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Analysis of CDM experience in Morocco and lessons learnt for West African Economic and Monetary Union. Case study: Benin, Burkina Faso, Niger and Togo

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Niger and Togo**

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HWWA Discussion Paper

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ABSTRACT

This study assesses the CDM potential in Benin, Burkina Faso, Niger and Togo. Morocco has been used as an example, as it is quite advanced in developing an impressive CDM project portfolio. The study focuses not only on the absolute greenhouse gas abatement potential of these countries, but also assesses the comparative CDM endowment on the basis of an holistic analysis of each country, thereby highlighting the relative position of Benin, Burkina Faso, Niger and Togo in the global CDM market.

The competitiveness of these four members of the West African Economic and Monetary union is assessed taking into consideration three pillars, namely “Potential supply size – countries’ facts”, “Country business climate” and “Country CDM institutions and CDM project experience”.

Overall competitiveness is analysed, as well as which activities could best maximize opportunities to convert theoretical mitigation options into real CDM investments.

The case study countries have a similar CDM climate, characterised by a low CDM potential, low FDI inflows and low financial support from the international CDM community. These factors help explain the low CDM activities in these countries.

Currently, only small-scale CDM projects could be developed in these countries in energy efficiency and renewable energy sectors. As transaction costs and risks are high for these project types, it is likely that in the short- and mid-term, only special CDM project support programmes in LDC such as Community Development Climate Fund (CDCF), Bio Carbon Fund (BioCF) and Africa Assist may provide a chance for participation in the international CDM market.

Keywords: CDM potential, CDM viability factors, Energy intensity, energy consumption, CO₂ Emissions intensity, Country investment climate, CDM Institutions.

JEL classification: L70, L71, O11, O12, O14, O16, O55, Q20, Q40

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Abbreviations

ADB	African Development Bank
AFD	Agence Francaise de developpement
AFREPREN	AFRican Energy Policy Research Network
AREED	African Rural Energy Enterprise Development training programme (UN)
CC	Climate Change
CDM	Clean Development Mechanism
CEET	Centre for Energy Environment and Technology
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH4	Methane
CILES	West African Solar Energy Project
CO2	Carbon dioxide
CO2eq	Carbon dioxide equivalent
COP	Conference of Parties
DGE	Energy Administration
DNA	Designated National Authority
ECOWAS	Economic Community of West African States
EIA	Energy Information Administration
FCCC	Framework Convention on Climate Change
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gas
GNI	Gross National Income
GNESD	Global Network on Energy for Sustainable Development (UNEP)

GTZ	Gesellschaft Technische Zusammenarbeit (Germany)
IEA	International Energy Agency
IEPF	Institut de l'Énergie et de l'Environnement de la Francophonie
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land-Use Land-Use-Change Forestry
MCA	Multi Criteria Analysis
MDG	Millennium Development Goal
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organisation
N ₂ O	Nitrous oxide
NSS	National Strategy Study
ODA	Official Development Assistance / Overseas Development Agency
OECD	Organisation for Economic Co-operation and Development
PRSP	Poverty Reduction Strategy Paper
SME	Small and Medium-sized Enterprise
SSN	SouthSouthNorth
SSA	Sub-Saharan Africa
UN	United Nations
UN-DESA	United Nations Department of Economics and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organisation.
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme

UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
US	United States
WAEMU	West African Economic and Monetary Union
WAGPP	West African Gas Pipeline Project
WAPP	West African Power Pool
WB	World Bank
WEC	World Energy Council

1 INTRODUCTION

The countries to the Kyoto Protocol can develop and implement CDM projects. As CDM projects are costly, support from industrialised countries or funding institutions is crucial for the development of CDM activities in developing and Least Developed Countries (LDC). In addition, the experience in the international CDM market has shown that the potential volume of GHG emissions reduction could be highly correlated with the CDM perspective of a country. However, the absolute CDM potential alone may not guarantee a proportional volume of CDM investment flows into a country, as the absolute emissions reduction potential does not show the influence of other important factors of the investment decision such as political and economic risks, opportunity costs and market barriers, etc. (Dang et al., 2006).

For this reason, this study will not assess the CDM potential by focussing only on the absolute GHG abatement potential in the countries, but rather, the comparative CDM endowment on the basis of a holistic analysis of each country in terms of investment climate, institutional arrangements and CDM experience, as well as the economic viability factors, thereby showing the relative positions of Morocco, Benin, Burkina Faso, Niger and Togo in the international CDM market. Morocco is used as the reference case as its CDM activities are well developed and it is the second best CDM destination in Africa (Breuer 2006).

2 CDM POTENTIAL AND CDM ECONOMIC VIABILITY FACTORS

CDM is a market-driven mechanism, with CDM investment flows into a country influenced by both supply and demand side factors. These factors can be ‘endogenous’ (up to a host country itself) or ‘exogenous’ (up to investors and the international market) (Dang et al., 2006, p. 9ff.). Generally, *ceteris paribus*, CDM investments will flow to the countries that can generate cheap certified emission reductions (CERs) with sufficiently large volumes.

Given relatively high transaction costs of CDM projects compared to the relatively low prices of CERs in the carbon market, a CDM project must be large enough to be economically viable. This is thus a significant barrier for small host countries with small potential CDM projects. Several studies suggest a minimum size of above 20,000 t CO₂ per year for regular CDM projects even in the case that more approved baseline and monitoring methodologies become available (Michaelowa 2005). At present there is no information on the potential number of small scale CDM projects available. However, a study undertaken by Point Carbon (2002) concluded that the opportunity of making a business case of small scale CDM projects is relatively low since there are rather high risks involving such projects, and also constraints of additional transaction costs and issues related to simplified rules for them. The viability size of a project may vary considerably from one study to another, given the different assessments and assumptions for market factors such as demand, supply (and thus price) as well as projections on climate policy changes internationally and regionally. Obviously, a large number of projects with annual reductions of between 10-20,000 t CO₂-eq per year are submitted for validation, showing the effect of higher CER price expectations.

