implementation

Priority No.	Adaptation actions provided for in the INDC	Sectors	Weighted prioritisation score
1.	Promotion of dolo cook stoves with the aim of affecting 97% of dolo brewers at the 2030 horizon	Biomass energy/ waste recovery energy	935
2.	Distribution of 15,000 drip irrigation kits in order to irrigate 3,750 ha with surface water for the production of high-value crops (such as tomatoes and potatoes).	Agriculture, water	915
3.	Restoration and maintenance of the fertility of 1,575 million ha of crop lands through various water and soil conservation techniques (CES).	Agriculture, water	890

Priority No.	Adaptation actions provided for in the INDC	Sectors	Weighted prioritisation score
4.	Equipping of 75,000 households in 2030 with functional biodigesters in at least 10 regions of Burkina Faso	Animal husbandry	875
5.	Restoration and development of the Ouagadougou green belt	Housing and urban development	875
6.	Forestation/reforestation project equivalent to one forest investment program	Forests-land use	870
7.	Production and distribution of improved cook stoves in urban and semi-urban areas	Biomass energy/ waste recovery energy	865
8.	Flood water management and flood prevention in the 13 regional capitals of Burkina Faso	Housing and urban development	865
9.	Emphasis on local materials and promotion of wood and metal-free housing as an adaptation to climate change in the rural and semi-urban areas of Burkina Faso.	Housing and urban development	860
10.	Creation of 150 agricultural production intensification units through high-flow boreholes, using innovative irrigation techniques (pressurised drip irrigation)	Agriculture, water	825
11.	Inclusion of efficient and effective hydrometeorological and environmental information in long-term development plans to generate early and seasonal warnings	Early warning system	825
12.	Rehabilitation of 1,125,000 ha of degraded land for forest and grazing purposes, i.e. an investment of 75,000 ha each year	Animal husbandry	805
13.	Strengthening of capabilities to forecast and respond to the phenomena associated with climate change: total of nine activities	Health	800
14.	Energy efficiency in urban and rural housing	Housing and urban development	795
15.	Mowing and storage of 10,000 tons of coarse fodder each year (hays and crop residues)	Animal husbandry	790
16.	Establishment and classification of 900,000 ha of regionally focussed biodiversity conservation areas in 12 regions or 180 communes	Forests-land use	785
17.	Completion of 800,000 ha of assisted natural regeneration in 200 rural communes	Forests-land use	785
18.	Restoration of 150,000 ha of degraded land for agricultural production through the completion of 10,000 ha of micro watersheds (or half moons) each year	Agriculture, water	770
19.	Recovery of methane from used water from the Ouagadougou municipal purification station	Biomass energy/ waste recovery energy	770
20.	Transfer of technologies for climatic, meteorological and environmental monitoring	Early warning system	770
21.	Improved protection of water resources against filling and invasive aquatic plants	Agriculture, water	765
22.	Creation and sustainable management of five animal production intensification zones in five regions of the country	Animal husbandry	760
23.	Research and development on architectural and construction technologies adapted to climate change	Housing and urban development	745

Priority No.	Adaptation actions provided for in the INDC	Sectors	Weighted prioritisation score
24.	Recovery of methane from the solid wastes of the city of Ouagadougou landfill	Biomass energy/ waste recovery energy	725
25.	Pursuit of R&D actions in the areas of water, water use and the impacts of climate change	Agriculture, water	720
26.	Mapping and marking of flood risk zones in settlements of more than 5,000 inhabitants as an adaptation to climate change	Housing and urban development	720
27.	Development of 15,000 ha of shallows and irrigated areas and their exploitation for the intensive rice cultivation system	Agriculture, water	705
28.	Development of research on health and climate change: total of three activities	Health	690
29.	Audit of plans to develop all classified or protected forests for updating purposes	Forests-land use	685
30.	Strengthening of capabilities to forecast and respond to phenomena associated with climate change: creation of an MT health care monitoring centre	Health	680
31.	Participative development of sustainable land management technologies / Adaptive climate change R&D	Forests-land use	675
32.	Strengthening of personnel capabilities with regard to diseases sensitive to climate change: training of 100 specialists	Health	670
33.	Rehabilitation and protection of 30,000 ha of stream banks	Forests-land use	640

Source: Author, August 2015, estimates from the table of adaptation and mitigation actions

5.4. Sources and conditions of financing

There are multiple sources for financing projects within the INDC.