Up to now, the results of different projections show that about 70% of the CDM investments will be directed towards China and India (Michaelowa and Jotzo, 2005). Thus, the remaining 30% will be allocated among other developing and Less Developed Countries (LDCs), which must compete for that. Obviously, such an unequal distribution is against the spirit of the Kyoto Protocol. Nevertheless, the actual trends of the global carbon market do show that the CDM is dominated by a small number of countries¹ and a small number of high volume projects² (Dang et al., 2006, p. 9).

The next section will assess the potential volume of emission reductions that can be generated through CDM projects in the Moroccan context and the case study countries through top-down and bottom-up approaches.

1 Brazil, China, India and South Korea together have a share of about 75% of the expected CER volume until 2012; 32% of the volume will be achieved by just five projects (UNFCCC 2005).

2 These projects are industrial gases projects such as N₂O, CH₄ and HFC-23 emissions reduction projects (UNFCCC 2005).

2.1 Top-down approach: CDM potential at national level

A top-down assessment of a country's CDM potential is generally based on national studies such as "national communications" which communicate emissions reduction potentials at the national level. Most of the time, indicators linked to the energy profile are used.

2.1.1 National energy profile

i) Primary energy potential

The energy resource endowment of a country is an important factor in the economic development prospects of the country. In this section, the absolute primary energy potential is used as a measure of energy endowment (see table 1) due to its high correlation with a country's trends in energy production and use. The last column of the table shows the results of the countries' energy endowment ranking.

From the table, Morocco is endowed with hydro, wind and solar energy. The country has some reserves of fossil fuel energy which is not that large.

Morocco is endowed with a huge potential of wind, namely, about 6,000 MW with a wind speed of around 8-11 m/s which is among the most important in the world.³ Currently, around 1.4% of this potential contributes to the electricity supply

(EIA 2004b).

³ For more details see: www.eia.doc.gov/emeu/cabs/morocco.html .

Table 1: Primary energy potential

Country	Energy type							Resource endowment ranking
	Oil reserve (million barrels)	Natural gas reserve (billion cubic feet)	Coal reserve (Mt)	Hydro-power resource (GW)	Wood fuels (million m3)	Wind energy resource (GW)	Solar energy resource (kWh/m ² /day)	
Morocco	2	43	0	5	2.9	6	5.6	1
Benin	8	40	0	0.7	6	0.1	6.5	2
Burkina Faso	0	0	0	0.2	11	N.A	6.5	4
Niger	0	0	Anthracite: 77	0.2	8	N.A	6	3
Togo	0	0	0	0.4	6	0.06	5.5	5

Source: Official energy statistics from the U.S. Government, EIA (2004a), EIA (2005), FAO (2005), DGE Benin (2003), DGE Burkina Faso (2003), ONE (2001).

As far as solar energy is concerned, the country is exposed to a direct solar irradiation which varies between 4.7 to 5.6 kWh/m² per day. Furthermore, Morocco has around 2,800 to 3,400 hours of sunshine per annum (IEA 2001a; IEPF 2001). Currently some applications to tap the solar energy are in use.

As far as hydroelectricity is concerned, the country has a potential of around 5 GW. Currently only 23% (roughly 1,167 MW) is used for electricity generation. Furthermore, hydroelectricity contributes to about 6% of total electricity supply (EIA 2004b). Due to recurring droughts, the main water sources are used for irrigation and household water services. This explains the steady decrease in hydroelectricity contribution to electricity production. In 2002, the contribution decreased to about 2.4% as compared with 2001 (ONE 2002).

In contrast to Morocco, the primary energy endowment in Benin, Burkina Faso and Togo is lower.

As far as CDM project eligibility is concerned, the richer in primary resources a country is, the higher the potential for CDM development they may have. Hence, theoretically Morocco has a higher CDM potential compared to the studied countries.

ii) Energy consumption

The endowment of resources is an indication of a potential positive development in a country but it does not necessarily show the country's economic development level, for example, in the case of Japan. The present research therefore examines indicators linked to the actual energy consumption of Morocco and the studied countries. To show the link between an economy and energy consumption indicators, the GDP per capita is incorporated with energy indicators in table 2. From the table, it is seen that total energy consumption as well as per capita energy consumption is higher in Morocco than in the studied countries. In addition, the per capita energy consumption in Morocco is about 23% higher than in Benin.

Between the studied countries, per capita energy consumption in Benin is higher than the other countries.

Table 2: Energy-consumption indicators in 2004

Country	Total energy consumption (TWh)	Per capita energy consumption (kWh/year)	Energy intensity (kWh/\$2000)	GDP- per capita purchasing power parity (\$)
Morocco	143	4,748	3.8	4,300
Benin	76	1,114	2.77	1,070
Burkina Faso	50	410	1.68	1,100
Niger	46	381	2.43	800
Togo	58	1,026	3.98	1,480

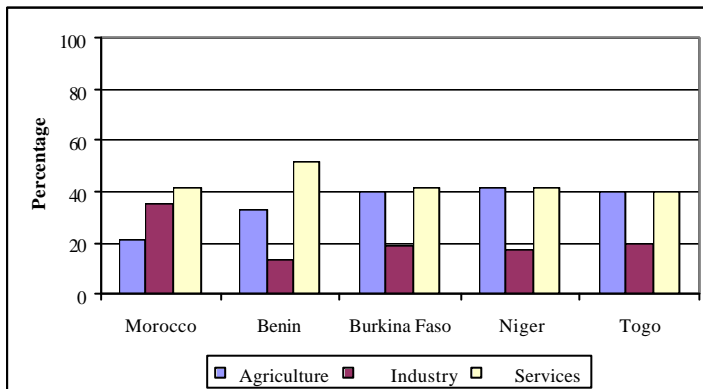
Source: World Fact Book (2005), EIA (2005), Official Energy Statistics from the U.S. Government.