The availability of financing sources will depend on the ability of Burkina Faso to develop active cooperation with financing partners and institutions. To finance adaptation and mitigation projects, Burkina Faso could rely on access to the **Green Climate Fund (GCF)** and on the availability of the Environmental Action Fund created by the government, provided that this fund conforms to the rules of transparency, neutrality and good governance that permit a GCF window to be created within them.

The strengthening of bilateral relations with friendly countries and multilateral relations with institutions such as the World Bank, the European Union, the GEF, the UNDP, the UNEP, the ADB, the IDB, the BOAD, the ECOWAS or WAEMU, all potential financial partners for the various projects through funds already in place, may permit Burkina Faso to finance these projects within the framework of climate change and international agreements and conventions.

The Burkina Faso private sector will contribute a large part (almost 50% of the financing) on condition that the commercial banks are made aware of these types of financing.

Burkina Faso supports the use of market mechanisms such as the Clean Development Mechanism (CDM) as an effective monitoring, reporting and verification tool for mitigation activities and an instrument for results-oriented financing. Thus, Burkina Faso supports the use of certified emission reduction units (CER's) delivered by CDM project, programmes and activities to reach the pre-2020 mitigation goals. Hence, payments for carbon such as to make this economically viable in the specific context of the less advanced countries, the developing countries and the small developing island

states is a priority. To do this, the establishment of new accounting rules within the framework of the UNFCCC is necessary to guarantee the environmental integrity of market mechanisms and avoid double counting. These accounting rules will also be introduced for the EIF in order to achieve the required financial transparency.

Section 6. Implementation and monitoring and evaluation of projects listed within the INDC

6.1. Implementation system and actors

The implementation of the projects listed within the INDC will require the establishment of an INDC Coordination Unit to report to the SP-CONEDD.[1] The Coordination Unit will be responsible for coordinating and supervising (monitoring) the implementation of the various actions identified in the INDC and will consist of three technical entities:

- A coordination entity responsible for scheduling the implementation activities of the various projects.
- A Technical **Adaptation** Cell that will be concerned with coordinating the implementation and follow-up of the adaptation projects and which could become a Designated National Authority for Adaptation (DNA-AD).
- A Technical **Mitigation** Cell that will be concerned with coordinating the implementation and follow-up of the mitigation projects in coordination with or on behalf of the Burkina Faso DNA (Designated National Authority).

The staff and experts within these units will cooperate closely with the staffs of the various ministries in charge of the projects, which are:

- The Ministry of Agriculture
- The Ministry of Water Resources
- The Ministry of Animal Resources
- The Ministry of Environment and Forests
- The ministry and public institutions responsible for scientific research and technological innovation
- The Ministry of Housing and Urban Development
- The Ministry of Health
- The Ministry of Energy
- The Ministry of Transportation

The Coordination Unit will work with the above departments and other cross-cutting ministries, such as the Ministry of Economy and Finance, the Ministry of the Promotion of Women and Gender and the Ministry of International Cooperation, within the framework of the financing agreements. Finally, it will coordinate with the civil society structures and the institutions representing the private sector.

6.2. Follow-up and evaluation system and actors

The Coordination Unit will be responsible for overall follow-up of the implementation activities of the INDC[2]. For this purpose, it will have to have a manual of administrative procedures and a harmonised system of follow-up and evaluation of the projects, detailing the principal responsibilities and the objectives that have been assigned.