The ratio of energy use to GDP provides a measure of energy intensity. Differences in this ratio over time and across countries may reflect structural changes in the economy, changes in the energy efficiency of particular sectors, and differences in fuel mixes. Furthermore, energy consumption will continue to decline as energy efficiency improves. In order to better analyse the possibility to improve energy efficiency in the countries, we supplement the results in table 2 with the structure of the GDP as shown in figure 1 below. The figure shows that agriculture (more than 20%) and services (more than 40%) are the major contributors in the countries. Furthermore,

industrialisation is around 35% in Morocco, while it is less than 20% on average in the studied countries.

From what has been discussed so far, it is obvious that GDP per capita and the share of GDP by industry and service are proportional to the level of energy consumption. The lowest values in GDP per capita in the studied countries and the high dependence of their economies on agriculture are in line with the very low energy consumption. Although the energy consumption in Togo is higher than in Morocco, this does not necessarily imply that Togo is more industrialised than Morocco, as the value could be a reflection of high inefficiency in the usage of the energy resources.

Figure 1: GDP structure by sector in 2005



Source: World Fact Book 2005

The analysis of the GDP per capita and energy consumption per capita in OECD countries and non-OECD countries has shown a non-linear correlation between the potential to improve energy efficiency and the economic development status in terms of GDP per capita (Sakamoto 2003). The link can be differentiated with respect to the three levels of GDP per capita as summarised below:

- 1st stage: low GDP per capita → improvement of energy efficiency
- 2nd stage: middle GDP per capita → deterioration of energy efficiency
- 3rd stage: high GDP per capita → improvement of energy efficiency

The analysis of the three development stages shows that the case study countries are at the first stage. This implies that theoretically, there are possibilities to develop CDM projects from improving energy efficiency in their economies.

The carbon dioxide emission reduction potential in a country is also an indicator for CDM investors. The next section analyse this indicator in the energy sector.

iii) Carbon dioxide emissions from the energy sector

The potential emission reduction in a country is an important indicator⁴ for CDM investment decision making. This research focuses on the potential CO₂ emission from the energy sector only since it deals with CDM in the energy sector. The potential of CO₂ emissions reduction in the countries will be analysed based on the per capita CO₂ emissions, the CO₂ intensity and the potential to generate carbon emissions reduction as shown in table 3 below.

The three indicators can be summarised as follows:

- Potential to produce emission reduction: assessed through a country's share of the world emissions⁵
- Potential to improve energy efficiency (absolute value reflected by energy intensity)
- Potential to switching fuel (absolute value reflected by CO₂ intensity)

To assess the potential to improve energy efficiency and switching fuel, energy intensity and carbon dioxide intensity values of the countries are compared with the US values used as a scale unit (100%).

4 There are other important factors such as low carbon dioxide abatement cost, short lead-time to develop a project, relative easy additionality test process and relative easy baseline determination (Dang et al., 2006).

5 The absolute value is shown by total carbon dioxide emissions from the consumption and flaring of fossil fuels emission (Dang et al., 2006).

Table 3: Energy-related CO2 emissions 2003

Country	CO2 emissions from the consumption and flaring of fossil fuel (million tonnes)	Per capita CO2 emissions (tonnes)	CO2 intensity (metric tonnes/thousand \$2000)
Morocco	33.74	1.27	0.88
Benin	1.72	0.3	0.63
Burkina Faso	1.12	0.1	0.36
Niger	1.22	0.1	0.64
Togo	1.23	0.4	0.88

Source: EIA (2004).

The results of the assessment are shown in the last column in table 4 below.

From table 4, it is obvious that the scope for CO₂ emissions is very limited or low in Benin, Burkina Faso, Niger and Togo, while it is high in Morocco. However, the increase in industrialisation in the studied countries in the future may change this figure.

The top-down assessment discussed so far does not take into consideration all factors which influence the CDM potential in a country. A realistic CDM potential can be assessed through the bottom-up approach discussed in the next section.

Table 4: Scope for emission reductions (data for the year 2003)

Country	Total CO2 emission		Energy intensity		Carbon intensity		Scope for emission reductions
	% contribution to world's emission	Potential to generate emission reductions	vs. U.S value of 2.3 kWh/\$ 2000 (100%)	Potential to improve energy efficiency	vs. U.S. value of 0.56 metric tonnes/ thousand \$ 2000 (100%)	Potential to switching fuel	
Morocco	1.3	Very high	164	High	157	High	High
Benin	0.07	Very low	120	High	112	High	Low
Burkina Faso	0.04	Very low	73	Low	64	Low	Low
Niger	0.05	Very low	105	High	114	High	Low
Togo	0.05	Very low	173	High	157	High	Low

Source: World Fact Book (2005), EIA (2005), Official Energy Statistics from the U.S. Government

2.1.2 Bottom-up approach–CDM potential by sector

This section analyses important factors influencing CDM potential of a country, which are not taken into consideration by the top-down assessment approach. In fact, important market factors such as lead-time, baseline and additionality assessment and

the marginal emissions abatement cost significantly influence a country's CDM potential and competitiveness on the world CDM market.

Cost per CER differs strongly between sectors within a country. Furthermore, it is compared internationally when CDM investors or CER buyers make their investment decision. Hence, a least-cost CDM option at national level can be considered a high-cost option in the international CDM market.⁶ The lead-time factor, in turn, deals with the period of time required to develop a project from the project idea to its implementation. This period of time differs from project to project and is project category specific.⁷ A short project lead-time combined with the low abatement cost can increase the internal rate of return (IRR) of a project. As far as baseline and additionality assessment are concerned, CDM investors are looking for projects for which these factors are easily assessed. The discussion so far is summarised in table 5 below. The table presents the attractiveness criteria in the first column and the preferred values by CDM investors in the last column. It could be the case that a CDM project, which is viewed as the best option at national level, does not fulfil the preference criteria of the investors and is thus not competitive in the global CDM market. Hence, these factors influence the CDM potential and consequently the attractiveness of a country.

Table 5: Matrix of attractiveness factor of CDM Projects

Criteria	Possible value	Preferred value
1. CO ₂ abatement costs	Very low – very High	Very low
2. CO ₂ abatement size	Very low – very High	Very high
3. Challenging assessment of baseline and additionality	Very low – very High	Very low
4. Lead time	Very low – very High	Low

Source: Adapted from Dang et al., (2006).

As these factors are not considered by the top-down approach but by the bottom-up assessment, the current assessment combines the two assessment methods in order to carry out a more comprehensive assessment of a country's CDM potential as shown in

6 For example, F_{gas} and N₂O emissions reduction projects can generate a huge amount of CERs per year compared to CO₂ abatement projects. Hence, they offer a least-cost abatement option and are preferred by CDM investors (Dang et al., 2006, p.16f.).

7 The current experience in developing CDM projects reveals that lead-time for large CDM projects may reach four to nine years (Dang, et al., 2006, p.16).

table 6 to 11 below. On the basis of tables 6 to 11, the realistic CDM potential of the countries is analysed.

The information on Morocco has been extracted from the DNA website.⁸ As for the WAEMU countries, the information originates from the United Nations Industrial Development Organisation⁹ (UNIDO) 2006, IEPF (2004)¹⁰ and the National Communications.

An analysis of tables 6 to 11 reveals that Morocco has CDM project potential in almost all project categories apart from transportation, fugitive emissions control and industrial gases. Furthermore, it has CDM projects in the pipeline, with the projects at different development stages, while there is only small scale CDM project potential in the WAEMU countries in energy efficiency in administration buildings and in households and renewable energy sectors. Currently there is no CDM project idea notified (UNIDO 2006).

The discussion made so far on the WAEMU countries points out that:

- The countries have medium primary energy endowment,
- Their energy consumption is very low, and
- Their contribution to the world emissions is very low and the CO₂ abatement possibilities are low.

Furthermore, although there are currently no CDM projects done, there exist some possibilities in energy efficiency and renewable energy, which can be developed. The prospective CDM projects in the studied countries can only be small-scale projects such as improved cook stoves, mini- and micro-hydroelectricity, agriculture residues used for energy generation and small wind projects¹¹. Of course, the local development impact of these projects is relatively high. However, as shown and discussed in table 5, these project categories are not likely to be supported by carbon investors at least in the first

8 www.cdmmaroc.com.

9 The United Nations Industrial Development Organisation presented a report on potential CDM sectors in most of french speaking countries in Africa. For more details see: www.unido.org/doc45989

10 IEPF states for Institut de l'Energie et de l'Environnement de la Francophonie. It provides valuable information on energy states in french speaking countries.

11 Due to high investment costs, Photo Voltaic can not be currently considered under CDM.

commitment period. High transaction costs and high risk levels decrease the competitiveness of these projects on the international CDM market (Dang et al., 2006, p. 22).

Based on the circumstances in Benin, Burkina Faso, Niger and Togo and the current preferred project categories by the CDM investors, it is challenging for the countries to compete on the world carbon market.

As for Morocco, it has a large and diversified range of CDM projects at different development stages. Currently, the country has a portfolio of 58 projects, of which 53 are in the energy sector¹². As at October 2006, three Moroccan CDM projects have already been registered by the CDM Executive Board.¹³

The discussion on Morocco so far can be summarised as follows:

- The country has high primary energy endowment,
- It has relatively high energy consumption, and
- It has high CO₂ emissions abatement potential.

These important indicators can partly explain the extensive CDM project activity in Morocco.

Although Morocco has an impressive CDM portfolio, there is no CDM project which lies in the investors' most preferred CDM categories. However, there are about 13 project ideas that can deliver at least 100,000¹⁴ CERs per year.

Furthermore, the issue why of the large project pipeline in Morocco only a limited number has been registered so far is beyond the scope of the current research. Nonetheless, the research analyses in the following section the circumstances, such as

12 The data from the Moroccan CDM project portfolio show the status as at June 2006. For more details, see: www.cdmmaroc.com.

13 The registered CDM projects are: Essaouira windpower project, Tétouan wind farm project and Photovoltaic kit to light rural households in Morocco. For more details, see: UNFCCC website.

14 The 100 thousand CERs threshold is provided by recent studies which indicated that projects delivering less than this minimum per year are unlikely to be cost-effective under the CDM (Haïtes 2004). For more details on projects' CERs generation per year, see: www.cdmmaroc.com.

local investment climate, that lead to the high CDM project activity in Morocco and lessons that could be drawn for the studied countries in WAEMU.

Table 6: Sectoral CDM opportunities

Mitigation options	CER cost range	Abatement size	Difficulty in assessing additionality and baseline	Lead time	Morocco	Benin	Burkina Faso	Niger	Togo
Energy efficiency									
Industrial boiler	Low	Low-medium	Medium	Low	xxx	--	--	--	--
Cement manufacture (blending old fuels)	Low	Medium	Medium	Medium	xxx	x	x	x	x
Substitution of incandescent lamps with fluorescent lamps	Low	Low-medium	Medium	Medium	x and xxx	x	x	x	x
Cooking stoves	Low	Low	Medium - High	Medium	--	x	x	x	x

x: small size available xx: medium size available xxx: large size available --: not available

Source: Own table.