The project evaluation actors are external and will come from the technical and financial partners of the projects to be implemented. These evaluations will take place annually or at given intervals and, at certain stages in the implementation of the projects, will consider the work of the independent evaluators.

1 According to the options for a national sustainable development policy, the CONEDD will evolve into a National Council for Sustainable Development (NCSD).
2 Each project will have within it a follow-up and evaluation mechanism using tools that are harmonised (and if necessary standardised) with the other INDC projects.

Section 7. Conclusion

In Burkina Faso's INDC, the mitigation and adaptation themes have been integrated, the two of them being closely linked: to "mitigate" it is necessary in principle to "adapt" since the agriculture-forestry-land use (AFOLU) sector is an emission sector but also a major sequestration sector. Consequently, adaptation contributes to a great extent to mitigation revenues (CO_2 sequestration and emissions avoided x the price per ton of carbon on the exchanges).

However, adaptation necessitates substantial funding. Although the price per ton of CO_2 has collapsed on the global markets, the reduction of CO_2 emissions remains an excellent indicator of the performance and impact of the mitigation programmes and projects in Burkina Faso. But CO_2 is not the only source of life in Burkina Faso (food security, atmospheric pollution, air and water quality). One molecule of water (H_2O) is just as vital to the soil as CO_2 for food security and the life cycle chain. For adaptation, the conservation of water (H_2O) (runoff water, groundwater etc.) is an adaptation indicator just as CO_2 is in the case of mitigation. Therefore, CO_2 and H_2O can both be counted, CO_2 for its market value and H_2O for its economic value.

In the case of **mitigation** (approach and results), and for the purpose of reducing carbon emissions and increasing sequestration, the three scenarios are clear and obvious. The issue is to prioritise these scenarios by linking them to investments in adaptation, clean technology and projects whose end objective is a society with low carbon emissions and a greener rural world.

In the case of **adaptation**, the options are above all varied and it is also necessary to prioritise them in a summary table based on mitigation projections, adaptation options and the investments required. For example, adaptation in the area of water resource management is multi-sectoral, with initiatives to conserve this resource with regard to both quality and quantity. In addition, collection, recycling, reuse, water treatment technologies and innovative schemes for water efficiency and good water management would aid to the "clarity" of this water. Other ideas would form part of the Strategic Framework for Investment in Sustainable Land Management (SFI-SLM), with a budget of 869 billion CFA francs for five years that is both ambitious and conservative. With one-third of the land degraded and thus 9,316,000 ha in distress, the application of good land use practices and the sustainable management of land are also required, given that these funds affect directly the people who are the most vulnerable (the users of these lands) and the fact that this activity directly attacks the problem of management of natural resources at all levels. Thus, developing an Integrated Adaptation Scenario for this INDC is ambitious.

In terms of co-benefits, and in order to maximise them, the regions of the north and the animal husbandry sector will need more attention and greater investments. Here also, as in the forests sector, the mitigation and adaptation actions operate both symbiotically and in parallel.

Climate change will amplify their impacts where there is already population pressure, that is in the heavily populated urban areas.

The G7 countries have committed to contribute 100 billion dollars per year from now to 2020 to the fight against climate change, part of which is to pass through the Green Climate Fund (GCF).

This sum promised by the international community is to support the developing countries in the limitation of their greenhouse gas emissions and their adaptation to the effects of climate change. However, this commitment does not cover all that is needed to finance worldwide reduction of greenhouse gases, an amount estimated at between 650 billion and 1,950 billion US dollars per year. Burkina Faso through its INDC should position itself among the community of nations to have access to these funds.

In terms of financing, the Environmental Intervention Fund (EIF) established by Burkina Faso appears to be an excellent tool provided that the operating rules of this fund are flexible and transparent in a way to make it a tool of good governance. The income from emissions reductions could be paid into this fund. And since adaptation is at the heart of mitigation and gives rise to it, one could logically imagine that a percentage of the mitigation revenues would be mobilised to finance the adaptation options (up to 75%, for example), depending on the innovative mechanisms. One could also imagine more broadly that a percentage of the EIF (40%) would go to implement adaptation and mitigation measures (15%), cutting-edge follow-up and evaluation/certification technologies (15%) and applied research (10%, for example).

From the beginning, Burkina Faso's INDC was intended to be **participative**, particularly workshops 1 to 3 and the ad hoc working group, **robust, fair, ambitious** and **transparent**, not to mention other qualifiers.

The INDC is **robust** because of its range of data, multiple analyses, summary tables and in-depth thinking on the environment, climate change, mitigation and adaptation, and social and socioeconomic areas and in the scenarios that give meaning to such thinking.

To be **fair** and engender fairness, the INDC was intended to demonstrate to the community of nations that, despite this country's low emissions of carbon and GHG in comparison to worldwide emissions, Burkina Faso assumes responsibility for the emissions it emits, particularly in the AFOLU sector. To do this, despite the fact the cost of reducing emissions and the ratio of investment cost to benefit (health, social benefits, food security) are high in Burkina, the government fully intends to undertake major mitigation actions in the energy sector and adaptation actions in the rural sector and the sectors of health and housing in order to help reduce its emissions, while significantly reducing the vulnerability of the strategic sectors of its economy.

The INDC is **ambitious** because it goes beyond the BaU scenario and moves toward two other scenarios, Unconditional and Hybrid Conditional that integrate mitigation with adaptation. In the Unconditional Scenario, Burkina explores new targets and presses hard for the mitigation opportunities that the country would be expected to have if it took the technical and economic measures necessary to achieve ambitious economic growth to follow an upward curve that has still not been achieved in all sectors of development. In this Hybrid Conditional Scenario, Burkina Faso moves toward sustainable development. And the Integrated Adaptation Scenario lends itself well to transforming the resource consumption economy of Burkina Faso into a gradually green (or almost green) economy and into a society with low carbon emissions. In this scenario, it is estimated that the total value of the environmental services provided by the actions that are proposed in the AFOLU sectors over the 15 years up to 2030 would be at least US $11,500,000,000, which would give a return on investment of more than 400% (which, when compared with the solely financial return of primary production of 64%, is six times greater). These environmental services, although invisible in a consumption economy measured in GDP, are real in a circular or natural capital economy and contribute greatly to the national economy.

While being fair and ambitious, the INDC aims to be **transparent** and aspires to reach the objectives of the Climate Convention by aligning itself with the 2°C objective and taking into consideration the need to limit cumulative emissions over this period to almost zero. Once again, this objective is ambitious and requires total transparency. Technically and economically, this means for Burkina Faso an economy with low carbon output (a low carbon emission society) and a country covered with green and with a green economy. With its semi-arid nature and climate conditions that are still more uncertain in the years to come, this transformation will demand considerable efforts and huge investments in adaptation, particularly in the agriculture-forests-land use (AFOLU) sectors. The adaptation solutions exist to help the population foresee and prepare to face the effects of climate change that will inevitably arise because of the GHG emissions that have already taken place since 1900.

As it turns out, many adaptation actions rely on clean technologies that in turn contribute to the lowering of GHG emissions. The most important are connected with land management and the conservation of water, soil and forests in order to increase the resilience of the population. It is thus important that the government, its partners and international donors support these initiatives and make possible, through reasonable and proper investments, their greatest possible spread throughout the country.

Section 8. Commitments / recommendations

Burkina Faso's commitment comes about through three scenarios.

A first scenario, ***Unconditional (annex 1)***, the objective of which is to reduce GHG emissions by 7,808 Gg per year in 2030, **i.e. 6%** when compared to BaU, for ongoing investments of US $1.25 billion.

A ***Hybrid Conditional*** scenario ***(annex 1)***, which aims to reduce GHG emissions by **11.6%**, which corresponds to 13,766 Gg per year in 2030, for investments of US $**756,032,667**.