Table 7 Sectoral CDM opportunities (continued)

Mitigation options	CER cost range	Abatement size	Difficulty in assessing additionality and baseline	Lead time	Morocco	Benin	Burkina Faso	Niger	Togo
Energy efficiency (continued)									
Energy savings in building	Low	Low	Medium	Medium	x and xxx	x	x	x	x
Waste heat recovery in heavy industry (Sulphur, paper industries)	Low	Medium	Medium	Medium	xxx	--	--	--	--

x: small size available xx: medium size available xxx: large size available --: not available

Table 8 Sectoral CDM opportunities (continued)

Mitigation options	CER cost range	Abatement size	Difficulty in assessing additionality and baseline	Lead time	Morocco	Benin	Burkina Faso	Niger	Togo
Energy efficiency – Power generation									
Thermal renovation and modernisation	High	Medium-high	Medium	Low-medium	Xxx	x	x	x	x
Co-generation	Low	Medium	Medium	Medium	x and xxx	--	--	--	--
Renewable energy									
Wind power	High	Medium	High	Medium	x and xxx	x and xx	--	--	x and xx
Mini hydro power plants	Low – medium	Low	High	Medium	--	x and xx,	x and xx	x and xx,	x and xx
Large hydro power plants	Medium	High	High	High	xx	xxx	--	xxx	--

x: small size available xx: medium size available xxx: large size available --: not available

Table 9 Sectoral CDM opportunities (continued)

Mitigation options	CER cost range	Abatement size	Difficulty in assessing additionality and baseline	Lead time	Morocco	Benin	Burkina Faso	Niger	Togo
Renewable energy (continued)									
Solar power	Very high	Low	High	Medium	x and xxx	x and xx	x and xx	x and xx	x and xx
Geothermal power plant	Medium-High	Medium-High	High	High	--	--	--	--	--
Biomass	Low-Medium	Medium	High	Medium	x	x	x	--	x
Transportation									
Fuel switching	Medium	Low-medium	High	Medium	--	--	--	--	--
Public transportation	High	Low	High	Medium	--	--	--	--	--

x: small size available xx: medium size available xxx: large size available --: not available

Table 10 Sectoral CDM opportunities (continued)

Mitigation options	CER cost range	Abatement size	Difficulty in assessing additionality and baseline	Lead time	Morocco	Benin	Burkina Faso	Niger	Togo
Fugitive emissions control									
Landfill gas (LFG)	Low	Medium-High	Low	Medium	Xxx	x	x	x	x
Associated gas from oil production	Low	Very high	Low	Medium	--	--	--	--	--
Methane capture from agriculture waste	Medium	Medium-High	High	Medium	--	x	x	x	x
Coal mine/bed methane	Low	High	Low	Medium		--	--	--	--

x: small size available xx: medium size available xxx: large size available --: not available

Table 11 Sectoral CDM opportunities (continued)

Mitigation Options	CER cost range	Abatement size	Difficulty in assessing additionality and baseline	Lead time	Morocco	Benin	Burkina Faso	Niger	Togo
Industrial gases									
N ₂ O – nitric acid	Very low	High	Low	Medium	--	--	--	--	--
PFC aluminium	Low	High	Medium	Medium	--	--	--	--	--
N ₂ O – adipic acid	Very low	Very high	Low	Medium	--	--	--	--	--
HFC 23	Very low	Very high	Low	Medium	--	--	--	--	--

x: small size available xx: medium size available xxx: large size available -- : not available

3 COUNTRY INVESTMENT CLIMATE

3.1 Investment climate and CDM investment attractiveness

The investment climate is another important parameter in assessing the competitiveness of a country for CDM investment. This attractiveness is often considered based on the favourableness of the general investment climate and associated level of financial and investment risks. Foreign Direct Investment (FDI) means investment in one country by firms owned in another country. Attracting foreign direct investment is at the top of the agenda for most countries, especially developing countries. The total FDI level gives an overview of the general investment climate in a country. Furthermore, it gives an indication of possible relationships between the type of favourable conditions that attract FDI and the possibility to successfully develop and implement CDM projects. A recent research analysed the actual (FDI) and official development assistance (ODA) flows and potential CDM investment flow and showed that the countries expecting to supply the most credits from the proposed CDM projects are also often the countries which are recipients of an important share of the total FDI flows (Ellis et al., 2004).

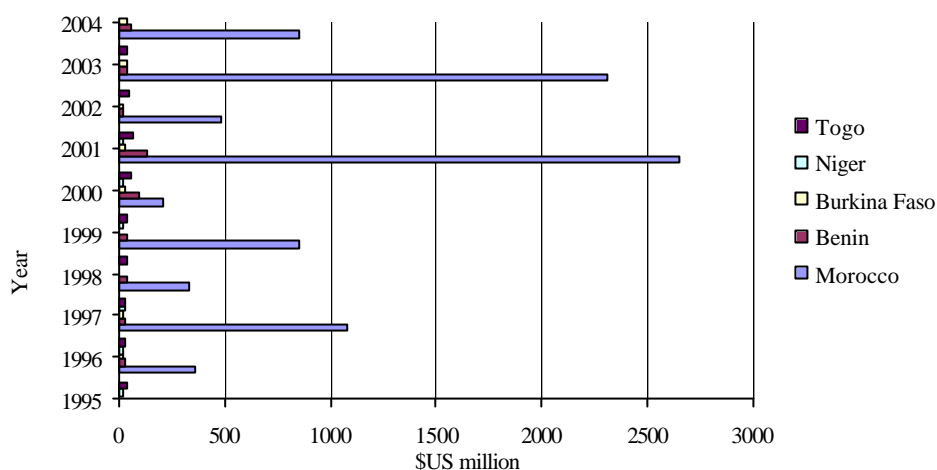
This section analyses the investment climate in Morocco, compares it with the WAEMU countries and assesses the implications for the potential flow of CDM projects.