A third scenario, ***Adaptation (annexe 2***), which aims, among other things, to restore and develop 5,055 million ha of degraded lands at the 2030 horizon, corresponding to 55% of the total current area of degraded lands in the country and making it possible to feed more than 6 million additional persons at the 2030 horizon. Moreover, these adaptation projects will contribute to a reduction in GHG emissions of 43,707 Gg of CO2, **i.e. 36.95% when compared to BaU**, for an overall investment of US $5,804,949,915.

The recommendations may be summarised as:

- Guarantee the use of the Environmental Intervention Fund, the financial transparency of which will be beyond question, to receive and distribute the receipts from the sale of carbon resulting from mitigation.
- Clearly promote renewable energy, at least by eliminating fossil fuel subsidies and, at best, by subsidising investments in renewable energy.
- Promote architectural structures that use materials that are local, renewable and insulating and have a low energy cost for all public construction and, through subsidies and tax breaks, for private residences.
- In the agricultural sector at large, move resolutely toward sustainable and adapted agricultural practices, particularly for family operations and small producers.
- For the large private and public farms, review the value chain in terms of climate change and, in particular, evaluate in the most rigorous and complete way the new biotechnology programmes, especially GMO's.

Section 9. ANNEXES

9.1. Annex 1: List of projects with a mitigation component

	Cost (in US$)
UNCONDITIONAL SUBTOTAL	**1,124,779,259**
Forest Investment Programme	21,645,878
NAMA's SNV	17,710,839
Improved cook stoves SNV	196,787
Improved cook stoves Tipaalga	2,230,254
National Biodigester Project	19,722,922
Electricity production	
Samendeni Dam	69,710,913
Ouessa Aval Dam	350,000,000
Bagré Aval Dam	128,741,379
Zagtoulli solar power plant (SONABEL)	67,758,621
Kaya PV solar power plant (SONABEL)	21,666,667
Ouaga 2000 solar power plant (SONABEL)	
Dédougou PV solar power plant (SONABEL)	

	Cost (US$)
CONDITIONAL SUBTOTAL	**756,032,667**
Forestation/reforestation project equivalent to three Forest Investment Programmes (FIP)	64,938,000
Recovery of methane from used water from the Ouagadougou municipal purification station	72,784,000
Recovery of methane from the solid wastes of the Ouagadougou municipal industrial landfill	8,444,000
A. Electrical energy production	
Small hydroelectric plants (Bontioli, 5.1 MW; Gongouro, 5 MW; and Folonzo, 10,8 MW) in public-private partnership	109,166,667
Solar	163,666,667
Renewable and hybrid energy based mini-networks	
PV, pico-hydro and small wind systems	
Bioenergy	12,500,000
B. Transportation	
More rapid improvement in the stock of vehicles (30% reduction in fuel consumption in 2025 instead of 20% for 2030)	3,325,000
Substitution of biofuels for hydrocarbons: bioethanol production units (replace 10% of super grade petrol consumption in 2030)	94,708,333
Substitution of biofuels for hydrocarbons: biodiesel production units (replace 5% of diesel consumption in 2030)	

Gaoua PV solar power plant (SONABEL)	
Zina PV solar power plant	
Diapaga PV solar power plant (SONABEL)	
Zagtoulli II solar power plant (Scatec solar)	
Kodeni solar power plant (Canopy) at Pâ	
Patte d'oie solar power plant (Naange)	
Zano solar power plant (Soltech)	
Pâ solar power plant (Canopy)	
Small hydroelectric plants (Bontioli, 5.1 MW; Gongouro, 5 MW; and Folonzo, 10,8 MW) in public-private partnership	109,166,667
Installation of 20 MW of PV solar connected to the network every 10 years (beginning in 2015)	99,341,667
Gasifiers (cotton stalks) for electricity production (20 X 250 KW)	
Photovoltaic solar (EDF)	72,000,000
Renewable and hybrid energy based mini-networks	
PV, pico-hydro and small wind systems	
Reduction of losses from the electric network	34,686,667