3.2 Investment climate in Morocco and the studied countries

In the 1970s and 1980s, Benin, Burkina Faso, Niger and Togo nationalised their economies. All economic sectors were owned by governments. The bad governance and unorthodox administration of the economic facilities led to a productivity decline in the economic sectors. Subsequently, all the countries experienced bankruptcy in the mid 1990s. To reverse the economic decline that began in the 1970s, many Sub-Saharan countries initiated programs to restructure their economies in order to pave the way for long-term development and prosperity. Hence, the countries were engaged in the privatisation of their economies in order to make the private sector contribute to the

economic development. Nonetheless, the economic restructuring efforts undertaken were not sufficient to positively influence the main determinants of FDI flows¹⁵ (World Bank 2005).

Figure 2: FDI inflows for the period 1995-2004



Source: UNCTAD/WRI 2005, p. 303f.

Figure 2 shows the FDI inflows from 1995 to 2004.

From Figure 2, it is obvious that the overall FDI inflows are very low in the WAEMU countries compared to Morocco. Some of the changes shown in Figure 2 are described below:

The downturn in Moroccan FDI in 2002 – represents a return to normal levels following an exceptionally large acquisition in the telecommunications sector in 2001 (UNCTAD 2005). Privatisation has periodically influenced the volume of FDI inflows. The increase in Benin’s FDI in 2001 can be explained by the privatisation policy in telecommunications, water, electricity, and agriculture. The decrease in 2004, on the other hand, can be explained by the incapability of the government to successfully complete the privatisation process. The low FDI inflows in Burkina Faso during the

¹⁵ The World Bank research on investment climate in the studied countries showed that due to corruption, on average almost 8.5% of firms’ annual revenue disappeared into “informal payments” so that the private sector perceived corruption to be the most severe constraint they face.

As for regulations and their enforcement, about 65% of the private sector do not trust the judiciary to enforce their property right and 54% considered the administration inefficient in its dealing with the private sector. This leads to the fact that entrepreneurs spend on average 10% of their working time dealing with bureaucratic

period can be explained by the relatively late privatisation process and the relative political instability compared to Benin, which introduced democracy in the 1990s. The lowest point in 1998 can be explained by the non- implementation of the liberalisation decision made by the government. FDI flows in Niger are attributed especially to the uranium investors. The high poverty prevailing in the country does not help provide any confidence to foreign investors.

In sum, overall FDI level in the studied countries is very low at around 1.4 % of GDP, compared to 2.3 % for Sub-Saharan region (UNCTAD 2005), despite efforts in economic restructuring and privatisation of public utilities. This could be explained by the lack of transparency¹⁶ in the privatisation process and economic restructuring programmes. According to an investment attractiveness ranking for 155 countries done in 2006, Benin, Burkina Faso, Niger and Togo ranked 129, 145, 150, 149 respectively (World Bank 2006). Hence, these WAEMU countries have a dismal environment to attract FDI.

Kyoto-Coaching-Cologne¹⁷ developed a CDM investment climate index¹⁸ (CDM ICI) in order to assess the investment environment for CDM in a host country. The scale ranges from 0 (representing unsatisfactory conditions) to 100 (representing very good conditions to attract CDM projects). The result of the ranking done for 52 African countries shown in table 12 reveals that Benin, Burkina Faso, Niger and Togo ranked

procedures. As far as infrastructure is concerned, 62% of the private sector declared that on average, 7.6% output loss is due to electricity supply problems (World Bank 2005). For more information, see: www.worldbank.org.

16 For example, concerns have emerged on the transparency of some privatisations. In particular, the sale of 55% of the Société nationale de commercialisation des produits pétroliers (Sonacop, the petroleum distribution company) came under scrutiny in 1999 when it was purchased by La Continentale des pétroles et investissements, a local company owned by an influential businessman and politician, Séfou Fagbohoun, who is close to Mr Kérékou, former president. In fact, the Sonacops' capital was used to purchase it with support of a local bank managing director (BCEAO 2002). See also www.eiu.com.

17 A joint venture of TÜV Immissionsschutz und Energiesysteme GmbH (a subsidiary of TÜV Rheinland Group) and DEG - Deutsche Investitions- und Entwicklungsgesellschaft mbH.

18 The CDM investment climate index involved parameters such as: the Institutional Investor Country Rating (based on the macroeconomic environment index, the public institutions index and the technology index), The Transparency International Corruption Perceptions Index - the ratification of the Kyoto Protocol - The appointment of a Designated National Authority - Acceptance of a methodology or registration of a project by the Executive Board - the purchase of climate certificates by selected international funds. These indicators together give an indication of the investment climate and the efforts of a country in implementing CDM projects. It is of course not a perfect index. Nonetheless it gives an overview on the general requirement to implement a CDM project in a country. For more details see: www.kyoto-coaching-cologne.net. For the full ranking results see Appendix 1.

13, 14, 23, 41 respectively, thus average, below average and unsatisfactory respectively, while Morocco is the second best destination after South Africa (KCC 2006).

Table 12: African countries ranking according to CDM ICI

Rang	Country	CDM index value	Note
1	South Africa	79.4	Good
2	Morocco	60.9	Satisfactory
3	Egypt	60.3	Satisfactory
...
13	Benin	37.9	Average
14	Burkina Faso	37.8	Average
...
23	Niger	34.6	Below average
...
41	Togo	18.8	Unsatisfactory
...
52	Central African R.	4.9	Unsatisfactory

Source: KCC (2006).

The trend of FDI flows and investor experience in doing FDI projects in Benin, Burkina Faso, Niger and Togo reveal unsatisfactory conditions to attract CDM investors to invest in these countries. In contrary, in Morocco, better circumstances exist to attract CDM projects, as compared to the studied countries. Even if a country shows good conditions to attract CDM projects, specific institutional arrangements at national level must be set up in order to be in line with the international CDM requirements. This issue is analysed in the next section.