Residential and tertiary	
Energy efficiency in electric lighting (residential, EP and tertiary)	168 750 000
Industries	
Lighting efficiency (project to distribute 2 million low-consumption bulbs in the industrial and tertiary sectors) reduction of 2% per year	52,500,000
Energy-efficient technologies (-3% per year)	5,250,000
Energy	609,866,667
Agriculture	64,938,000
Waste	81,228,000

Transportation	
Modal transfer	1,108,333
Enhancement of the modal transfer project in the city of Ouagadougou (for 20 km)	2,216,667
B. Residential and tertiary	
Energy efficiency/introduction of low-consumption bulbs	6,875,000
Energy efficiency in electric lighting (residential, EP and tertiary)	100,000,000

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9.2. Annex 2: List of projects in the INDC adaptation component

ADAPTATION PROJECTS (INTEGRATED ADAPTATION SCENARIO)						
Projects	**Scenarios**	**Net emissions (Gg CO2)**	**Cost/ Investment (US$)**	**Targets**	**Number of beneficiaries**	**Project cost/ beneficiary (US$)**
	ADAPTATION SUBTOTAL	**43,707**	**5,804,949,915**			
AFOLU SECTORS		**43,701**	**2,840,846,189**			
Agriculture-water sector		**5,150**	**1,233,470,000**		**17,858,000**	**69**
Restore and maintain the fertility of 1,575 million ha of cropland through various water and soil conservation techniques.		4,662	828,450,000	1,575,000 ha	15,750,000	52;6
Restoration of 150,000 ha of degraded land for agricultural production through the construction of 10,000 ha of micro watersheds (or half moons) each year		444	63,000,000	150,000 ha	1,500,000	42
Development of 15,000 ha of low lands and irrigated areas and their exploitation for the intensive rice cultivation system		44,4	8,400,000	15,000 ha	500,000	16.8
Distribution of 15,000 drip irrigation kits for the irrigation of 3,750 ha with surface water for the production of high-value crops (tomatoes and potatoes, for example)		0	105,000,000	3,750 ha	60,000	1,750
Creation of 150 agricultural production intensification units from high-flow boreholes using innovative irrigation techniques (pressurised drip irrigation)		0	151,200,000	4,000 ha	48,000	3,150
Improvement in the protection of water resources against filling and invasive aquatic plants		0	60,340,000	Non-quantified targets	Indefinite	
Pursuit of R&D actions in the areas of water, water use and impacts of climate change		0	17,080,000	Non-quantified targets	Indefinite	

ADAPTATION PROJECTS (INTEGRATED ADAPTATION SCENARIO)						
Projects	**Scenarios**	**Net emissions (Gg CO2)**	**Cost/ Investment (US$)**	**Targets**	**Number of beneficiaries**	**Project cost/ beneficiary (US$)**
Animal husbandry sector		**21,630**	**562,080,189**		**701,000**	**801.8**
Rehabilitation of 1,125,000 ha degraded land for forest and pastoral purposes, i.e. an investment of 75,000 ha each year		3,330	236,250,000	1,125,000 ha	460,000	514
Mowing and the conservation of 10,000 tons of coarse fodder each year (hay and crop residues)		0	17,830,189	150,000 tonnes	24,000	743
The equipment of 75,000 households in 2030 with functional biodigesters in at least ten regions of Burkina Faso		18,000	189,000,000	75,000 households	75,000	2520
Creation and sustained management of 5 animal production intensification zones (APIZ) in five regions of the country		300	119,000,000	5 APIZ's	142,000	838
Biomass energy sector		**1,220**	**87,696,000**		**3,600,000**	**24.4**
Production and distribution of improved cook stoves in urban and semi-urban areas		610	12,096,000	540,000 household cook stoves over 15 years	2,700,000	4.5
Promotion of dolo cook stoves with the aim of reaching 97% of dolo brewers at the 2030 horizon		610	75,600,000	180,000 dolo cook stoves over 15 years	900,000	84
Forests and changes in land use sector		**15,700**	**957,600,000**		**13,800,000**	**69,4**
Rehabilitation and protection of 30,000 ha of stream banks		60	12,600,000	30,000 ha	1,200,000	10.5
Creation and classification of 900,000 ha of biological diversity conservation spaces with a regional focus in 12 regions or 180 communes		9,360	504,000,000	900,000 ha	8,400,000	60
Audit of the development plans of all classified or protected forests for the purpose of updating them		4,680	252,000,000	450,000 ha	1,200,000	210
Completion of 800,000 ha of assisted natural regeneration (ANR) in 200 rural communes		1,600	134,400,000	800,000 ha	3,000,000	44.8
Participative development of sustainable land management technologies / R&D on climate change adaptation		0	54,600,000	Non-quantified targets	Indefinite	

ADAPTATION PROJECTS (INTEGRATED ADAPTATION SCENARIO)						
Projects	**Scenarios**	**Net emissions (Gg CO2)**	**Cost/ Investment (US$)**	**Targets**	**Number of beneficiaries**	**Project cost/ beneficiary (US$)**
OTHER VULNERABLE SECTORS (NAP)		**7**	**2,964,103,726**			
Housing and urban development sector		**6.5**	**2,918,154,526**		**16,017,000**	**182.2**
Mapping and marking of flood-risk zones in settlements of more than 5,000 inhabitants for climate change adaptation		0	167,580,000	399 settlements	11,500,000	14.6
Flood water management and flood prevention in the 13 regional capitals of Burkina Faso		0	2,646,000,000	2,700 km channels / culverts	2,500,000	1,058
Restoration and development of the Ouagadougou green belt		6.5	1,176,000	2,100 ha	2,000,000	0.59
Emphasis on local materials and promotion of wood and metal-free housing as a climate change adaptation in rural and semi-rural areas of Burkina Faso		0.0	98,828,926	19,152 private dwellings 2,298 community buildings	17,000	5,813
Energy efficiency in urban and rural housing		0	1,209,600	Gain of 50 Kwh/m2	Indefinite	
R&D on architectural and construction technologies adapted to climate change		0	3,360,000	Non-quantified targets	Indefinite	
Health sector		**0**	**38,329,200**		**74,000,000**	**0.52**
Strengthening of capabilities to forecast and respond to phenomena associated with climate change: total of 9 activities		0	4,788,000	Non-quantified targets	18,500,000	0,26
Development of research on health and climate change		0	1,551,200	Non-quantified targets	18,500,000	0.08
Strengthening of personnel competencies with respect to diseases sensitive to climate change: training of 1000 specialists		0	23,800,000	1000 trained specialists	18,500,000	1.29
Strengthening of capabilities to forecast and respond to phenomena associated with climate change: creation of an MT health monitoring centre		0	8,190,000	1 health monitoring centre	18,500,000	0.44
Early warning for the management of external climate events		0	7,620,000		37,000,000	0.21

ADAPTATION PROJECTS (INTEGRATED ADAPTATION SCENARIO)						
Projects	**Scenarios**	**Net emissions (Gg CO2)**	**Cost/ Investment (US$)**	**Targets**	**Number of beneficiaries**	**Project cost/ beneficiary (US$)**
Transfer of technologies for climatic, meteorological and environmental monitoring		0	5,229,400	11 hydro equipped stations; 50 automatic stations; 1 rehabilitated radar; 1 radiosonde instrument'; 1 satellite imagery instrument; 11 trained teams	18,500,000	0.28
Inclusion of efficient and effective use of hydrometeorological and environmental information in long-term development plans to generate early and seasonal alerts		0	2 390 600	Multiple targets	18 500 000	0.13

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