4 CDM INSTITUTIONS AND CDM PROJECT EXPERIENCE IN CASE STUDY COUNTRIES

Participation in the CDM process requires institutional arrangements, such as inter alia, the ratification of the Kyoto Protocol and the notification of the DNA. This section analyses the state of compliance by the WAEMU countries with the requirements and the particular circumstances that helped Morocco develop its CDM portfolio. The analysis is based on information available on the UNFCCC website and in National Communications as well as on the CDM website of Morocco. The analysis focuses on the Kyoto Protocol ratification, notification of DNA, status of CDM-relevant regulations and involvement of local stakeholders in the CDM process. Table 13 below summarises CDM status and activities of the countries studied. In the last column of the

table, the main CDM-capacity building providers and supporters of other aspects of CDM as well as local actors participating in the CDM process are listed.

Table 13: CDM institutions in Morocco, Benin, Burkina Faso, Niger and Togo

	National focal point location	1st National Communications	Kyoto Protocol ratification	DNA	CDM Projects in pipeline/registered by CDM EB	Actors active in the country
Morocco	Ministry of territorial planing, Water and Environment	November 2001	25/01/02	Operational	58 projects 3 registered	UNEP/UNDP Germany, France, Italy, Netherlands Local actors**
Benin	Ministry of Environment, Habitation and Urbanisation	December 2001	25/02/02	Notified	0	AFD, IEPF, UNIDO Local actors**
Burkina Faso	SP/CONEDD*	December 2001	29/06/05	Notified	0	AFD, IEPF, UNIDO, Local actors**
Niger	Cabinet of Prime Minister	November 2000	30/09/04	Notified	0	AFD, IEPF, UNIDO, Local actors**
Togo	Ministry of Environment and Forest Resources	November 2001	02/07/04	Not notified	0	AFD, IEPF, UNIDO, Local actors**

* SP/CONEDD Permanent Secretariat of National Environment and Sustainable Development Council.

** Local actors identified are: Ministries, research institutions, the private sector and environmental NGOs.

Source: Own compilation based on UNFCCC, UNDP website.

4.1 Morocco

The Moroccan DNA is composed of the Conseil National pour le MDP (CN MDP) and the Secretariat permanent pour le MDP (SP CDM). The CN MDP is responsible for the compliance of the local CDM with the international requirements of the Kyoto Protocol, while the SP MDP deals with CDM project development and compliance with local CDM regulation, such as compliance with sustainable development criteria. The CN MDP is chaired by the Ministry of Land Planing, Water and environment and involves many ministries as well as representatives of enterprises, banks and research institutes.¹⁹

¹⁹ For more details see www.mdpmaroc.com.

As far as CDM approval procedures are concerned, a two-step decision-making has been adopted at national level. First, the project developers submit the Project Identification Note (PIN) with standardised contents to the SP MDP. The submitted project is assessed against national CDM requirements and decision on acceptance or rejection of the project is made within two weeks. Second, the project is checked for conformity with the Kyoto Protocol requirements. As the Moroccan national regulation requires an environmental impact assessment, this is done before a Host Country Approval (HCA) is delivered. This second assessment phase is not allowed to exceed four weeks.²⁰

A set of sustainable development criteria exists and a sustainability assessment procedure is set up. All relevant information on CDM activities and investment climate in Morocco has been made available on the DNA website. Obviously, Morocco has developed almost all relevant requirements to facilitate CDM climate at national level. This helped Morocco to be one of the CDM-leading countries in Africa. As far as CDM experience is concerned, endogenous and exogenous factors contributed to the relative CDM success in Morocco. Morocco is highly dependent on fossil fuel imports. As the international oil price is steadily increasing, an increasing burden is made on the foreign exchange reserves.²¹ This energy dependence led to the adoption of policy decisions to increase the contribution of the renewable energy in the energy balance up to 10% by 2011 (EIA 2004a,b). In addition the electricity sector was engaged in a liberalisation process and the Moroccan government has set up the Fonds de Depollution Industrielle (FODEP), in order to promote investment in energy efficiency. Exogenous factors refer to international programmes that provide financial support to the improvement of the CDM local climate and capacity development to local CDM project developers or actors. In fact, Morocco profited from a three-year programme by the United Nations (UNDP/UNEP) to develop and implement the national strategy for CDM, completed in 2005²² (UNEP 2005). Moreover, the World Bank, France and Germany supported

20 For more details see www.mdpmaroc.com .

21 The Moroccan energy deficit for 2003 reached around US\$ 2 billion. For more details see ONE report 2004.

22 For more details, see: www.unep.org or www.cd4cdm.org .

different aspects of CDM projects²³ in the country. Furthermore, the recent bilateral accords on CDM with France, Italy, Japan, Canada and Denmark (Breuer 2006) gave more hope to the local CDM community.

4.2 Case study countries

As far as Benin, Burkina Faso, Niger and Togo are concerned, they have very similar CDM institutions, but very different from the Moroccans' case.

Despite having notified their DNA, none of these countries has an operational DNA. In fact, no CDM sustainable development criteria and no CDM approval procedure are available (UNIDO 2006). As far as CDM experience is concerned, CDM activities are supported by IEPF, UNIDO and AFD. Currently, no CDM project pipeline is available. Table 14 below summarises the CDM activities to date. Three workshops on CDM have been organised in Burkina Faso (2001, 2003 and 2005), and two in Niger. In Benin and Togo no direct CDM workshops were organised, but representatives from the countries have participated in the workshops held in Burkina Faso. Most of the time, these workshops dealt with general issues on Kyoto Protocol and CDM. Moreover, the key issues on CDM such as baseline determination and additionality assessment were not addressed.

Table 14: CDM activities

	CDM capacity building	Sustainable development criteria definition	National CDM approval procedure	CDM project idea in energy sector
Benin	-	Not completed	Not available	Renewable energy Energy efficiency
Burkina Faso	3 workshops	Not completed	Not available	
Niger	2 workshops	Not completed	Not available	
Togo	-	Not completed	Not available	

Source: UNIDO (2006).

In 2004 for the first time, the French Development Cooperation (AFD) and the Fonds Francais pour l'Environnement Mondiale (FFEM), in cooperation with the World Bank,

²³ For example, the KfW participated in several renewable energy project (Essaouira windpark and photovoltaic project in rural area). In addition, the World Bank is willing to support promotion of landfill gas under CDM (Breuer 2006).

set up a fund and announced the creation of the “Africa Assist” initiative. Africa Assist is intended to support CDM development in Africa marginalised in the CDM market. The main objectives are:

- Develop 40 CDM projects in important CDM sectors in Africa,
- Gather and inform potential local CDM actors,
- Create national network between local experts, banks and other stakeholders in order to promote CDM project development,
- Strengthen institutional arrangement for CDM development,
- Support DNA set up.

The AFD contributed 2 million euros out of 10 million euros²⁴ to the fund (AFD 2006). Under Africa Assist, two international workshops have been organised, one in Canada 2005, and the other in France 2006. An analysis of the objectives reveals that a clear CDM-capacity building, which is the first step to success of the CDM, is missing, compared to the UNEP/UNDP programme for Morocco. Furthermore, clarity on the allocation of the budget over the objectives is not available. It is too early to assess the achievements of the programme, but it is obvious that the studied countries do not have an operational DNA, CDM sustainable development criteria, and CDM approval procedure (UNIDO 2006). In addition, based on the survey made in the studied countries, stakeholder information on the CDM process is unsatisfactory.

From what has been discussed so far, conditions for CDM development in the studied WAEMU countries are not fully in place and could partly explain the few CDM activities.

24 For more details see: www.afd.fr .

5 LESSONS LEARNT

From the discussion made so far, it is obvious that CDM potential in Morocco is relatively high. The economic restructuring underway led to the increase in FDI flows. In addition, many CDM investors provided Morocco with a coherent CDM capacity building programme. All these factors contributed to the development of the extensive and diversified CDM project portfolio.

In respect of the countries studied, the low CDM potential in these countries, the low FDI flows (due to high risks), coupled with the low financial support from the CDM investor community can help explain the low CDM activities in these countries.

Currently, only small-scale CDM projects could be developed in the studied countries in energy efficiency and renewable energy sectors. As transaction costs and risks are high for these project categories, they may not sustain the competition in the international CDM market. Furthermore, they are not the most preferred CDM projects by CDM investors. Hence, it is likely that in the short and mid term, only special CDM project support programmes in LDC such as Community Development Climate Fund (CDCF), Africa Assist, Bio Carbon Fund (BioCF), etc. may provide a chance for the studied countries to participate in the international CDM market.

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Appendix

Appendix 1: African countries ranking according to CDM ICI

Rang	Country	CDM index value	Note
1	South Africa	79.4	Good
2	Morocco	60.9	Satisfactory
3	Egypt	60.3	Satisfactory
4	Tunisia	53.1	Average
5	Mauritius	51.3	Average
6	Uganda	50.2	Average
7	Zambia	44.6	Average
8	Botswana	43.6	Average
9	Ghana	41.6	Average
10	Senegal	41.5	Average
11	Nigeria	38.4	Average
12	Republic Tanzania	38.1	Average
13	Benin	37.9	Average
14	Burkina Faso	37.8	Average
15	Kenya	37.8	Average
16	Mali	37.736.0	Average
17	Madagascar	36.0	Below average
18	Namibia	35.5	Below average
19	Malawi	35.4	Below average
20	Ethiopia	35.0	Below average
21	Algeria	34.8	Below average
22	Rwanda	34.8	Below average
23	Niger	34.6	Below average
14	D. R. Congo	31.9	Below average
25	Liberia	31.7	Below average
26	Guinea	30.4	Below average
27	Lesotho	28.5	Below average
28	Swaziland	27.7	Below average
29	Seychelles	26.5	Below average
30	Mozambique	26.2	Below average
31	Cape Verde	24.7	Unsatisfactory
32	Gambia	23.8	Unsatisfactory
33	Cameroon	23.7	Unsatisfactory
34	Eritrea	22.1	Unsatisfactory
35	Djibouti	21.7	Unsatisfactory
36	Sudan	20.4	Unsatisfactory
37	Burundi	20.1	Unsatisfactory
38	Libyan	19.8	Unsatisfactory
39	Mauritania	19.6	Unsatisfactory
40	Zimbabwe	19.6	Unsatisfactory
41	Togo	18.8	Unsatisfactory
42	Guinea-Bissau	17.0	Unsatisfactory
43	Gabon	11.3	Unsatisfactory
44	Angola	9.5	Unsatisfactory
45	Chad	8.8	Unsatisfactory
46	Congo	8.6	Unsatisfactory
47	Côte d'Ivoire	8.3	Unsatisfactory
48	Sierra Leone	7.4	Unsatisfactory
49	Sao Tome	7.1	Unsatisfactory
50	Somalia	6.3	Unsatisfactory
51	Comoros	5.4	Unsatisfactory
52	Central African R.	4.9	Unsatisfactory

Source: KCC 2006

Appendix 2: FDI inflows, by country, 1995-2004(US\$ million)

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Morocco	335	357	1079	329	850	201	2658	481	2314	853
Benin	8	25	26	35	31	97	131	14	45	60
Burkina Faso	10	17	13	10	10	23	26	15	29	35
Niger	16	20	25	9	15	19	13	2	11	20
Togo	38	27	23	42	35	57	67	53	34	60

Source:UNCTAD 2000-2005